Guideposts in Time: The Scope and Currency of Intergenerational Climate Justice

by

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Introduction

A. Three calamities

It is September, 2008, and though my hands tap out this introduction from a coffee shop in suburban Lansing, Michigan, my mind is elsewhere.

In New Orleans and in the other towns and cities of the American Gulf Coast, some two million people are now returning to homes they evacuated days ago, before Hurricane Gustav hit. Thanks to their foresight, a newly fortified set of levees, and a proactive, coordinated governmental response, this particular hurricane has killed few Americans.[1] But in the wider Caribbean, the storm's impacts have been more serious: before striking the Gulf Coast, Gustav killed 97 people in Cuba, the Dominican Republic, southern Florida, Haiti, and Jamaica, destroying or damaging some 90,000 houses in Cuba alone.[2]

In the villages of Bihar State, eastern India, nearly two and a half million people are now refugees. Eighteen days ago, monsoon rains—the region's heaviest in least 50 years—changed the course of the Kosi River, bursting a dam in neighboring Nepal. The resulting floodwaters have inundated nearly 1,000 small villages, stranding residents in the surrounding hills and treetops without food or clean water. 117 are confirmed dead, but the figure will surely rise as naval divers uncover bodies and water-borne illnesses spread.[3]

In the Darfur region of western Sudan and eastern Chad, as in Bihar State, two and a half million people have also been displaced. Their exile has lasted longer than that of either the Gulf

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[1] As of September 2, 2008, seven people are reported to have died as a consequence of the storm. Hurricane Katrina, by comparison, killed 1,836. Patrik Jonsson, "How New Orleans weathered Gustav," *Christian Science Monitor*, September 3, 2008, http://www.csmonitor.com/2008/0903/p10s01-usgn.html.

[2] Tim Gaynor and Matthew Bigg, "New Orleans levees hold as Hurricane Gustav weakens," *Reuters*, September 1, 2008, http://www.reuters.com/article/topNews/idUSN25418913200809O1?feedType=RSS&feedName=topNews&pageNumber=1&virtualBrandChannel=10112.

[3] Rama Lakshmi, "'River of Sorrow' Floods Affecting Millions in India," *Washington Post*, September 2, 2008, http://www.washingtonpost.com/wp-dyn/content/article/2008/09/02/AR2008090201419.html.

Coast Americans or the Bihar State Indians previously mentioned, however, and its causes are more varied and complex than any single biophysical impact. In the late 1980s, a major drought struck Ethiopia and Sudan, sparking one of history's deadliest famines and, subsequently, a contest for Sudan's scarce arable land among the country's diverse ethnic groups.[4] For the past twenty years, Arab militias known as Janjaweed have waged a slow genocide—replete with mass killings, rapes, and, since about 2004, government-assisted aerial bombings[5]—against the primarily black, non-Arab farming communities of Darfur, in an apparent effort to expropriate their land and livestock. Indeed, a black Djiba tribesman who was driven from his village by the Janjaweed in 2004 recalls being told by "some Arabs in the region:" "'We're going to send you blacks away and claim this land for ourselves'."[6] [7] Sustained water and crop shortages have accompanied and exacerbated the conflict; the Sudanese government's failure to help black Darfurians cope with these difficulties was among the reasons that drove the Sudanese Liberation Army and other resistance groups to attack government outposts in 2003. [8] These actions prompted a greatly intensified series of Janjaweed raids and aerial bombings, which have resulted in the deaths of approximately 300,000 people since they began in 2003.[9]

Climate science advises us not to attribute particular natural events like Hurricane Gustav, or the Kosi River floods, or desertification in Darfur to climate change, given the tangle

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[4] Patrick Webb, Joachim von Braun, and Tesfaye Teklu, "Drought and Famine in Ethiopia and Sudan: An Ongoing Tragedy," *Natural Hazards*, 4, 1991, pp. 85-86.
[5] Jeevan Vasagar, "Hunted by death squads, a people without hope," *Salon.com*, August 24, 2004, http://archive.salon.com/news/feature/2004/08/24/guardian_sudan_death_squads/index.html.
[6] *Ibid.*
[7] The Janjaweed's scorched-earth tactics—which have included poisoning wells with corpses and burning prime farmland—are most simply understood within the context of a wider campaign to permanently remove black Darfurians from their land. Physicians for Human Rights staff, *Assault on Survival: A Call for Security, Justice, and Restitution*, January 11, 2006, http://physiciansforhumanrights.org/library/documents/reports/darfur-assault-on-survival.pdf.
[8] Josh Braun, "A Hostile Climate: Did Global Warming Cause a Resource War in Darfur?", *SEED Magazine*, August 2, 2006, http://seedmagazine.com/news/2006/08/a_hostile_climate.php.
[9] CBC News staff, "Darfur death toll could be as high as 300,000: UN official," *CBC.ca*, April 22, 2008, http://www.cbc.ca/world/story/2008/04/22/darfur-un.html.

of physical factors that causes them. But science does admit of statements about "the likelihood of certain types of extreme events," which may be used in coordination with careful statistical analyses to estimate the extent to which greenhouse gases *generally* affect these types of events.[10] In this way, climate models have linked rising atmospheric greenhouse gas concentrations with stronger, more destructive hurricanes[11] and monsoons[12] and more frequent droughts and rain pattern disruptions.[13] These concentrations have indeed risen, at historically unprecedented rates: since the Industrial Revolution began, the atmosphere's carbon dioxide content has increased from 280 parts per million to about 380 parts per million, with corresponding observed increases in radiative forcing (that is, the extent to which a greenhouse gas adds to the atmosphere's net energy balance).[14]

We can conclude without controversy that, somewhere in the catastrophes now afflicting the Gulf of Mexico, Bihar, India, and Darfur, the hand of human-induced climate change is at work. [15] What measure of the work it does, we cannot precisely say. But it is there, now, and as the first chapter of this thesis explains, it will probably get worse.

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[10] Intergovernmental Panel on Climate Change, "9.1. Can Individual Extreme Events Be Explained by Greenhouse Warming?", *Fourth Assessment Report*, from the website of the IPCC, http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Print_Ch09.pdf, p. 696.

[11] Peter Webster *et al.*, "Frequency, Duration, and Intensity of Tropical Cyclonic Storms in a Warming Environment," presented January 31, 2006 at the American Meteorological Society's 18th Conference on Climate Variability and Change, *86th Annual AMS Meeting*, Atlanta, GA, January 28 – February 4, 2006.

[12] Ed Malby *et al.*, "How Will Climate Change Affect India's Monsoon Season?", *Science Daily*, March 12, 2007, http://www.sciencedaily.com/releases/2007/03/070308121808.htm.

[13] Intergovernmental Panel on Climate Change, "Executive Summary, Chapter 2 (Africa)," *The Regional Impacts of Climate Change*, 1995, http://www.grida.no/climate/ipcc/regional/007.htm.

[14] The recent on-the-ground effects of this radiative forcing have been apparent enough: eleven of the twelve years occurring between 1995 and 2006 ranked among the twelve warmest recorded since detailed measurements began being kept in 1850. Intergovernmental Panel on Climate Change, "Summary for Policymakers," *Fourth Assessment Report*, from the website of the IPCC, 2007, http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf, pp. 2-5.

[15] I support these claims in further detail in Chapter One.

B. Thesis overview

This thesis is about justice between present and future generations in the context of climate change. In writing it, I have come to see that, despite temporal divides, climate justice in the future and climate justice in the present are not fundamentally different propositions. This view of mine rests on two foundations. First, I believe the requirements of justice will change fundamentally only when the human species changes fundamentally—an occurrence that, given the glacial pace of human evolution thus far, I see no reason to foresee in the coming hundred or even thousand years. Second, the climate impacts that compromise the provision of justice in the future will be largely similar to those that are compromising it now in places like Louisiana, Bihar, and Darfur (although runaway sea level rise and other big, yet-unseen problems may indeed occur if the world follows a business-as-usual emissions pathway in the coming century[16]).

All this is not to say that the requirements of justice are ever simple things to fulfill, or that the challenges posed to their fulfillment by the effects of human-induced climate change are minor. It is simply to say that intergenerational climate justice is not so different from climate justice generally. In this thesis, I attempt to measure overlap between the contents of climate justice in the short and long terms. I also seek to establish intergenerational and (by extension[17]) international climate justice as ethically obligatory pursuits, rather than as optional benevolences for the virtuous. In structuring the thesis, I have drawn on the work of Edward Page, who urges people thinking about foundational theories of justice to address the following three questions:

1. What is the *scope* of the theory of justice?

[16] See Chapter One, Section B of this thesis.
[17] In Chapter Two, I argue that international justice has "relevance for the comprehensive account of intergenerational justice this thesis seeks" in light of Edward Page's observation that "the most vulnerable of all to climate change will be *future* members of developing countries." Edward Page, *Climate Change, Justice and Future Generations*, Cheltenham: Edward Elgar, 2006, p. 36.

2. What is the *shape* of the theory of justice?

3. What is the *currency* of the theory of justice?[18]

By *scope*, Page here means the set of entities a theory of justice identifies as legitimate recipients of society's benefits and burdens—that is, as *subjects* of justice. The *scope* of justice gives boundaries to a system of justice, providing an inventory of the legitimate subjects of justice within the system. By *shape*, Page means the principles according to which a theory of justice distributes benefits and burdens. The principles of utility, sufficiency, equality, and priority are foundations for different *shapes* of justice. These are not to be confused with such economic formations as capitalism or communism, which may tend toward but are by no means identical with particular *shapes* of distributive justice. And by *currency*, Page means the "aspect of well-being, or unit of benefit or advantage, on which our distributive concern should focus."[19]

I begin the first chapter of this thesis with a series of observations about the features that make climate change unique as a matter of justice—namely the intergenerational asymmetry associated with it and all other intergenerational processes; the fact that it entails intergenerational *harms*, not just the intergenerational compromising of benefits; its origins in emissions-intensive but often necessary human life functions; and the considerable uncertainty surrounding its future impacts. These observations point forward to some of the theoretical challenges I resolve in my second and third chapters. In the next sections of the Chapter One, I outline the impacts that climate scientists expect to result from various emissions trajectories in "near future" (that is, the period between now and 2100) and the "distant future" (the period after 2100).

[18] *Ibid.*, p. 51.
[19] *Ibid.*, p. 51.

In the second chapter of the thesis, I make the case for including both future generations and foreign peoples in the *scope* of climate justice, following the assumption that a truly comprehensive conception of intergenerational climate justice must include *all* members of future generations, not just the descendants of a particular people. My arguments center on the intergenerational and international justice provisions of John Rawls—respectively, the *just savings principle* and the *duty of assistance.* In the interest of making the theoretical basis for intergenerational and international justice as robust and consistent with the challenges of climate change as possible, I suggest a set of modifications to Rawls's arguments. Specifically, I propose stripping the just savings principle of its "adjacency constraint," which requires parties in the original position to give special preference to the interests of their "more immediate descendants"[20] in crafting intergenerational principles and policies. I then recommend expanding Rawls's duty of assistance to include a "duty of compensation," under which peoples responsible for furthering carbon-intensive practices and institutions might remunerate the victims of these activities in proportion to their suffering. I find both proposals to be in keeping with the rational interests of the parties in the original position, and thus consistent with the wider moral system I outline and endorse in the next section of this introduction.

The final section of the second chapter is a case study on the scope of intergenerational climate justice. Its focus is *discounting*, the process by which modern-day economists and policymakers estimate the present value of future benefits and burdens. In the case study, I examine an assortment of moral and practical arguments for and against discounting. I conclude that the practice is almost certainly unethical within any moral framework that assigns every generation an equal claim to justice, as the scope of justice I advance does. Due to a lack of technical information, however, I give no final verdict about the practice of discounting for

[20] John Rawls, *A Theory of Justice*, Cambridge: Harvard University Press, 1971, p. 255.

future extinction risk,[21] which I find logically sound but, depending on the factor of extinction risk used, potentially unacceptable for the extent to which the practice itself increases background extinction risk.

In the thesis's third chapter, I seek to specify what justice consists of—what its *currency* is—in the context of near- and long-term climate change. I reject a trio of basic currencies—*resources*, *welfare*, and *opportunity for welfare*—on grounds that they do not properly account for the basic ethical features of long-term climate change outlined early in Chapter One. I then turn my attention to three more sophisticated currencies of justice: *social primary goods* (as advanced by Rawls), *basic capabilities* (as advanced by Amartya Sen and Martha Nussbaum), and *vital interests* (as advanced by Brian Barry). All of these currencies possess some desirable characteristics with respect to the ethical features that make climate change unique. Ultimately, I incorporate each into a wider, hybridized definition of the currency of intergenerational climate justice. Within this definition, I recommend Sen and Nussbaum's currency of basic capabilities for situations in which climate justice can only be provided through relatively immediate adaptation measures. Additionally, I argue that human capability fulfillment is (or should be seen as) the ultimate aim of all efforts to ensure climate justice, including the relatively long-term push for climate change mitigation through emissions reduction. But I deny that capabilities are the most appropriate currency of climate justice for policymakers to *consider* as they establish long-term, mitigation-focused policies for climate protection. For these efforts, I endorse Barry's currency of vital interests, which is simply a slight, sustainability-focused revision to the Rawlsian social primary goods. Vital interests and social primary goods, I argue, specify the raw materials of climate justice—things like clean water, basic social institutions, and fundamental

[21] Cited by Partha Dasgupta in reference to the work of Nicholas Stern and Menachem Yaari. Partha Dasgupta, "Discounting Climate Change," *University of Cambridge Working Papers*, April 2007, www.econ.cam.ac.uk/faculty/**dasgupta**/pub07/stavins_june07.pdf, p. 15.

rights, liberties, and opportunities—at a level of generality that is consistent with our merely general knowledge of both future climate impacts and future needs and preferences. These "raw materials" are the only elements of justice that present generations have the power to protect for future generations. Indeed, from its position of temporal remove, it would be logically inconceivable for the present generation to attend to every last detail of every last future individual's set of capabilities, given uncertainty about both the future climatic results of present actions and the particular preferences and interests that future individuals will possess.

A lingering unmanaged flaw of the three sophisticated currencies of justice, I note, is their failure to account in satisfying ways for the direct *harms* associated with long-term climate change. To remedy this flaw, I suggest incorporating a per-capita entitlement to the global atmospheric commons into Barry's currency of vital interests. This added vital interest, I argue, captures both the interest of safety from preventable natural impacts and the interest of justly participating in crucial but climate-affecting activities like fossil fuel-based cooking.

The final substantial section of Chapter Three and of this thesis examines Cyclone Nargis, a storm that has taken 140,000 Burmese lives amid circumstances of profound governmental neglect since striking southeast Asia last May. The section provides a case study on the currency of intergenerational climate justice, demonstrating why we must regard such things as political rights and functioning public institutions, not just obviously necessary items like clean water, as parts of climate justice's currency.

C. Limitations

In this thesis, I explore the scope and currency of intergenerational climate justice in depth, thus answering two of the three critical preliminary questions Edward Page encourages

justice theorists to consider.[22] The question I neglect to address is that of justice's *shape*, which (once again) concerns the principles according to which a theory of justice distributes benefits and burdens among members of a society. I exclude the question of shape from this paper partially because of time constraints, and partially because I believe it is of marginal importance once one has specified a scope and currency of justice. If a society can provide the *currency* of justice specified by an appropriate theory to all the society members this theory includes within its *scope*, the distributive *shape* by which it does so should not much matter. One can imagine cases in which the shape of justice *is* morally relevant, of course; the best way to provide certain resources to a certain range of societal groups could well be to put a benevolent dictator in charge of distributing them. Fortunately, it seem such obviously flawed schemes rule themselves in the case of my own theory of intergenerational climate justice, whose currency embraces political rights and liberties in addition to resources. Nonetheless, I consider my failure to address the shape of intergenerational climate justice in this thesis unfortunate.

Also unfortunate, in this thesis, is my anthropocentrism. For the sake of analytical simplicity, I have not made any serious effort to include non-human subjects within the scope of intergenerational climate justice I outline here, even though climate change threatens nature very seriously. The principle reason for this omission that the addition of non-human perspectives would massively complicate my treatment of the original position, the hypothetical framework I borrow (from John Rawls) in evaluating most of this paper's arguments.[23] Rawls makes a number of small provisions for non-humans (which he regards collectively as a "problem of

[22] Page, *op. cit.*, p. 51.

[23] It seems the original position could admit of non-human perspectives only if we enabled non-humans to negotiate the just principles and practices of society together with their human counterparts. The sorts of communication that this would require become harder and more comical to imagine as the non-human entities in question become more different from human beings. We might expect dolphins in the original position to demand principles of justice that ensure the protection of their ocean habitat from climate change, but it would be markedly more difficult to predict the requests of viruses and bacteria, which may not even experience things like benefit and disadvantage, and which may thus be incapable of preferring certain circumstances to others.

extension" for his theory of justice as fairness[24]) that seem to apply to my own arguments as well. Specifically, he points to both the long-standing tendency of humans to use animals and nature for their benefit and, less instrumentally but perhaps even more conservatively, to the argument that constraints on the use of comprehensive doctrines (like religion) in shaping the laws and principles that govern plural democratic societies do not apply to arguments about the proper relation between humans, animals, and nature, since this is "not a constitutional essential or a basic question of justice" in the way that, say, abortion is.[25] As a result, Rawls reasons, nothing prevents people in liberal societies from working to incorporate their beliefs about animal and natural rights into the laws of their societies. This is by no means a positive protection for natural rights; in a way it is actually insulting to discourses about just relations between humans and nature, since it categorically regards as being something less than "constitutional," "fundamental," or "basic." I acknowledge the insufficiency of these provisions for animals and non-human nature. Unfortunately, I lack the time in this particular project to develop more adequate provisions of my own.

The coming section provides a detailed description of the original position, which (as I have said) provides a key foundation of my reasoning in this paper.

D. A basic approach: Rawls's original position

In *A Theory of Justice*, John Rawls lays forth a sweeping approach to justice that seeks most fundamentally to ensure the "inviolability," the undeniable basic rights, of each member of a free plural society. Relevant for this thesis is the mechanism Rawls uses to account for his arguments, namely the *original position.* By this mechanism Rawls presents a "conception of

[24] Rawls, *Political Liberalism*, p. 245.
[25] Rawls, *Political Liberalism*, p. 246.

justice which generalizes and carries to a higher level of abstraction the familiar theory of the social contract as found, say, in Locke, Rousseau, and Kant."[26] Mirroring the social contract, the original position provides fair, equal bargaining conditions for a hypothetical agreement between "free and rational persons concerned to further their own interests" about the "principles which are to assign basic rights and duties and to determine the division of social benefits" in society.[27] A crucial feature of the original position, and one which renders it necessarily hypothetical, is that the "persons" have not yet entered the society whose terms they must agree upon; though they know they will inevitably occupy stations in the society, they do not yet know and cannot control their spatial or temporal positions, or their natural or inherited socioeconomic advantages, or even their "conceptions of the good or… special psychological propensities."[28]

The parties' uncertainty about the conditions of the lives they are to inherit—an uncertainty Rawls dubs the "veil of ignorance"—compels them to adopt principles of justice, a constitution, and structures of basic governance under which they would be willing to live *even if* they found themselves at the lowest social and material rungs of their society. Through a lengthy analysis of the features of contemporary plural societies, Rawls derives two particular "principles of justice" to which he believes free, equal, rational persons in the original position would likely agree.[29] Rawls calls the system of justice established by the conditions of the original position and the principles agreed to therein "justice as fairness"—a term he uses frequently to describe

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[26] Rawls, *A Theory of Justice*, p. 10.
[27] *Ibid.*, p. 10.
[28] *Ibid.*, p. 11.
[29] These principles are as follows:

1. Each person is to have an equal right to the most extensive total system of equal basic liberties compatible with a similar system of liberty for all.
2. Social and economic inequalities are to be arranged so that they are both:
   (a) to the greatest benefit of the least advantaged, consistent with the just savings principle, and
   (b) attached to offices and positions open to all under conditions of fair equality of opportunity.

See Rawls *op. cit.*, p. 266.

the notion that a society's governing principles are just if they are "agreed to in an initial situation that is fair."[30]

"No society can, of course, be a scheme of cooperation which men enter voluntarily in a literal sense," Rawls writes, since real people are in fact born into particular positions in particular societies, which affects their "life prospects" and, consequently, compromises their ability to reason fairly and objectively toward the conditions of justice. And yet,

> a society satisfying the principles of justice as fairness comes as close as a society can to being a voluntary scheme, for it meets the principles which free and equal persons would assent to under circumstances that are fair. In this sense its members are autonomous and the obligations they recognize self-imposed.[31]

In the following sections, I derive what I take to be the appropriate scope, currency, and shape of intergenerational climate justice from the perspective of the original position. In doing so, I seek to imbue my principles of intergenerational climate justice with a sense of contractual reciprocity in an effort to demonstrate that real-world adherence to these principles is not merely a benevolence, not just a mark of altruism, but a positive *duty* for anyone who views society as a system of fair, mutual cooperation over time.[32]

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[30] *Ibid*., p. 11.
[31] *Ibid.*, p. 12.
[32] In *Political Liberalism*, Rawls defines "reasonableness" as the view that society is a system of fair, mutual long-term cooperation: "Citizens are reasonable when, viewing one another as free and equal in a *system of social cooperation over generations*, they are prepared to offer one another fair terms of social cooperation (defined by principles and ideals) and they agree to act on those terms, even at the cost of their own interests in particular situations, provided that others also accept those terms. For these terms to be fair terms, citizens offering them must reasonably think that those citizens to whom such terms are offered might also reasonably accept them… I refer to this [requirement of mutual reasonableness] as the *criterion of reciprocity.* Thus, *political rights and duties are moral rights and duties, for they are part of a political conception that is a normative (moral) conception with its own intrinsic ideal…*" (Italics added for emphasis.) I believe this reciprocal understanding of interactions in society is what justice requires of each of us. It is my hope that this thesis will influence those possessing a similar view of justice in society to take intergenerational climatic obligations seriously. See John Rawls, 1993, *Political Liberalism*, New York: Columbia University Press, p. xlii.

A. Preliminary remarks

Climate change is an intergenerational process, as the second two sections of this chapter demonstrate in detail. It thus possesses at least one morally significant feature, common to all such processes: the feature of temporal "asymmetry."[33] Because the future lies down the one-way temporal stream from the present, it must accept the raw impacts of climate change exactly as the present chooses to impose them. The future can have no shaping influence over inherited processes that affect it. This is certainly true with the case of climate change, for which "the difficult tradeoffs must be threshed out in the [present-day] political forum," though "most of the beneficiaries of [climate-friendly] policies will have no direct voice in the debate."[34]

Climate change also possesses a number of morally significant features that make it unique among other intergenerational phenomena. First and foremost, unlike such challenges as monetary saving and the preservation of scarce natural resources, which concern the passage of *benefits* between generations, climate change involves also the imposition of *harm*—although these harms do have important implications for the long-term maintenance of beneficial stocks of physical resources. (Importantly, harm from climate change is now preventable only to an extent, since a certain measure of climate change would be bound to occur even if everyone in the world stopped emitting greenhouse gases today.[35]) Second, climate change is a byproduct of present-day activities that are in many cases necessary for the survival of contemporary people (though it

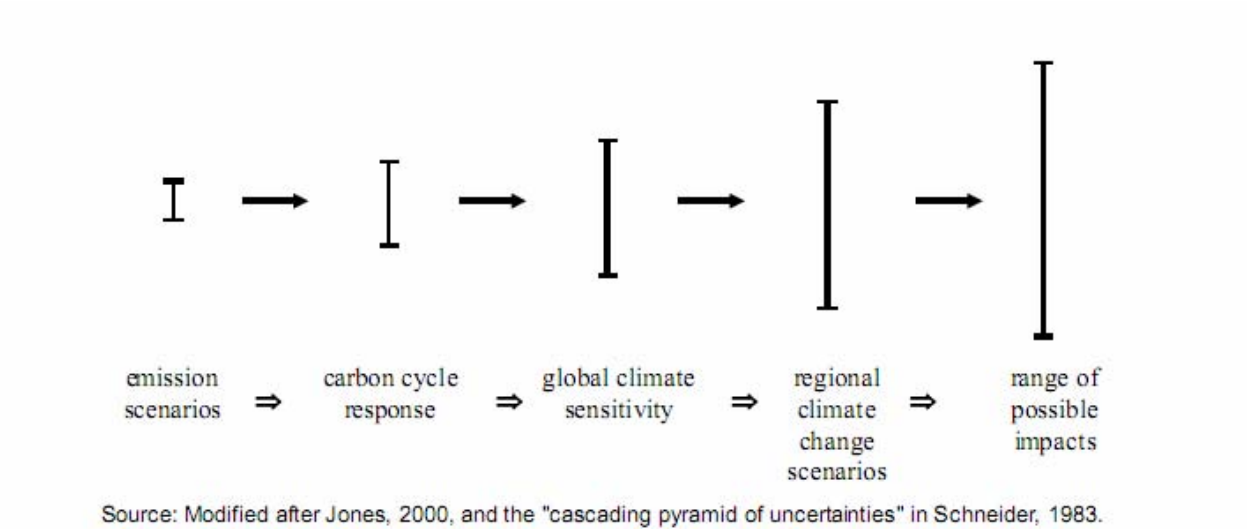
[33] Rasmus Karlsson, "Reducing Asymmetries in Intergenerational Justice: Descent from Modernity or Space Industrialization?" *Organization and Environment*, 19, 2006, p. 233.

[34] Raymond Pierrehumbert, "Climate Change: A Catastrophe in Slow Motion," *Chicago Journal of International Law*, 6:2, 2006, pp. 249-250.

[35] As I note later in this chapter, half of the global average surface temperature change slated to occur between now and approximately 2040 is "locked in" by greenhouse gases already emitted. Gerald Meehl and Thomas Stocker, "Chapter 10 - Global Climate Projections," *Climate Change 2007: The Physical Science Basis*, from the website of IPCC Working Group I, 2007, http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter10.pdf, p. 762.

is certainly possible to distinguish between the "subsistence emissions" of the poor and the "luxury emissions" of wealthy jet-setters.[36]) Third, the coming impacts of climate change are by no means certain, given the presence of what Stephen Schneider and Janica Lane call "uncertainty explosions," through which relatively small uncertainties about future emissions trajectories combine with additional uncertainties about climatic responses to these trajectories and about the regional distribution of impacts arising from these responses to form large measures of uncertainty that make the impacts of our present-day greenhouse gas emissions dangerous but hard to predict with specificity.

FIGURE 1. Uncertainty explosion[37]



Source: Modified after Jones, 2000, and the "cascading pyramid of uncertainties" in Schneider, 1983.

These features of climate change combine to form an intergenerational phenomenon that future peoples are almost certain to find harmful, but which is, unlike theft, murder, and other traditional *intra*generational harms, compounded incrementally by everyone now alive,

[36] Henry Shue discusses this distinction between kinds of emissions, as well as climate change's character as a source of intergenerational harm, in his writings on climate change and environmental philosophy. Henry Shue, "Climate," *A Companion to Environmental Philosophy*, ed. Dale Jamieson, Oxford: Blackwell Publishers, 2001, pp. 449-459.

[37] Taken from Stephen Schneider and Janica Lane, "Dangers and Thresholds in Climate Change and the Implications for Justice," in *Fairness in Adaptation to Climate Change*, eds. W. Neil Adger, Jouni Paavola, Saleemul Huq, and M.J. Mace, Cambridge: MIT Press, 2006, p. 32.

associated with perfectly justifiable functions of life, and only partially preventable through mitigation (therefore requiring also remediation through *adaptation*).

B. The near future: climate change through 2100

In 2007 the Intergovernmental Panel on Climate Change published its Fourth Assessment Report (AR4), a summary of the most recent findings on climate change from 2,500 of the world's leading climate experts. In its third section, the report examines likely near- and long-term climate impacts in two broad groups of emissions scenarios—group A, in which status quo levels of energy consumption and greenhouse gas emissions remain the norm, and group B, in which current energy consumption and emissions decline and efforts to improve environmental sustainability and social equity gain momentum. None of the scenarios include climate policy provisions beyond those already in place (e.g. the Kyoto Protocol), and none have been assigned probability figures. Table 1 and Figure 2 provide greenhouse gas emissions estimates, temperature change estimates, and sea level rise estimates through 2100 for the A and B groups; the following paragraphs describe the characteristics of these groups' sub-scenarios (A1FI, A1B, A1T, A2, B1, and B2).

TABLE 1. Projected global average surface warming and sea level rise for SRES scenarios[38]

Table SPM.1. Projected global averaged surface warming and sea level rise at the end of the 21st century. {Table 3.1}

	Temperature change (°C at 2090-2099 relative to 1980-1999) [a, d]		Sea level rise (m at 2090-2099 relative to 1980-1999)
Case	Best estimate	*Likely* range	Model-based range excluding future rapid dynamical changes in ice flow
Constant year 2000 concentrations [b]	0.6	0.3 – 0.9	Not available
B1 scenario	1.8	1.1 – 2.9	0.18 – 0.38
A1T scenario	2.4	1.4 – 3.8	0.20 – 0.45
B2 scenario	2.4	1.4 – 3.8	0.20 – 0.43
A1B scenario	2.8	1.7 – 4.4	0.21 – 0.48
A2 scenario	3.4	2.0 – 5.4	0.23 – 0.51
A1FI scenario	4.0	2.4 – 6.4	0.26 – 0.59

Notes:
a) Temperatures are assessed best estimates and likely uncertainty ranges from a hierarchy of models of varying complexity as well as observational constraints.
b) Year 2000 constant composition is derived from Atmosphere-Ocean General Circulation Models (AOGCMs) only.
c) All scenarios above are six SRES marker scenarios. Approximate CO_2-eq concentrations corresponding to the computed radiative forcing due to anthropogenic GHGs and aerosols in 2100 (see p. 823 of the WGI TAR) for the SRES B1, AIT, B2, A1B, A2 and A1FI illustrative marker scenarios are about 600, 700, 800, 850, 1250 and 1550 ppm, respectively.
d) Temperature changes are expressed as the difference from the period 1980-1999. To express the change relative to the period 1850-1899 add 0.5 °C.

The A1 family of sub-scenarios models a world marked by "very rapid economic growth, low population growth, and the rapid introduction of new and more efficient technologies," along with "convergence among [nations' economic and trade policies and per capita income levels], capacity building, and increased cultural and social interactions."[39] This family contains three sub-scenarios—A1FI (fossil intensive), A1T (high technology), and A1B (balanced), with A1FI generating the most emissions and A1T generating the least.[40]

[38] Intergovernmental Panel on Climate Change, "Summary for Policymakers," *Fourth Assessment Report*, from the website of the IPCC, 2007, http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_topic3.pdf, p. 7.
[39] Intergovernmental Panel on Climate Change, "SRES Scenario Taxonomy," *Special Report on Emissions Scenarios*, from the website of the IPCC, 2000, http://www.grida.no/climate/ipcc/emission/091.htm#4.2.1.
[40] Stephen Schneider and Janica Lane, "Dangers and Thresholds in Climate Change and the Implications for Justice," in *Fairness in Adaptation to Climate Change*, eds. W. Neil Adger, Jouni Paavola, Saleemul Huq, and M.J. Mace, Cambridge, Massachusetts: MIT Press, 2006, p. 24.

FIGURE 2. Projected GHG emissions through 2100 for SRES scenarios[41]

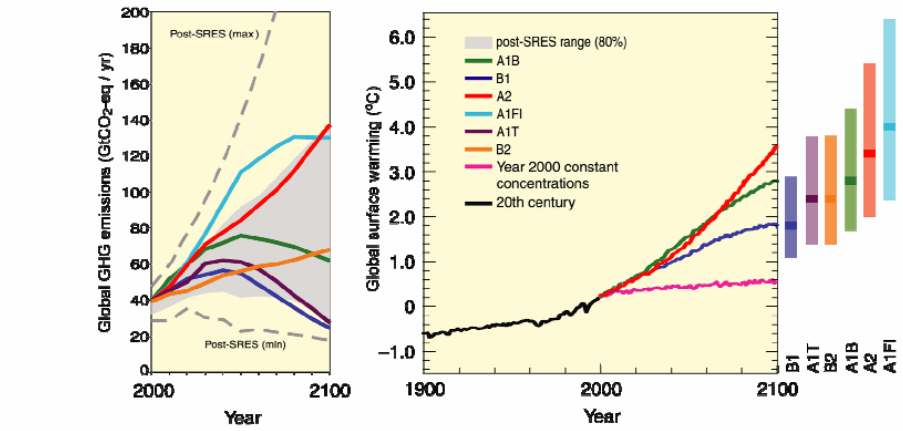


Figure SPM.5. Left Panel: Global GHG emissions (in CO_2-eq) in the absence of climate policies: six illustrative SRES marker scenarios (coloured lines) and the 80th percentile range of recent scenarios published since SRES (post-SRES) (gray shaded area). Dashed lines show the full range of post-SRES scenarios. The emissions cover CO_2, CH_4, N_2O, and F-gases. Right Panel: Solid lines are multi-model global averages of surface warming for scenarios A2, A1B and B1, shown as continuations of the 20th-century simulations. These projections also take into account emissions of short-lived GHGs and aerosols. The pink line is not a scenario, but is for Atmosphere-Ocean General Circulation Model (AOGCM) simulations where atmospheric concentrations are held constant at year 2000 values. The bars at the right of the figure indicate the best estimate (solid line within each bar) and the *likely* range assessed for the six SRES marker scenarios at 2090-2099. All temperatures are relative to the period 1980-1999. {Figures 3.1 and 3.2}

The world of the A2 scenario is "very heterogeneous" in its cultural practices, fertility patterns, and approaches to economic development. Population growth is rapid in A2, while economic growth and technological change are "more fragmented and slower than in other story lines."[42]

The B1 scenario shares with the A1 family a low average population growth rate. Unlike the A1 scenarios, however, the B1 scenario is the site of "rapid changes in economic structures toward a service and information economy… reductions in material intensity, and the introduction of clean and resource-efficient technologies." B1 provides an equitable "alternative

[41] Intergovernmental Panel on Climate Change, "Summary for Policymakers," *Fourth Assessment Report*, from the website of the IPCC, 2007, http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_topic3.pdf, p. 7.
[42] IPCC, "SRES Scenario Taxonomy."

vision" of social and technological change, and offers the lowest energy consumption and emissions figures of the all the SRES scenarios.[43]

Like B1, the B2 scenario emphasizes environmental sustainability and social equity. Population growth and economic development are moderate in the B2 scenario, but technological change is slower and more geographically fragmented than in A1 or B1. Local and regional initiatives, not international agreements, are the primary drivers of improvements in sustainability and equity.[44]

Given the measure of randomness responsible for climatic phenomena and the many uncertainties that bedevil global circulation models (GCMs) and climate impact assessments—a combination referred to as the "uncertainty explosion" by Schneider and Lane[45]—we cannot meaningfully link physical climate impacts of specific magnitudes with particular emissions scenarios. Even if we could, the labeling of certain magnitudes of climate change as "dangerous," and the implicit labeling of lesser magnitudes as "safe," would remain a subjective and inherently political process resting on individual tolerances for risk.[46] But for those who will be born in this century, the scenario after which we humans model our emissions trajectories matters a good deal. Although our species's greenhouse gas emissions will continue to drive a measure of global warming through the year 2100 no matter what emissions pathways we implement, the magnitude of our emissions shares a direct relationship with the magnitude of the warming (see Table 1)—and thus the magnitude of the impacts—that we will likely observe. This is particularly true of estimates about the warming that will occur more than twenty years from now. Though half of the global average surface temperature change slated to occur between

[43] *Ibid.*
[44] *Ibid.*
[45] Schneider and Lane, *op. cit.*, p. 32.
[46] *Ibid.*, p. 33.

now and approximately 2040 is "locked in" by already-emitted greenhouse gases that will remain in the atmosphere for some years,

> by mid-century, the choice of scenarios becomes more important for the magnitude of warming, with a range of 0.46ºC, and with about one-third of that warming due to climate change that is already committed to. But by the late [21st] century, there are clear consequences for which scenario is followed, with a range of 1.3°C in these results, with as little as 18% of that warming coming from climate change that is already committed to.[47]

Table 2 provides an index of some of the potential climate change impacts projected for the mid- to late-21st century. It is once again impossible to link impacts of specific magnitudes with particular emissions scenarios, but we can assume that greenhouse gas-intensive scenarios like A1FI will *generally* increase the magnitude of predicted climate impacts more than low-emissions scenarios like B1 will.

The direct relationship between the greenhouse-gas intensity of our emissions trajectories and the magnitude of the impacts that will befall the world in the 21st century is a good reason to choose less emissions-intensive trajectories, particularly if we wish to avoid saddling those born later in the century with burdens they did not create. But there are at least two other reasons for avoiding emissions-intensive trajectories. First, these trajectories increase the risk of abrupt and irreversible climate changes and "climate surprises." Second, emissions-intensive trajectories chosen now will constrain the ability of policymakers and environmental regulators working in the mid- and late-21st century to ratchet down into their own more climate-friendly trajectories.

[47] Meehl and Stocker, *op. cit.*, p. 762.

TABLE 2. Potential climate impacts in the mid- to late-21st century[48]

Table SPM.3. Examples of possible impacts of climate change due to changes in extreme weather and climate events, based on projections to the mid- to late 21st century. These do not take into account any changes or developments in adaptive capacity. The likelihood estimates in column two relate to the phenomena listed in column one. {Table 3.2}

Phenomenon[a] and direction of trend	Likelihood of future trends based on projections for 21st century using SRES scenarios	Examples of major projected impacts by sector			
		Agriculture, forestry and ecosystems	Water resources	Human health	Industry, settlement and society
Over most land areas, warmer and fewer cold days and nights, warmer and more frequent hot days and nights	*Virtually certain*[b]	Increased yields in colder environments; decreased yields in warmer environments; increased insect outbreaks	Effects on water resources relying on snowmelt; effects on some water supplies	Reduced human mortality from decreased cold exposure	Reduced energy demand for heating; increased demand for cooling; declining air quality in cities; reduced disruption to transport due to snow, ice; effects on winter tourism
Warm spells/heat waves. Frequency increases over most land areas	*Very likely*	Reduced yields in warmer regions due to heat stress; increased danger of wildfire	Increased water demand; water quality problems, e.g. algal blooms	Increased risk of heat-related mortality, especially for the elderly, chronically sick, very young and socially isolated	Reduction in quality of life for people in warm areas without appropriate housing; impacts on the elderly, very young and poor
Heavy precipitation events. Frequency increases over most areas	*Very likely*	Damage to crops; soil erosion, inability to cultivate land due to waterlogging of soils	Adverse effects on quality of surface and groundwater; contamination of water supply; water scarcity may be relieved	Increased risk of deaths, injuries and infectious, respiratory and skin diseases	Disruption of settlements, commerce, transport and societies due to flooding; pressures on urban and rural infrastructures; loss of property
Area affected by drought increases	*Likely*	Land degradation; lower yields/crop damage and failure; increased livestock deaths; increased risk of wildfire	More widespread water stress	Increased risk of food and water shortage; increased risk of malnutrition; increased risk of water- and food-borne diseases	Water shortage for settlements, industry and societies; reduced hydropower generation potentials; potential for population migration
Intense tropical cyclone activity increases	*Likely*	Damage to crops; windthrow (uprooting) of trees; damage to coral reefs	Power outages causing disruption of public water supply	Increased risk of deaths, injuries, water- and food-borne diseases; post-traumatic stress disorders	Disruption by flood and high winds; withdrawal of risk coverage in vulnerable areas by private insurers, potential for population migrations, loss of property
Increased incidence of extreme high sea level (excludes tsunamis)[c]	*Likely*[d]	Salinisation of irrigation water, estuaries and freshwater systems	Decreased freshwater availability due to saltwater intrusion	Increased risk of deaths and injuries by drowning in floods; migration-related health effects	Costs of coastal protection versus costs of land-use relocation; potential for movement of populations and infrastructure; also see tropical cyclones above

Notes:
a) See WGI Table 3.7 for further details regarding definitions.
b) Warming of the most extreme days and nights each year.
c) Extreme high sea level depends on average sea level and on regional weather systems. It is defined as the highest 1% of hourly values of observed sea level at a station for a given reference period.
d) In all scenarios, the projected global average sea level at 2100 is higher than in the reference period. The effect of changes in regional weather systems on sea level extremes has not been assessed.

[48] In IPCC terminology, "virtually certain" means "having > 99% probability of occurrence"; "very likely," > 90% probability; "likely," > 66% probability; "about as likely as not," 33%-66% probability; "unlikely," < 33% probability; "very unlikely," < 10% probability; and "exceptionally unlikely," < 1% probability. IPCC, "Summary for Policy Makers," p. 12.

The best-documented example of the sort of abrupt, "surprising" climate impacts I have just referenced involves possible changes to the Atlantic Meridional Overturning Circulation (MOC), also known as the thermohaline circulation (from the Greek roots *thermo-*, for "heat," and *–haline*, for "sea" or "salt") or the Great Conveyor.[49] Crucial to the MOC-induced circulation of the world's oceans are depth-based variations in seawater's density, which varies with temperature and salinity. Because it involves the transfer of vast amounts of heat among the oceans, this pattern of global seawater circulation is an important regulator of climate in many of the world's inhabited places, notably Western Europe. By increasing both precipitation and the rate at which freshwater from the Greenland ice sheet enters the North Atlantic, global warming could reduce the salinity and associated density of seawater enough to weaken or interrupt the MOC, possibly leading to abrupt climatic changes in certain geographies. Such a weakening appears to be the cause of a rapid North Atlantic cooling event that occurred 8,200 years ago, during which average temperatures in the region fell by 2-3°C (3.5-5.5°F) over a matter of decades.[50] Although virtually all GCMs indicate that a complete shutdown of the MOC would require "many decades to more than a century" of rapid warming, the processes that would be required for such a shutdown remain very poorly understood.[51] Given this limited understanding, precaution urges us to avoid excessive greenhouse gas emissions: a shutdown of the MOC occurring over even a century could alter the geography of agricultural production faster than humans could respond, leading to catastrophic levels of scarcity.

Changes to the MOC constitute one of many potential scenarios for abrupt climate change. Of equal concern for those living at the end of the 21st century is the prodigious

[49] Meehl and Stocker, *op. cit.*, p. 775.
[50] Allegra LeGrande and Gavin Schmidt, "Modeling an Abrupt Climate Change," from the website of the NASA Goddard Institute for Space Sciences, 2006, http://www.giss.nasa.gov/research/briefs/legrande_01/.
[51] Meehl and Stocker, *op. cit.*, p. 775.

influence current emissions trajectories will have on climate change mitigation efforts later on. The sources of this influence are twofold.

First, natural climate feedback effects—"changes in the planetary energy balance induced by climate change that can magnify or diminish climate response," in the words of Hansen[52]—are likely to amplify human contributions to climate change. Because some feedbacks will only manifest themselves beyond certain thresholds of human-induced warming, greenhouse gas-intensive emissions trajectories entail a kind of double imposition on future atmospheric greenhouse gas concentrations. First, by emitting large quantities of greenhouse gases now, and thereby driving relatively large measures of global warming, we may unlock large stores of methane previously frozen in the Arctic permafrost[53] or (through our unwitting tinkering with the oceans' thermal mixing) churn deep-ocean carbon upward into the atmosphere,[54] thus consigning ourselves and those living later in the century to measures of warming that would not have occurred if not for our large initial emissions.[55]

Second, CO_2, methane, and the many other known greenhouse gases possess a range of atmospheric lifetimes, which means that some of the gases we release into the atmosphere now will continue to warm the planet for decades, centuries, or millennia to come. In the next section, we explore these and other temporally distant climate impacts.

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[52] James Hansen, "Defusing the Global Warming Time Bomb," *Scientific American*, 290:3, 2004, pp. 68-77.

[53] Katey Walter, Laurence Smith, and F. Stuart Chapin III, "Methane Bubbling From Northern Lakes: Present and Future Contributions to the Global Methane Budget," *Philosophical Transactions of the Royal Society A*, 365, 2007, p. 1657.

[54] IPCC, "Summary for Policymakers," p. 13.

[55] Permafrost in the Northern Hemisphere contains an estimated 950 billion tons of CO_2 equivalents (much of it in the form of methane)—enough to double current atmospheric CO_2 concentrations, if released at once (Walter *et al.* 2007, p. 1666). Further, after being "unlocked" by permafrost thawing associated with global warming, many Northern greenhouse gas pockets release their through ebullition, in which gases bubble upward through ice or soil. These subterranean pockets may take 500-1,000 years to release all of their stored greenhouse gases (Walter *et al.* 2007, p. 1669). If we wish to avoid unleashing potentially massive natural stores of greenhouse gases on peoples of the distant future, we should avoid crossing the warming thresholds that "unlock" such feedback effects, whatever these thresholds may be. This seems to imply selecting the least emissions-intensive development trajectories available to us.

C. The distant future: climate change beyond 2100

The atmospheric lifetime of carbon dioxide—that is, the amount of time it takes the average CO_2 molecule to leave the atmosphere after entering it—is often mistakenly quoted at about 100 years. This estimate is the result of a "fallacious and largely meaningless method of aggregating the many physical processes that operate on widely differing time scales into a single number."[56] Though a small portion of the CO_2 emitted today will settle quickly into the ocean, about one quarter will remain in the atmosphere 500 years later, and seven percent will linger on for hundreds of thousands of years.[57] Given these lifetimes, it goes nearly without saying that the rate of CO_2 emissions "greatly exceeds" the rate of CO_2 removal, resulting in an atmospheric accumulation of CO_2 that extends over staggering temporal scales.[58] Other greenhouse gases, like CFC-11, leave the atmosphere through one or a few removal processes, and thus possess singular atmospheric lifetimes.[59] Table 3 provides atmospheric lifetimes for CFC-11, CO_2, and four other greenhouse gases. HFC-23 and CF_4, it is worth noting, possess singular atmospheric lifetimes of 260 years and more than 50,000 years, respectively. Considered with the roughly seven percent of CO_2, molecules that remain in the atmosphere for hundreds of thousands of years, these gases provide a sense of the vast temporal reach of our present-day activities.

[56] Pierrehumbert, *op. cit.*, p. 577.
[57] *Ibid.*, p. 577.
[58] Meehl and Stocker, *op. cit.*, p. 825.
[59] Intergovernmental Panel on Climate Change, "Topic 3 – Climate Change and its Impacts in the Near and Long Term Under Different Scenarios," *Fourth Assessment Report*, from the website of the IPCC, 2007, http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_topic3.pdf.

TABLE 3. Six greenhouse gases and their atmospheric lifetimes[60]

Table 1: *Examples of greenhouse gases that are affected by human activities. [Based upon Chapter 3 and Table 4.1]*

	CO_2 (Carbon Dioxide)	CH_4 (Methane)	N_2O (Nitrous Oxide)	CFC-11 (Chlorofluoro-carbon-11)	HFC-23 (Hydrofluoro-carbon-23)	CF_4 (Perfluoro-methane)
Pre-industrial concentration	about 280 ppm	about 700 ppb	about 270 ppb	zero	zero	40 ppt
Concentration in 1998	365 ppm	1745 ppb	314 ppb	268 ppt	14 ppt	80 ppt
Rate of concentration change [b]	1.5 ppm/yr [a]	7.0 ppb/yr [a]	0.8 ppb/yr	-1.4 ppt/yr	0.55 ppt/yr	1 ppt/yr
Atmospheric lifetime	5 to 200 yr [c]	12 yr [d]	114 yr [d]	45 yr	260 yr	>50,000 yr

[a] Rate has fluctuated between 0.9 ppm/yr and 2.8 ppm/yr for CO_2 and between 0 and 13 ppb/yr for CH_4 over the period 1990 to 1999.
[b] Rate is calculated over the period 1990 to 1999.
[c] No single lifetime can be defined for CO_2 because of the different rates of uptake by different removal processes.
[d] This lifetime has been defined as an "adjustment time" that takes into account the indirect effect of the gas on its own residence time.

What impacts do our emissions portend for distant future generations? Scientific understanding of climate impacts grows hazier as time scales grow longer. All the same, the IPCC's Fourth Assessment Report offers two broad but salient observations about long-term climate impacts. First, even if we stabilize our emissions at a relatively low constant (i.e. non-increasing) levels by 2100, global average temperature increases will continue for at least a millennium, and sea level rise will continue for the next few centuries. Global average temperature increases, which would reach about 0.5°C within a few centuries under a stabilized emissions scenario, will continue because of the long atmospheric lifetime of CO_2 and other greenhouse gases; sea level rise, which would reach 0.3-0.8 meters within a few centuries under such a scenario, will continue because of the large time scales associated with the full thermal expansion of seawater.[61] Second, if global average surface temperatures increase by 1.9-4.6°C or

[60] Intergovernmental Panel on Climate Change, "Technical Summary," *Climate Change 2001: The Scientific Basis*, from the website of IPCC Working Group I, 2001, http://www.grida.no/climate/ipcc_tar/wg1/016.htm.
[61] Intergovernmental Panel on Climate Change, 2007b, "Topic 3 – Climate Change and its Impacts in the Near and Long Term Under Different Scenarios," *Fourth Assessment Report*, from the website of the IPCC, http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_topic3.pdf.

more beyond pre-industrial baselines (an eminently possible outcome for *this* century) and remain at these elevated levels for a few millennia, the Greenland ice sheet will probably disappear completely, resulting in a very gradual sea level rise of about 7 meters.[62]

If 21st-century emissions trajectories take us beyond the aforementioned temperature increase ranges—which emissions scenarios A1FI, A1B, and A2 are all likely to do (see Table 1)—long-term ice melting and associated sea level rise will presumably be even more severe than the IPCC predicts, as will a full range of other projected climate impacts.

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[62] *Ibid*.

Chapter Two: The Scope of Intergenerational Climate Justice

A. Preliminary remarks

Intergenerational relations has been the subject of considerable recent scholarship, as worries about nuclear waste generation and other long-term, industrial-scale environmental problems have come to the fore.[63] By no means do these concerns predate ethical interest in justice between generations, however; John Rawls gives an especially thorough account of intergenerational justice in his *Theory of Justice* (1971) and *Political Liberalism* (1993), despite making little mention of environmental concerns in either work.

Rawls's interpretation of the scope of justice—that is, the subjects his theory regards as legitimate recipients of a society's benefits and burdens—differs somewhat between *A Theory of Justice* and his later works, most notably *Political Liberalism*, which provides a framework for the application of the principles of justice in contemporary democratic societies, and *The Law of Peoples*, which concerns Rawls's theory of just relations between peoples.[64] In each text Rawls uses the premises of justice as fairness to argue for a more or less universal account of human justice, which regards people of all spatial and temporal positions as the just theoretical beneficiaries of rights and "social primary goods." Before assessing Rawls's treatment of these "goods" as the currency of justice, I turn to a discussion of the intergenerational justice provisions Rawls outlines in *A Theory of Justice* and *Political Liberalism*—which hinge not on his two principles of justice but on a distributive mechanism he calls the "just savings principle"—and, secondly, the *international* justice provisions Rawls outlines in *The Law of*

[63] See, for example, Clark Wolf, "Intergenerational Justice," in *A Companion to Applied Ethics*, eds. R.G. Frey and Christopher Wellman, Malden, Massachusetts: Blackwell, 2003, pp. 279-294.

[64] *The Law of Peoples* has often been described as a treatise on "international relations." Though the work does indeed reflect on global justice and the interactions between societies, it does so in considerable abstraction from the contemporary world order, taking "peoples" rather than "states" as the relevant units of governance. It therefore seems appropriate to call *The Law of Peoples* something other than an "international relations" text, given the considerable disconnect between the theory it details and the world of states in which we live. See John Rawls, *The Law of Peoples,* 1999, Cambridge, Massachusetts: Harvard University Press.

People, which consist in the "second original position" and international "duty of assistance" he describes therein. Why this consideration of Rawlsian international justice? As Page notes, "the most vulnerable of all to climate change will be *future* members of developing countries;"[65] it follows that Rawls's international justice provisions, as I interpret them for the case of climate change, have relevance for the comprehensive account of intergenerational justice this thesis seeks. Unlike his most recently updated inter*generational* justice provisions, however, the inter*national* justice provisions of Rawls's *The Law of Peoples* possess significant flaws, as I discuss in the section after next.

B. Intergenerational justice and the just savings principle[66]

In *A Theory of Justice*, Rawls observes that "there are no [moral] grounds for discounting future well-being on the basis of pure time preference" (p. 253); this provides the initial impetus for his consideration of justice between generations. For all its usefulness in the establishment of just reciprocity between contemporary members of the same society, Rawls finds that the veil of ignorance fails to secure justice *between* generations because, given the "present time of entry interpretation"[67] that unites the parties as members of the same generation, the parties can "favor their generation by refusing to make any sacrifices at all for their successors" (p. 121). Rawls attempts to remedy the situation by tacking two constraints to the veil of ignorance. The first—what I call the *adjacency* constraint—assumes that the parties in the original position have families and requires that they "care at least about their more immediate [or temporally *adjacent*]

[65] Page, *op. cit.*, p. 36.
[66] In this section, parenthetical page citations refer to Rawls's *A Theory of Justice*, Cambridge: Harvard University Press, 1971.
[67] In justifying his "present time of entry interpretation," Rawls remarks that the original position "is not a gathering of all actual or possible persons. If we conceived of the original position in [this way], the conception would cease to be a natural guide to intuition and would lack a clear sense." Rawls, *A Theory of Justice,* p. 120.

descendants," while the second—what I call the *universality* constraint—requires the parties to adopt only those principles that they "wish all earlier generations to have followed" (p. 255). Together with the veil of ignorance, these constraints constitute the "just savings principle," which for Rawls is simply an "understanding between generations to carry their fair share of the burden of realizing and preserving a just society" (p. 257). Rawls contextualizes the just savings principle within the principles of justice by asserting that just savings are to "constrain the application of the difference principle" (p. 258), or second principle of justice,[68] which might in the absence of such a constraint require the maximization of the prospects of the least advantaged within a present generation to the detriment of the least advantaged across subsequent generations.

Rawls's adjacency and universality constraints prove incompatible with one another in view of the uneven temporal distribution of benefits and burdens that afflict the contemporary world. Nitrogenous fertilizers provide one example.[69] Since the Green Revolution, these fertilizers have played a critical role in increasing and sustaining crop yields around the world, contributing importantly to the ongoing global struggle against hunger.[70] Hunger threatens temporally adjacent generations by threatening the lives of poor people—child bearers and potential child bearers—who are living now. Insofar as nitrogenous fertilizers alleviate the threat of hunger to adjacent generations, they may be called consistent with the adjacency constraint to Rawls's veil of ignorance.

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[68] Rawls's second principle of justice, which he and others also call the "Difference Principle," reads:

"Social and economic inequalities are to be arranged so that they are both:

(c) to the greatest benefit of the least advantaged, consistent with the just savings principle, and

(d) attached to offices and positions open to all under conditions of fair equality of opportunity."

See Rawls, *A Theory of Justice*, p. 266.

[69] This example is undoubtedly a simplification of the challenges of modern agriculture, but it serves to illustrate how very conceivable the conflict between Rawls's adjacency and universality constraints is.

[70] Balu Bumb and Carlos Baanante, "Policies to Promote Environmentally Sustainable Fertilizer Use and Supply to 2020," from the website of 2020 Vision for Food, Agriculture, and the Environment, October 1996, http://www.ifpri.org/2020/BRIEFS/NUMBER40.HTM.

Unfortunately, the production of nitrogenous fertilizer requires substantial inputs of energy, and its application on farms has been demonstrated to increase nitrous oxide (N_2O) emissions from soil significantly.[71] N_2O, a potent greenhouse gas that is the world's third largest contributor to the greenhouse effect after CO_2 and methane,[72] possesses an atmospheric lifetime of 114 years.[73] Thus, nitrogenous fertilizer use may be said to threaten temporally distant generations, since it results in additions to the greenhouse effect that will continue to manifest themselves 114 years into the future—in apparent violation of the universality constraint to Rawls's veil of ignorance. Since neither the adjacency constraint nor the universality constraint has primacy over the other, we are faced with an irresolvable conflict. For the matter of nitrogenous fertilizer use, Rawls's just savings principle seems to be unworkable.

In *Political Liberalism*, Rawls recognizes this difficulty with the just savings principle outlined in *A Theory of Justice*.[74] As a remedy, he strips the principle of its adjacency constraint, emphasizing again the large set of conceivable generations his universality constraint protects through the features inherent in its structure:

> …the correct principle is that which the members of any generation (and so all generations) would adopt as the one their generation is to follow (and later generations to follow), *no matter how far back (or forward) in time.*[75]

Rawls notes that this revision to the just savings principal removes the need for an adjacency constraint: the purpose of this initial requirement, under which it is assumed that parties in the original position "care for their [immediate] descendants," is to dissuade these parties (who are

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[71] Bumb and Baanante, *op. cit.*

[72] Energy Research Center of the Netherlands staff, "N_2O abatement in the chemical industry," from the website of the Energy Research Center of the Netherlands, 2008, http://www.ecn.nl/en/h2sf/products-services/catalytic-emission-reduction/n2o/.

[73] Intergovernmental Panel on Climate Change, "Technical Summary," *Climate Change 2001: The Scientific Basis*, from the website of IPCC Working Group I, 2001, http://www.grida.no/climate/ipcc_tar/wg1/016.htm.

[74] Rawls notes in *Political Liberalism* that the "account in *Theory*, §44 ('Justice between Generations') is defective." Rawls, *Political Liberalism*, p. 20.

[75] *Ibid.*, p. 274. (Italics added for emphasis.)

bound together in the same uncertain generation by Rawls's "present time of entry" interpretation) from "refusing to make any savings at all" for future generations.[76] *Political Liberalism* specifies that the parties are to select a just savings principle "subject to the… condition that they must want all *previous* generations to have followed it." [77]

Stripped of the adjacency constraint, the just savings principle seems to provide a clear solution to the problem of nitrogenous fertilizer use: if the fertilizer's intergenerational effects are so bad that a person in the original position would prefer for all previous generations to have abstained from its use, then the fertilizer should not be used; more intergenerationally benign solutions to problems of hunger should be found. Indeed, such solutions—which include more energy efficient fertilizer production[78] and no-till farming techniques that reduce the amount of N_2O fertilized soil emits[79]—are already being implemented in practice, suggesting that (for this example at least) the mandates of the newly stripped just savings principle are reasonable enough.

More generally, Rawls's new approach succeeds in mirroring the universal logic of Rawls's original position, insofar as it removes the requirement that people care for their most immediate descendants. This former requirement was considerably less consistent with the notion of "mutual disinterest" between generations than is Rawls's newer approach, which encourages the selection of a just savings principle not on the basis of family ties—ties peoples in a plural society like the one for which Rawls writes may or may not possess—but on the basis of contractual self-interest.

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[76] *Ibid.*, p. 274.
[77] *Ibid.*, p. 274.
[78] Bumb and Baanante, *op. cit.*
[79] Carl Bernacchi, Steven Hollinger, and Tilden Meyers, "The conversion of the corn/soybean ecosystem to no-till agriculture may result in a carbon sink," *Global Change Biology*, 12:8, 2006, pp. 1585-1586.

C. International justice and the duty of assistance

1. Problems of representation in the second original position

In *The Law of Peoples*, Rawls extends the logic of his original position—which he designs in *A Theory of Justice* to serve only the potential members of particular liberal societies at particular shared points in time—to the international "Society of Peoples."[80] He accomplishes this through the application of a second hypothetical original position that serves to "extend a liberal conception to the Law of Peoples."[81] The conditions for justice as fairness in this original position are much the same as those in the first: here as before, the parties are "situated symmetrically… modeled as rational… and subject to a veil of ignorance."[82] Controversially, Rawls interprets the appropriate parties in the second original position to be liberal *peoples*, headed by "rational representatives," rather than individual *persons*. Rawls's reasons for interpreting the parties as such are unclear; as Gary Chartier notes,[83] Rawls promises in his introduction to *The Law of Peoples* to describe the qualities that give peoples and not persons the "status of the (moral) actors," but fails do so in any satisfying way later in the work.[84]

What is problematic about Rawls's interpretation of the parties to the second original position as peoples, rather than persons? As Chartier points out,[85] Rawls conceives of this original position as containing both liberal democratic peoples and "decent hierarchical societies"—societies that may not regard all the people they contain as "free and equal citizens, nor as separate individuals deserving representation," but which at the very least possess "consultation hierarchies" into which unrepresented groups can channel their requests and

[80] Rawls, *The Law of Peoples*, p. 3.
[81] *Ibid.*, p. 3.
[82] *Ibid.*, p. 32.
[83] Gary Chartier, "Peoples or Persons? Revising Rawls on Global Justice," *Boston College International and Comparative Law Review,* 27:1, 2004, p. 1.
[84] *Ibid.*, p. 5.
[85] *Ibid.*, p. 5.

complaints.[86] Because Rawls believes interventions in the internal affairs of decent hierarchical peoples by liberal democratic peoples unacceptably violate the autonomy of these hierarchical peoples, Chartier expresses the legitimate concern that Rawls's conception of the parties as peoples may leave certain citizens both unrepresented in their home societies and unprotected by a higher international body or set of principles, with troubling implications for the protection of human rights.

Rawls's peoples-based approach to constituting the second original position is problematic also from the perspective of intergenerational climate change. It is increasingly well-recognized in the field of international environmental development that any just international climate policy response, whether the Kyoto Protocol or something else, must supplement its efforts at climate change mitigation with comparable provisions for climate *adaptation*. An international system devised by the representatives of existing *peoples* in the second original position cannot be guaranteed to create representation-based channels for communicating the particular adaptation needs of individual groups of persons in hierarchical societies—particularly marginal minority groups in the societies, which are often the first to suffer from the sorts of environmental problems and resource shortages we expect from climate change—to national-level agencies charged with distributing the means of adaptation.[87] This shortcoming, it seems, would render international systems generated under the Rawlsian second original position considerably less responsive to the climate adaptation needs of people now and in the future than a system devised via a *cosmopolitan*, or *person-based*, second original position.

Chartier correctly asserts that a *person-based* second original position is compatible with Rawls's wider account of justice between peoples, given in particular Rawls's emphasis in *A*

[86] Rawls, *The Law of Peoples*, p. 72.
[87] This suggestion appears to be tragically borne out by my case study, in Chapter Three, on the Burmese military junta's failure to help its citizens respond to Cyclone Nargis.

Theory of Justice on justice for and between individual *persons*."[88] Consequently, I endorse for my own model of intergenerational climate justice a cosmopolitan second original position approach for devising principles of international justice, which, as Page and others rightly argue, is inextricable from the broader challenge of justice between generations.[89]

2. Problems with the duty of assistance[90]

As I note in my upcoming discussion of the currency of intergenerational climate justice, climate change implies an increase in the incidence of natural disasters both short (like hurricanes) and protracted (like sea level rise). In *The Law of Peoples*, Rawls observes that well-ordered peoples owe a "duty of assistance" to societies burdened by such unfavorable conditions (p. 106). He regards this duty as parallel to the just savings principle outlined in *A Theory of Justice*, since "in each instance, the aim is to realize and preserve just (or decent) institutions" (p. 107). For Rawls, this duty does not entail unbounded giving to disadvantaged people. Rather, it takes as its target and "cutoff point" the raising of the world's poor into positions of free citizenship within either reasonably liberal societies or decent hierarchical societies (p. 119). In this section, I examine the implications of Rawls's cutoff point for present-day global justice in the context of climate change. Though I ultimately embrace Rawls's assertion that the difference principle should not apply between peoples in the global sphere, I argue for extending the duty of assistance's cutoff point to require that wealthy well-ordered societies mitigate the burdens their practices impose on the world by either refraining entirely from harmful institutional practices

[88] Chartier *op. cit.*, p. 15.
[89] Page *op. cit.*, p. 36.
[90] In this section and two sections following it, parenthetical page citations refer to Rawls's *The Law of Peoples*, Cambridge, Massachusetts: Harvard University Press, 2003.

(such as carbon-intensive production processes) or, barring this, by financially compensating other societies in proportion to the damages imposed on them.

3. Limits to the duty of assistance and their implications in the context of climate change

Rawls illustrates the need for limits on well-ordered societies' obligations to burdened societies by means of two hypothetical scenarios (pp. 117-118). In the first scenario, two "liberal decent societies" begin with equal resources and population sizes, but quickly lose parity after the first society industrializes and increases its rate of savings, leaving the "more pastoral and leisurely" second society behind (p. 117). The second scenario is similar, except that now the disparity arises after the first society willfully reduces its population growth rate by stressing the "elements of equal justice for women" (p. 117), thus increasing its rate of savings relative to the second society, which despite possessing similar elements of gender equality fails to reduce its population growth, owing to its "prevailing religious and social values" (p. 118). In both scenarios, Rawls finds it unreasonable to require (as Thomas Pogge's global egalitarian principle[91] does) that the wealthier first society tax itself to assist its less disciplined counterpart, since "both societies are liberal or decent, and their peoples free and… able to make their own decisions" (p. 118).

Rawls rests his principal contention about the duty of assistance—that this duty ends once the assisted society has developed a working liberal or decent government—on the supposition that such governments give people "sufficient all-purpose means to make intelligent and effective use of their freedoms and to lead reasonable and worthwhile lives" (p. 114). Climate change challenges this supposition, since it threatens to dramatically disrupt and in some cases end the lives of people around the world without regard for the social and political

[91] Thomas Pogge, "An Egalitarian Law of Peoples," *Philosophy and Public Affairs*, 23:3, 1994, pp. 195-224.

"ordering" of the societies in which they live. The "cutoff point" Rawls places on his duty of assistance suggests that, in their efforts to help poor societies prepare themselves for climate change's effects, wealthy well-ordered societies should provide aid only until the recipients of this aid become liberal or decent. Climate change does not cease to threaten societies once they reach these points, of course, nor does the development of liberal or decent government confer on poor peoples the resources many of them need to adapt to climate change's effects. Importantly, these well-ordered poor peoples (like poor peoples in general) tend to bear very little responsibility for climate change, relative to wealthier nations like the United States. Bangladesh provides an illustrative example.

A parliamentary democracy with a functioning constitution, a widely shared language (Bangla, spoken by 98 percent of the population) and religion (Islam, followed by 83 percent of the population), and a 17-year track record of free, fair democratic elections,[92] Bangladesh appears to fit Rawls's definition of a liberal people.[93] Despite all this, Bangladesh remains extremely poor and, given its low-lying coastal geography and extensive human reliance on rice grown in the floodplains of the Brahmaputra and Ganges Rivers,[94] exceptionally vulnerable to climate change-induced sea level rise.[95] The costs of Bangladesh's adaptation to climate change—though difficult to estimate—will include the costs of developing coastal zone management systems and relocating people whose homes are inundated. These expenses are

[92] Central Intelligence Agency, "Bangladesh," *The World Factbook*, from the website of the Central Intelligence Agency, 2007, https://www.cia.gov/library/publications/the-world-factbook/geos/bg.html.

[93] For Rawls, liberal peoples are those that have "three basic features: a reasonably just constitutional democratic government that serves their fundamental interests; citizens united by… 'common sympathies;' and finally, a moral nature. The first is institutional, the second is cultural, and the third requires a firm attachment to a political (moral) conception of right and justice" (pp. 23-24).

[94] Central Intelligence Agency *op. cit.*

[95] A 1.5 meter sea level rise would inundate 16 percent of Bangladesh's total land area, displacing or killing as many as 25 million of its people. Bruce Douglas, *Sea Level Rise: History and Consequences*, San Diego: Academic Press, 2001, p. 200. See also Anwar Ali, "Vulnerability of Bangladesh to Climate Change and Sea Level Rise Through Tropical Cyclones and Storm Surges," *Water, Air, and Soil Pollution*, 92:1-2, 1996, pp. 171-179.

likely to be prohibitive. The cruel irony in all this, of course, is that Bangladesh contributes negligibly to the problem of climate change, having been the source of a little more than 0.1 percent of the world's carbon dioxide emissions in 2004—about 1/160th the contribution of the United States, which was the source of 22 percent of the world's carbon dioxide emissions that year.[96]

The cutoff point Rawls assigns to the duty of assistance suggests that Bangladesh should receive no assistance from wealthier peoples, since it is itself well-ordered. Given Bangladesh's poverty, vulnerability, and utter lack of culpability for the primary problem that now threatens it, this suggestion seems to violate basic notions of fairness, as specified by the logic of the original position. Climate change is a byproduct of the world's industrial economy, an institution that benefits from and is sustained primarily by the world's wealthiest societies. As Pogge notes,[97] those that benefit from and sustain such institutions share responsibility for their effects. In light of this, it seems obvious that the wealthy must give considerably more to the climate mitigation and adaptation efforts than the duty of assistance's cutoff point now requires. In the next section, I develop a more appropriate boundary for the duty of assistance.

4. A solution: the duty of compensation

If the cutoff point Rawls provides for his duty of assistance is not sufficient to ensure global justice in the context of climate change, what is? Extending Rawls's difference principle to the Society of Peoples would require the arrangement of social and economic inequalities such

[96] United Nations Statistics Division, "Carbon dioxide emissions in metric tons per capita," *Millennium Development Goals Indicators*, website of the United Nations, 2007, http://mdgs.un.org/unsd/mdg/SeriesDetail.aspx?srid=751&crid=.
[97] Thomas Pogge, *World Poverty and Human Rights*, Malden, Massachusetts: Polity Press, 2002, p. 112.

that these inequalities would afford "the greatest benefit of the least advantaged."[98] As Rawls notes, this arrangement would likely entail a massive redistribution of wealth from the rich to the global poor, until the only remaining inequalities would be those possessing some net utility for the global poor. Such an undertaking would presumably provide developing countries with the resources and institutions necessary to mount appropriate adaptive responses to climate change's impacts, and would furthermore compel wealthy societies to dramatically reduce their greenhouse gas emissions, in light of the poor's expropriation of the resources these rich societies had once relied on for their energy- and carbon-intensive lifestyles. These emissions-reducing redistributions would alleviate inequality, in keeping with the difference principle, by limiting the profits of the wealthy and the magnitude of climate change's impacts for the worst off while improving both the immediate economic prospects and the long-term adaptive capacity of these worst off. In these ways the application of the difference principle to the world order would indeed result in strides toward a just climate future.

As mentioned previously, however, the expenditures of money and effort required for a global application of the difference principle would likely be prohibitively large, since nothing short of total wealth redistribution would fulfill this principle. Furthermore, such a total redistribution could well be unjust. As Rawls notes in the two hypothetical scenarios (p. 117-118) discussed previously, differing conceptions of the good sometimes lead free liberal societies to different levels of saving and industriousness, which can in turn give way to disparities in wealth. Though inequalities that entail inadequacies of food, education, and other basic human provisions should be eliminated regardless of their origin,[99] it is unfair to regard *all* differences

[98] Rawls, *A Theory of Justice*, p. 266.
[99] The human rights to basic physical necessities (including food) and to education are outlined in Articles 25 and 26 of the Universal Declaration of Human Rights. United Nations General Assembly, "Universal Declaration of Human Rights," website of the United Nations, 1998, http://www.un.org/Overview/rights.html.

in the relative advantages enjoyed by societies as assistance obligations for the wealthiest societies, so long as these differences do not hinder the aforementioned fulfillment of basic human needs. Significantly, total redistribution as part of an international application of the difference principle would also eliminate nations' incentives to save by subjecting their gains from saving to seizure under conditions of even marginal inequality.

The inequalities of greatest concern seem in any case to be those that arise systematically and pervasively from global institutions, not those that arise from differences in saving.[100] Justice requires that peoples take steps toward phasing out their interactions with (and subsequent support of) harmful institutions like carbon-intensive industries or that they compensate the victims of those institutions in which they cannot avoid participating. We need not stray from Rawls's cutoff point for the duty of general assistance; we can argue that assistance conducted for the specific purpose of compensation has no cutoff point, extending instead to all the peoples that need it, ideally (for the sake of efficient resource allocation) in some reasonable proportion to their pre-existing ability to pay. Given its lack of a hard cutoff point and its focus on helping all societies manage difficulties and inequalities arising from global practices for which no individual peoples are exclusively responsible, this "duty of compensation" should be regarded as a separate counterpart to the duty of assistance, which has a cutoff point and seeks the reformation of burdened and other non-liberal, non-decent peoples into well-ordered peoples.[101]

As applied to climate change, the duty of compensation should compel peoples to reduce some of their greenhouse gas emissions,[102] given these emissions' influence on climate change,

[100] Pogge argues this persuasively in *World Poverty and Human Rights*. Pogge, *op. cit.*, pp. 112-116.
[101] Rawls refers to decent and liberal peoples together as "well-ordered peoples" (p. 4).
[102] I consider the delicate problem of balancing mitigation efforts with adaptation efforts in further detail in my upcoming discussions of the currency of justice. For now it is worth observing that the duty of compensation does

while remunerating other societies facing climate adaptation burdens for the costs of these burdens in some reasonable proportion to their pre-existing ability to pay. Peoples can collectively manage both of these components of the duty of compensation in the international sphere; in fact, the United Nations Framework Convention on Climate Change (UNFCCC) does just this, enabling nations to reduce their greenhouse gas emissions within a legally binding framework (the Kyoto Protocol) and to assist the global adaptation effort by directing two percent of the value of each saleable emissions credit generated through the UNFCCC's Clean Development Mechanism (CDM) into an Adaptation Fund created for the purpose of helping developing countries adapt to climate change's impacts.[103]

5. Advantages and disadvantages of the duty of compensation

One virtue of the duty of compensation discussed above is its consistency with the second original position Rawls uses to model the interests of the world's peoples from behind the veil of ignorance (p. 17). A representative of a people in the original position is unlikely to agree to terms of international justice if it appears these terms could leave his citizens to suffer the consequences of processes in which they participate minimally, without compensation from more significant contributors to these processes. The duty of compensation renders this eventuality impossible. A second virtue of the provision is that, in the context of climate change, it can help to secure justice in both the international case *and* the intergenerational case by encouraging the maintenance of the CDM's Adaptation Fund (or something similar) through

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not require peoples to mitigate their collective emissions so sharply as to compromise their own abilities to live decent lives.

[103] The Adaptation Fund has not yet begun to disburse payments to countries requiring adaptation assistance, but it will likely do so before the end of the Kyoto Protocol's first commitment period in 2012. United Nations Framework Convention on Climate Change, "Kyoto Protocol," Official United Nations Site for the Framework Convention on Climate Change, 2007, http://unfccc.int/kyoto_protocol/items/2830.php.

time. Since, as Edward Page notes, the "most vulnerable of all to climate change will be *future* members of developing countries,"[104] the Adaptation Fund possesses some promise as an enabler of climate adaptation projects in developing countries for the foreseeable future. (It is of course difficult to predict how the Adaptation Fund will change, or even whether it will persist, over the multi-millennial time scales climate change involves.)

A number of criticisms may also be leveled against the proposed "duty of compensation." First, the relative extents to which peoples participate in and sustain harmful institutions like the carbon-intensive power and manufacturing industries may be unclear, and thus the amounts of their various compensation obligations may be difficult to specify. Furthermore, it may be considered problematic that major contributors to the furtherance of these institutions—such as China and India, in the case of climate change—might also benefit from other peoples' compensation payments. It seems we can resolve the first of these dilemmas by applying a mechanism for collecting and distributing adaptation monies *to the basic structure* of the institutions in question, such that peoples automatically furnish compensation at levels consistent with their obligations—through a tax on their interactions with the institutions, for example—and receive payments from the fund created by their contributions in accordance with the decisions of an independent panel. The CDM Adaptation Fund, once operational, will function in almost precisely this way: agents generating saleable emissions credits using the CDM will contribute (as they currently do) a mandatory two percent of the monetary value of those credits to the Fund; an organization[105] independent of the UNFCCC will then allocate Fund monies to

[104] Page, *op. cit.*, p. 36.
[105] The UNFCCC has not yet chosen an "independent body" to administer payments from the Fund, but likely candidates for the duty include the World Bank and the Global Environment Facility (a joint initiative of the United Nations Development Programme, the United Nations Environment Programme, and the World Bank). Bank Information Center staff, "World Bank, African Development Bank, UN promote carbon credits for Africa," website of the Bank Information Center, 2006, http://www.bicusa.org/en/Article.3018.aspx.

help build resilience to climate change in countries throughout the world. To the second criticism, which questions the use of compensation funds to assist major contributors to the harmful institutions in question, I may respond by noting that the intended function of the duty of compensation is to give peoples a way of behaving justly when they cannot completely dissociate themselves from harmful practices and institutions, as discussed previously. If a country is unable to avoid participating in some excessively harmful practice despite experiencing damages as a result of the practice, it should not be barred from receiving external support in managing these damages *so long as* it has itself taken steps to provide similar compensatory support to other affected peoples. China and India, the world's most populous nations, are both undergoing rapid expansions in their populations and their demand for energy. We may request that these nations limit their emissions, but in the short term we can hardly expect them to stop emitting altogether, or even to reduce their emissions to negligible levels. If these countries were to contribute to such international climate aid initiatives as the CDM Adaptation Fund,[106] it would be unwise to bar them from receiving assistance from these initiatives in times of need.[107]

Of course, peoples contributing minimally to the problem should remain eligible for assistance whether or not they provide this assistance to other peoples under normal circumstances. To make a country's climate adaptation assistance conditional on its ability to pay

[106] It is well known China and India—like the United States—have not agreed to binding national emissions reduction targets under the Kyoto Protocol, and that they therefore do not contribute to the CDM Adaptation Fund. The CDM's principal purpose is admittedly to enable to first-world signatories to the Kyoto Protocol to meet their emissions reduction obligations by financing renewable energy installations and other low-carbon development projects in the third world. China, India, and other developing countries have made use of the CDM only as recipients of externally-financed development projects, and have thus not experienced the usual impetus for contributing to the Adaptation Fund. Given China's particularly large contribution to the climate crisis, however, some have called for it to help grow the CDM's Adaptation Fund despite its status as a developing country. Cape Times staff, "Call for big polluters to pay more into 'adaptation fund,'" from the website of the Cape Times, December 5, 2007, http://www.capetimes.co.za/index.php?fArticleId=4158741.

[107] China and India have very real climate adaptation needs: both would each experience the displacement of tens of millions of their citizens in the event of a 1.5-meter climate change-induced sea level rise. Douglas *op. cit.* 2001.

into some fund would strip the duty of compensation provisions of their appeal for countries like Bangladesh and, indeed, for all parties to the second original position.

In the following section, I consider the practice of discounting future benefits and burdens from the standpoint of the wide temporal and spatial scope of justice outlined in this chapter so far.

D. Discounting climate change: a case study in scope

As a staple of modern cost-benefit analysis, the social discount rate has a decisive influence on how attractive policymakers perceive different policy options to be. The underlying assumption of the discount rate is that the present value of a cost or benefit becomes smaller the further into the future it occurs; policymakers employ this assumption for a number of practical reasons that I will examine later in this section. Using a fixed, annually compounded discount rate, one can determine the present value *PV* of a future benefit (or, alternatively, cost) with the formula $PV = V / (1+ r)^T$, where *V* is the value of the benefit before discounting, *r* is the discount rate, and *T* is the amount of time that will elapse before the benefit materializes. Using this formula, and assuming an annually compounded discount rate of five percent,[108] we see that a benefit worth $1 billion when it occurs 500 years from now is valued at about two and a half cents today. One need not use dollars as the unit of valuation here; human lives function just as well, when moral considerations are set aside. At the same discount rate of five percent, one billion lives 500 years in the future are worth about one fortieth of one life today.[109] Thus, by the

[108] A discount rate of five percent is within the normal range for American policymakers: the discount rates used by the U.S. Congressional Budget Office and the U.S. Office of Management and Budget are, respectively, two and seven percent. Congressional Budget Office staff, "The Economic Effects of Federal Spending on Infrastructure and Other Investments," from the website of the Congressional Budget Office, June 1998, http://www.cbo.gov/doc.cfm?index=601&type=0.

[109] Lisa Heinzerling used these sample numbers in her Congressional testimony regarding the Stockholm Convention on Persistent Organic Pollutants (POPs). Lisa Heinzerling, "POPs, PIC, and LRTAP: the Role of the

logic of discounting, a policy that saves one human life today at the cost of one billion human lives 500 years from now can be said to have a positive benefit-cost ratio.

As the first chapter of this thesis explains, fossil fuel combustion, deforestation, and other climate change-inducing human activities entail immediate benefits (like the heating of food and water and the opening of new land for grazing and cultivation) that, in many cases, protect human life. They also entailed delayed costs—biophysical impacts (like sea level rise and stronger hurricanes)—that we can expect to occur on a more or less continuous basis until the greenhouse gases emitted through these activities leave the atmosphere. Atmospheric lifetimes for greenhouse gases range between five and 50,000 years,[110] and many millions of human lives would be placed at risk by catastrophic climate impacts like a sudden change to the Atlantic Meridional Overturning Circulation (MOC). Thus the projected benefits, costs, and temporal scale used for the sample discounting calculation in the last paragraph do not differ dramatically from those of climate change itself. Discounting's relevance for intergenerational climate justice is clear. This section examines moral and practical arguments for and against the practice, ultimately concluding that its use is unjustified in climate policymaking.

1. Moral arguments about discounting

In *A Theory of Justice*, Rawls uses the original position to argue that a positive social discount rate is not justified by one generation's preference for its own well-being. His reasoning is persuasive from the standpoint of justice as fairness. Since parties to the original position are assumed to select principles of justice in accordance with the "universality constraint" previously

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United States and Draft Legislation to Implement These International Conventions," testimony before the House Committee on Energy and Commerce, July 13, 2004, http://energycommerce.house.gov/reparchives/108/Hearings/07132004hearing1345/Heinzerling2191.htm.

[110] Intergovernmental Panel on Climate Change, 2001, "Technical Summary," *Climate Change 2001: The Scientific Basis*, from the website of IPCC Working Group I, http://www.grida.no/climate/ipcc_tar/wg1/016.htm.

discussed, it appears impossible that they would agree to the use of a policy mechanism that assigns more value to the present than it does to the future on the basis of time preference alone. I believe this argument has considerable intuitive and logical appeal. As of 2008, policymakers in the United States and other powerful nations possess great—probably unprecedented—influence over future climate change outcomes. But they and we were born into our generation by mere contingency, just as those living in 2100 and 3100 will be born into theirs by contingency. Why on earth would it be ethical for our generation to enjoy the luxuries of a fossil economy at the great expense of those living in 2100 and 3100, if none of us can be held responsible for the temporal positions we occupy?

Rawls offers one hypothetical moral reason to employ a positive social discount rate: to *reduce* time preference by counterbalancing an "extremely high rate of saving which imposes excessive hardships on earlier generations."[111] (This is by no means an endorsement of discounting *qua* discounting: Rawls remarks that discounting "has no intrinsic ethical appeal."[112]) Rawls believes an excessive savings rate is only likely to arise if society is employing an "incorrect" conception of the shape and currency of justice, particularly a utilitarian conception that "maximizes social utility over time."[113] But if a society does possess such a high rate of savings, Rawls believes it may be right to adjust for it using a matching discount rate.

These musings appear to be of little practical use. Rawls provides no indication of how he defines "excessive hardships" for earlier generations, thus making it very difficult for

[111] *Ibid.*, p. 262.
[112] *Ibid.*, p. 262.
[113] Rawls writes: "Unhappily I can only express the opinion that [social discount rates] simply mitigate the consequences of mistaken principles… Having started with the idea that the appropriate rate of saving is the one which maximizes social utility over time (maximizes some integral), we may obtain a more plausible result if the welfare of future generations is weighted less heavily. *Ibid.*, p. 262.

policymakers know the particular circumstances under which Rawls's conception would authorize them to apply a "correcting" social discount rate. Additionally, Rawls's belief that discounting would be an appropriate way of counteracting excessive saving in the modern day suffers from at least one flaw. A measure of global warming (along with its attendant biophysical impacts) is now unpreventable, but this measure of warming would increase catastrophically if the present generation did nothing to reduce its emissions. Therefore just climate policy responses will have to include both a reasonably high rate of saving into the future, to secure future generations' ability to adapt to their inevitable climatic burdens, *and* strong mitigation measures. But any policymaker employing a discount rate as a means of counteracting excessive saving (which Rawls finds justifiable) would find his mitigation programs less attractive, from a cost-benefit standpoint, than they appeared to be before he began discounting, given the discount rate's devaluation of the future benefits provided by the programs. Thus the policymaker would face pressure to eliminate mitigation programs rather than reducing the rate of saving. But this would be the opposite of the sensible reaction, as Nicholas Stern's report on the economics of climate change confirms: climate mitigation is generally a more cost-effective method of protecting future generations than climate adaptation is, and should thus be the last of the two policy measures in question to face cuts, not the first.[114]

In "Discounting Climate Change," Partha Dasgupta admits that he too finds it "hard to rebut" the claim that positive discount rates unjustly favor present generations.[115] All the same, he cites one moral argument (and, as I discuss in the next paragraph, two practical ones) in favor of discounting. This is that "rising consumption provides… justification for discounting future

[114] Nicholas Stern, "Summary of Conclusions," *STERN REVIEW: The Economics of Climate Change*, October 30, 2006, http://www.hm-treasury.gov.uk/media/9/9/CLOSED_SHORT_executive_summary.pdf.
[115] Dasgupta, "Discounting Climate Change," p. 15.

consumption costs and benefits at a positive rate."[116] Dasgupta observes that this increase in consumption occurs steadily over time as a consequence of both saving and the net productivity of capital, thus conferring a "natural advantage" on later generations *vis a vis* earlier ones; discounting, his reasoning goes, may correct this advantage to make schemes of temporal distribution more equitable for the present.[117]

These arguments suffer from a number of flaws. If it were the case that *per-capita* consumption increased over time as a result of saving and interest, Dasgupta might be justified in pointing to discounting as a reasonable way of counteracting these increases. In this case one could accurately point to an advantaging of future generations over present ones *after adjustment for generation size*. But global-scale per-capita consumption increases are not especially likely to occur in the foreseeable future.[118] And Dasgupta does not seem to be referring to per-capita increases anyway: he speaks simply of "rising consumption," which I take to mean *gross* consumption.[119] Assuming that the world's population does increase as projected in coming years, and that individual people's material living requirements do not become dramatically smaller—both reasonable assumptions, I believe—it seems gross consumption will indeed increase, even if per-capita consumption declines somewhat. But I do not believe discounting the future on the basis of gross consumption increases alone is legitimate. I assume these consumption increases will be required if a growing number of people are to live dignified lives. These people's material needs, which we should not expect to be anything more or less than the

[116] *Ibid.*, p. 6.
[117] *Ibid.*, p. 6.
[118] The world's current population of 6.7 billion people is expected to grow to 9.3 billion people by 2050. Given the magnitude of this projected growth and the serious water, food, fuel, and other resource shortages faced by people around the world already, it seems inappropriately optimistic to suggest that per-capita consumption will increase in the near future. Carl Haub, "2008 World Population Data Sheet," from the website of the Population Reference Bureau, 2008, http://www.prb.org/pdf08/08WPDS_Eng.pdf,
p. 7.
[119] Dasgupta, "Discounting Climate Change," p. 6.

needs of people living today, should not be held against them in determinations about discounting. Neither should the rate at which we expect future generations to grow. "Choice in matters of reproduction" is one component of the basic human capability of "bodily integrity," as discussed by Martha Nussbaum; though it is ecologically and socially prudent to limit birth rates by empowering and educating women and providing the means of birth control, the decision whether to have a child or children is a decision that I (like Nussbaum) believe must ultimately rest, as a matter of justice, with each individual couple.[120] Moreover, accelerating population growth is a matter of simple mathematics as much as (or more than) it is a matter of individual reproductive choices. Exponential growth (which human and other animal populations may be expected to follow until they begin nearing their material carrying capacities) entails population growth that becomes much faster as a given population base becomes larger. The size and growth rate of a given generation therefore has much to do with the simple matter of where in time that generation falls. And, once again, no generation is responsible for where in time it falls.

A second objection to Dasgupta's claim concerns the fact that climate change—a phenomenon for which the most climatically burdened future generations will be mostly unresponsible—will necessitate future increases in consumption, in the form of adaptation expenditures. By discounting in order to "correct" for these increases, we would penalize future generations for responding to a problem of *our*, not *their*, making. And ironically, we would likely also cause them to increase their consumption through our discount rate, quite contrary to our initial intentions: as I have written previously, discounting shrinks the present value of future benefits, which in this case would mean reducing the financial attractiveness of (and thus

[120] Nussbaum, *Sex and Social Justice*, cited in Jan Garrett, "Martha Nussbaum on Capabilities and Human Rights," *Western Kentucky University Working Papers*, 2008, http://www.wku.edu/~jan.garrett/ethics/nussbaum.htm.

commitment to) present-day mitigation measures among policymakers, thereby *increasing* the measure of climate change to which future generations would have to adapt.

The foregoing arguments reveal the moral case for discounting (as envisaged by Rawls and Dasgupta) to be feeble indeed. But it is Dasgupta who observes that, while it is "all well and good for the ethicist to assume the high moral ground and issue instructions like a philosopher-king… social ethics contains an irremediably democratic element."[121] My thesis is primarily concerned with the moral in matters of intergenerational climate change, but discounting in particular seems to have its roots in the practical. In the interest of meeting discounting where it stands (rather than only where I think it ought to stand), I use the following paragraphs to review also *practical* arguments for the use of discounting.

2. Practical arguments about discounting

In "Discounting Climate Change," Dasgupta offers two practical justifications for discounting. The first of these is impatience—the notion that "an additional unit of consumption tomorrow [is] of less value than an additional unit of consumption today if society is impatient to enjoy additional unit now."[122] As Frank Ackerman and Lisa Heinzerling note in "Priceless: On Knowing the Price of Everything and the Value of Nothing," the U.S. Office of Management and Budget has reformulated the impatience problem as the more sophisticated "Keeler-Cretin Paradox," which holds that without a discount rate to prioritize earlier social investments over later ones, public utility-maximizing policymakers would delay action *ad infinitum* in order to accumulate as much interest and investment on public monies as possible before spending

[121] *Ibid.*, p. 16.
[122] *Ibid.*, p. 6.

them.[123] Dasgupta's second practical justification for the use of discounting is the small but constant risk of near-term human extinction, which would remove most logical and moral barriers to temporally short-sighted behavior.[124]

It may seem callous and shallow of us to speak of our "impatience" for goods and services as justification for discounting, a practice that seems to contribute so heavily to intergenerational inequity. Yet "impatience" with respect to public goods is generally reasonable: none of us want to wait indefinitely for our policymakers to build or improve necessary roads, or water works, or school systems for our children, nor should we. According to the logic of the aforementioned Keeler-Cretin Paradox, however, we *will* wait indefinitely (in fact infinitely) for such goods unless we employ a discount rate to account for our impatience within the process of benefit-cost analysis. This is because capital tends to multiply over time as a result of interest and investment, and a policymaker possessing a mandate to provide a public good but no clear statement of time preference for the good (such as the statement a positive discount rate provides) will delay her projects for as long as possible. In this way she will accumulate ever more capital, enabling her to furnish the project, at some unreachable future point, such that it maximizes benefits to society. Without discounting, the Keeler-Cretin Paradox goes, no public good will ever be provided, since the optimal period of time over which to maximize capital accumulation is, theoretically, *eternity.*

I believe the argument of the Keeler-Cretin Paradox suffers two fatal objections. Ackerman and Heinzerling specify the first: in the real-world conditions of a functioning democracy, political sentiment would never allow the delays the Keeler-Cretin Paradox

[123] Ackerman and Heinzerling, *Priceless: On Knowing the Price of Everything and the Value of Nothing*, pp. 190-191.
[124] *Ibid.*, p. 18.

predicts.[125] In discounting's absence, representatives would simply enact stronger laws to prevent governmental bodies from putting off public provision. Discounting is therefore not a necessary condition for the avoidance of such delays. Small-government types might argue that such anti-delay regulations would compound bureaucratic inefficiencies in governance. But these arguments would do nothing to neutralize the serious and unjust harms that discounting would otherwise wreak on future generations. I believe (uncontroversially I think[126]) that matters of justice are prior in importance to matters of efficiency.

A related and equally serious objection to the Keeler-Cretin Paradox argument concerns the conception of the good this argument assumes to be in place. Specifically, utilitarianism is the only ethical framework under which the Keeler-Cretin Paradox is even coherent. Only by seeking the maximization of efficiency without regard for basic rights (particularly, in this case, rights to education and other services usually provided by government) could any policymaker justify delaying the provision of public goods indefinitely. Rawls thoroughly and convincingly debunks such utilitarian conceptions of justice: within these conceptions, he observes that "there is no reason in principle... why the violation of liberty [or the rights] of a few might not be made right by the greater good shared by many," and no serious regard for distinctions between persons, since the evaluation of any given utility balance can only logically be made from the perspective of a "single person whose system of desires determines the best allocation of limited means."[127]

As mentioned earlier, a second practical justification for the use of discounting arises from the risk that humankind will go extinct within the foreseeable future. If this were to occur,

[125] *Ibid.*, p. 194.
[126] Rawls writes that the "principle of justice is lexically prior to the principle of efficiency and to that of maximizing the sum of advantages." Rawls, *A Theory of Justice*, p. 266.
[127] *Ibid.*, pp. 23-24.

there would no longer be a human future to speak of, and whatever resources had been saved and activities foregone in the interest of posterity would prove to have been saved and foregone in vain. Referencing the work of Yaari[128] and Stern,[129] Dasgupta argues that by discounting future utilities at the "hazard rate" (that is, the probability of extinction in the foreseeable future) and then proceeding with planning and policy as though there is "no chance of extinction," officials can reasonably account for the chance of an extinction-induced annulment of the contract between present and future generations. Stern, Dasgupta observes, "has justified the choice of $\delta = 0.1\%$ a year on that very basis" (where δ is the time discount rate).[130] [131]

I find this line of reasoning novel and mostly sensible, if a little macabre. Since there is a chance that humankind will not possess a future after a certain date, there must also be a chance that we are wastefully spending time, money, and other resources that could be used to remedy present-day ills on intergenerational justice. By worrying as we do about the future, we may by some relatively slim chance be committing an injustice in the present, and I believe it is appropriate for us to account for this in our planning procedures if we can.

What concerns me about discounting for extinction risk has more to do with its potential unintended effects than with its underlying justification. It seems to me that any discounting of future utilities *increases* the probability of future extinction. By assigning a little less importance to the future—for whatever reason—we provide a little more justification for practices that threaten it, especially (for the purposes of this paper) greenhouse gas-intensive practices. Thus our efforts to account for extinction risk may become self-fulfilling prophecies of extinction—

[128] Menachem Yaari, "Uncertain Lifetime, Life Insurance, and the Theory of the Consumer," *Review of Economic Studies*, 32:2, 1965, pp. 137-158.
[129] Stern, *op. cit.*
[130] Dasgupta, *Discounting Climate Change*, p. 18.
[131] Here it is important to note that Dasgupta's analysis of intergenerational climate justice, like this thesis, is "self-consciously anthropomorphic:" for argument's sake, it disregards the future of species other than *Homo sapiens*, even while acknowledging the intrinsic value of these species and nature more generally. *Ibid.*, pp. 5-6.

the fate we humans try (or ought to try) hardest to prevent. On the other hand, small "hazard" discount rates like Stern's increase the risk of future extinction by amounts that are probably imperceptible, much on the scale that everyday individual activities like burning wood to heat one's home increase the risk of future extinction. Without having a good idea of either the size of these risk increases or the size of the benefits from hazard-based discounting for present-day individuals, I do not wish to conclusively endorse or condemn the practice. If it is possible to determine the size of these risks and benefits—and I lack the training to determine if it is—then I hope future researchers will do so, and weigh the risks against the benefits, before making their judgments about the justifiability of hazard-based discounting. If such determinations are not possible, then I believe the precautionary principle will have to prevail. And in this case, it seems precaution will side against the practice that increases the risk of human extinction.

3. Final thoughts on discounting

I began this discussion of discounting with considerable skepticism toward the practice; this was manifested in my numerical demonstration of how even a modest discount rate can yield vast temporal inequalities over long time scales. The first moral argument I cited against discounting—that the time preference it embodies is arbitrary and unjust within the contractual framework of Rawls's original position—is the most powerful condemnation of the practice that I know. All of the subsequent moral and practical arguments I posed in favor of discounting proved untenable, with the exception of "extinction risk," which I currently lack the information to conclusively support or reject. If it is just, "extinction risk" discounting (as discussed by Stern) probably does not admit of a discount rate much higher than 0.1%.[132] This is much lower than the discount rates employed by authorities like the United States' Congressional Budget Office

[132] Stern, *op. cit.*

and Office of Management and Budget, suggesting that current practice is quite out of touch with morality as I have analyzed it here. Unless this disconnect is remedied, I fear the future climate damages arising from our discounting procedures will be harsh and unjust indeed.

Chapter Three: The Currency of Intergenerational Climate Justice

A. Preliminary remarks

The previous section evaluates and revises Rawls's efforts to incorporate members of generations and societies ("peoples") other than our own into a shared system for distributing advantage and disadvantage. But what, in the context of near- and long-term climate change, are the units of advantage and disadvantage we are to distribute? What, in other words, is the *currency* of intergenerational climate justice? This is the question the present chapter considers.

With climate justice, as with justice generally, our choice of currencies may have important distributive implications. A purely economic interpretation of justice's currency might require us to provide only cash for future generations (assuming the scope of justice we adopt is reasonably inclusive of the future). A welfarist approach to currency, by contrast, might require us to enable the creation of such positive states as happiness in the minds of future people. The distributive differences arising between these interpretations, if implemented, are potentially profound: a generation of people taking the economic interpretation, it seems, would disregard the non-monetizable impacts of climate change and other environmental problems, exacerbating these to an extent that now seems unacceptable in its quest to bequeath more money to the future. Acknowledging the crucial impacts people's surroundings have on their well-being, it seems the welfarist interpretation would avoid some of the non-monetizable harms imposed by the economic approach while also providing the amounts of cash and tangible resources necessary to enable future peoples to maintain positive states of mind. In the context of climate change, it seems we must expect policymakers who employ a purely economic currency of justice to do relatively little to reduce emissions now, mitigating only to the extent that this will minimize clearly monetizable costs (like those associated with large sea level rises) and assuming, as the

economists William Nordhaus and Bjorn Lomborg do,[133] that the more crucial imperative is to grow the monetary resources of future generations by investing in present-day physical and human capital. A welfarist approach seems likely to take a heavier emphasis on mitigation, given its assumption that even non-monetizable or poorly monetizable costs (like those associated with the loss of pristine wilderness due to climatic shifts) can degrade the mental states of future human beings.

Although these characterizations of economic and welfarist approaches to the currency of justice are simplistic, they serve to illustrate a broader point: the effects of our contemporary climate policies on future generations may vary considerably with the currencies of justice that these policies seek to provide across generations. The selection of the appropriate currency of justice, then, is no small matter. What methods might we employ in selecting it? Early in *A Theory of Justice*, Rawls provides an intuitive mechanism—the original position—for evaluating propositions of justice. In this section, I use the original position to weigh the proposed currencies against each other, following Rawls's assumption that "one conception of justice is more reasonable than another, or justifiable with respect to it, if rational persons in the initial situation would choose its principles over those of the other for the role of justice."[134]

In an effort to further inform my upcoming comparison of currencies of justice, I presently recall the impacts climate change entails for the future, and the source of these impacts: as stated in Chapter One, climate change involves the imposition of sea level rise[135] and the

[133] Partha Dasgupta references the similarities between Nordhaus and Lomborg's approaches in his critique of Sir Nicholas Stern's economic assessment of climate change. Partha Dasgupta, 2006, "Comments on the Stern Review's Economics of Climate Change," *University of Cambridge Working Papers*, http://www.econ.cam.ac.uk/faculty/dasgupta/STERN.pdf.
[134] Rawls, *A Theory of Justice*, pp. 15-16.
[135] Bruce Douglas *et al.*, *Sea Level Rise: History and Consequences*, San Diego: Academic Press, 2001, p. xvii.

exacerbation of natural burdens like heat waves[136] and hurricanes.[137] And climate changing behaviors correspond to a considerable extent with basic activities of human survival, including (to name just a few) producing and cooking food, transporting oneself and one's possessions, and staying warm. The challenge, then, is one of justly balancing present and future needs against the backdrop of a changing but presumably salvageable climate. Such a balance would be impossible to strike without some understanding of what these particular needs are. For this reason, the following pages critically compares a number of definitions of need—or more, precisely, justice's *currency*—including the "crude" currencies of "resources," "welfare," and "opportunities for welfare," and the more sophisticated currencies of "equal rights" and "vital interests" for decent autonomous living (as advocated by Brian Barry), "social primary goods" (as advocated by John Rawls), and "basic capabilities to function" (as advocated by Amartya Sen and Martha Nussbaum).

B. Some simple currencies of justice

Resources is one very simple account of justice's currency. Presumably included in this broad category of goods are money, food, clothing, and other staples of survival, along with a full range of other basic and luxury items; accordingly, resources may at first glance appear to be a practical and usefully general guide to the things that posterity will need to secure its reasonable interests, and thus to the *currency* that present generations behaving justly should preserve for posterity. Yet we need only repeat the initial question that guides this discussion of

[136] Laurence Kalkstein, "Impacts of Global Warming on Human Health: Heat Stress-Related Mortality," in *Global Climate Change: Implications, Challenges and Mitigation Measures*, Easton, PA: Pennsylvania Academy of Science, 1992, p. 371.
[137] Peter Webster *et al.*, "Frequency, Duration, and Intensity of Tropical Cyclonic Storms in a Warming Environment," presented January 31, 2006 at the American Meteorological Society's 18th Conference on Climate Variability and Change, *86th Annual AMS Meeting*, Atlanta, GA, January 28 – February 4, 2006.

justice's currency to understand one of the conception's chief shortcomings: what are the benefits *and burdens* that our account of climate justice seeks to provide? Not all of the provisions people and societies will require to appropriately mitigate and adapt to climate change are readily categorized as "resources." Fair distribution of the materials necessary for effective climate adaptation is likely to require that individuals possess not only material goods but basic political abilities and liberties, including the ability to submit complaints within a governmental framework responsive to their needs and the liberty to inhabit (or, if necessary, move to) places that are not excessively burdened by climatic effects. Such abilities and liberties are not resources, and they are likely to require stable institutions and cultural practices *in addition to* resources if they are to be maintained.

Additionally, as observed in Chapter One, climate change entails *harms* that cannot always be considered as mere shortages of resources. Heat waves, for instance, are likely to become longer, hotter, and more frequent as a consequence of climate change.[138] The people who suffer and die as a consequence of heat waves do so because their personal biological systems, and often the physical and social structures on which they rely,[139] experience temperature increases so rapid that they cannot adapt to them. With heat waves, as with hurricanes, sea level rise, spreading disease vectors, and other climate impacts, the principal causes of injury are not resource shortages, but sudden, unmanageable changes in local environmental conditions that would not have come into being, or at least not so severely, in the absence of climate change. In their failure to account for climate change as a source of *harms*

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[138] Paul Epstein and Christine Rogers, eds., "Inside the Greenhouse: The Impacts of CO_2 and Climate Change on Public Health in the Inner City," *Harvard Medical School working papers,* 2004, http://chge.med.harvard.edu/publications/documents/green.pdf.

[139] Eric Klinenberg's *Heat Wave: A Social Autopsy of Disaster in Chicago* describes how buckling roads, an overwhelmed power grid, and completely unprepared healthcare and public outreach systems exacerbated the human toll of the July 1995 heat wave in Chicago. Eric Klinenberg, *Heat Wave: A Social Autopsy of Disaster in Chicago*, Chicago: University of Chicago Press, 2002.

and as a phenomenon to which people must often adapt using liberties, abilities, and institutions *as well* as resources, resourcist accounts of climate justice's currency fall short.

In view of these difficulties, it may seem logical to shift the currency's focus from resources to *welfare*; such a move seems to draw both harms and non-resource goods like institutions and liberties into the fold of its consideration, thereby neutralizing the concerns previously discussed. Edward Page distinguishes between *conscious-states* welfarism and *success* welfarism. In this typology, theories of conscious-states welfarism "hold that welfare consists in the presence of certain desirable conscious states," which can be "'simple,' as in the case of the pleasure a person derives from eating an ice-cream, or 'complex,' as in the case of the enjoyment a person derives from a tragic novel."[140] Success welfarism, by contrast, regards welfare as the extent to which people have fulfilled (or are fulfilling) the deeper objectives of their lives. Page regards theories of success welfarism as "superior to conscious-state theories" because "they can account for the idea that a person can be low in welfare even if they experience pleasurable conscious states" and "also... how people can be well off even if they are in temporary pain, such as where a person gives birth or experiences a painful, though nevertheless subjectively worthwhile, love affair."[141]

Before delving into what are perhaps the most serious flaws facing welfare as a currency of justice—what Page and others have called the "cheap tastes" and "expensive tastes" problems—it is possible, considering the discussion of the previous paragraph, to observe a more general difficulty with the *scale* at which welfarism seems to target its concern. The difficulty is this: both conscious-states welfarism and success welfarism seem preoccupied with the experiences of individuals and the states or objectives that these experience fulfill within them.

[140] Page, *op. cit.*, p. 54.
[141] *Ibid*., p. 55.

Even if these states and objectives were precisely the stuff of which high-quality human lives are composed (which, as I discuss in the coming section about the complex currency of capabilities, they probably are not), it seems an emphasis on the internal states and objectives of individuals cannot provide a clear sense of one generation's obligations to another in the context of climate change. There is no telling what preferences those living 50, 500, or 5,000 years in the future might possess; more significantly, it is impossible to say with much accuracy or precision how the actions of the present generation will affect the ability of these future individuals to fulfill their preferences, given the vast and uncertain range of impacts different contemporary actions might have on future climatic effects. (Here it is worth recalling the "uncertainty explosions" discussed by Stephen Schneider and Janica Lane in Chapter One.[142]) The welfarist currency seems to take a microscopic view of the ways in which climate change's distributive outcomes affect people, and though this view may be useful at the level of interactions between individuals, it is much too fine and much too narrow to be of use at the level of the more distant and ambiguous interactions between generations in the context of climate change. This is a difficulty that will reappear later in this chapter; for now, however, let us consider more directly the critical flaws that cripple welfare as an account of the currency of justice.

Welfarist theories, in both their "conscious states" and their "success" varieties, suffer from a set of more serious shortcomings: the "cheap tastes" and "expensive tastes" problems. Underlying these concerns is the basic observation that initial distributions of "welfare" necessarily affect people's preferences. A rich American who develops fetishistic obsessions with expensive food and clothing, prestigious university degrees and professional positions, and other trappings of privilege may only be capable of maximizing his "conscious states" welfare and "success" welfare through vast monetary expenditures. An impoverished Nigerian who

[142] Schneider and Lane, *op. cit.*, p. 32

comes to find inexpensive cassava dishes deeply satisfying, and who, possessing little else to distract him, develops powerful connections to his family and his community may experience levels of both "conscious states" welfare and "success" welfare equivalent to those enjoyed by the American, at a fraction of the cost. The American and the Nigerian may be said to have "expensive tastes" and "cheap tastes," respectively. Do the different "welfare functions" of these individuals justify the *vastly* different levels of spending required to satisfy each of them? In other words, are the requirements of justice met once the American and the Nigerian have attained equivalent levels of welfare, even if the resources they enjoy (by contingency of birth, not merit or fault) are completely unequal? Problematically, the welfarist accounts seem to answer "yes."

The "tastes" problems are of particular relevance for intergenerational climate justice. If the next few centuries yield climate changes that are disruptive and environmentally harmful but not suddenly cataclysmic, it seems quite possible that "members of later generations might adapt to their degraded surroundings by learning not to desire so intensely access to clean air"[143] and other goods while making peace with the shorter life expectancies that may have resulted from heat waves, hurricanes, droughts, malaria epidemics, and other climatically exacerbated difficulties. Under such conditions, and with such coping mechanisms, those living several centuries from now might come to experience levels of welfare equivalent to the ones we enjoy today, despite living on a planet that is by our standards considerably less inhabitable. Once again, welfarist currencies of justice seem to regard the lots of people possessing degraded sets of resources and opportunities as being equivalent, for purposes of distributive comparison, to the lots of people possessing undiminished resources and opportunities *so long as* each group experiences equal amounts of welfare. In addition to seeming quite out of sync with our

[143] Page, *op. cit.*, p. 56.

intuitions, the welfarist system is unworkable from the standpoint of distributive justice, since "welfare" is not and cannot be quantifiable, and is thus almost impossible to compare between individuals, much less temporally distant generations.

In recognition of the "tastes" problems, some theorists have advocated for the use of *opportunity* for welfare, not welfare itself, as the morally significant intergenerational currency.[144] Page contends that, in the context of intergenerational climate justice, the "cheap tastes" problem is as applicable to "welfare opportunism" as it is to "welfarism." Page refers in particular to the difficulties of climate adaptation, demonstrating how efforts to enable future generations to thrive within the constraints of a severely altered climate might, if successful, create "generations of persons who look on their environment in a similar way to [that in which] Tiny Tim views his disability," enjoying "neither less welfare, nor less opportunity for welfare, than their ancestors despite enjoying a worsened natural resource base."[145] Page's argument seems off. I believe we must assume categorically that a person with more resources (and fewer burdens) than another person enjoys a range of prospects preferable to the range enjoyed by the other, less well-endowed person. The less well-endowed person can always tweak her approach to living to maximize her utility within her particular set of constraints, but the better-endowed person can do the same thing in greater measure, insofar as the constraints she faces are not as severe as those faced by her peer. So, though it may always be possible (though perhaps highly difficult) for a climatically burdened generation to improve its welfare under current conditions

[144] Until recently, Richard Arneson was among these advocates. See Richard Arneson, 1989, "Equality and Equal Opportunity For Welfare," *Philosophical Studies*, 56, p. 86, cited in Page, *op. cit.*, p. 58.
[145] Page's allusion to the crippled but high-spirited Tiny Tim (of Charles Dickens's *A Christmas Carol*) seeks to illustrate how future generations saddled with the climatic consequences of past behaviors may inherit funding and educational institutions—the equivalent of Tim's sunny disposition—that enable them to provide for their own well-being despite persistent hardship.

through adaptation, such improvements are unnecessary or at the very least equally attainable for the present generation. Consequently, *relative inequality of opportunities for welfare* persists.

This refutation of Page's argument may appear to salvage "welfare opportunism" as a legitimate currency of justice. I believe the approach suffers from a more serious flaw. As mentioned briefly in the foregoing paragraph on welfarism, the emphasis on human welfare as justice's ultimate aim—welfare that is experienced solely and subjectively at the level of the individual—seems to imply a microscopic view of justice's currency. Welfare opportunism's "*opportunity*" provision generalizes the currency's focus away from the subjective level of individuals, who experience welfare via their own unique welfare functions, and toward the objective, quantifiable resources and liberties all people utilize in experiencing welfare. But this generalization neither removes welfare opportunism's ultimate emphasis on individual-level *welfare* nor provides any level of specificity about the kinds of resources, rights, and liberties that are required to enable individuals to secure welfare. Welfare opportunism thus occupies an uncomfortable middle ground between the microscopic and the macroscopic, failing to provide an intuitive guide to intergenerational climate justice's currency at either scale. As we shall see, Rawls's social primary goods approach provides a much clearer notion of the currency of intergenerational climate justice at the macroscopic scale—the only scale at which people living in the blinded present can envision the likely long-term climatic effects of their polluting activities—while Sen and Nussbaum's capabilities and functionings approach provides a clearer of notion of the currency of justice at the microscopic level of climate adaptation and economic development. Welfare opportunism's chief flaw, then, has less to do with the "cheap tastes" problem than with the indeterminacy of the scale at which it is applicable.

C. Sophisticated currencies of justice

Briefly setting aside the aforementioned concerns about scale, this section considers a group of approaches to the currency of justice that I consider more sophisticated than resourcism, welfarism, and welfare opportunism. These are John Rawls's "social primary goods," Amartya Sen and Martha Nussbaum's "capabilities and functionings," and Brian Barry's "vital interests."

1. Social primary goods

At several points in *A Theory of Justice*, Rawls discusses requirements of intergenerational justice that can seemingly only fall within the category of justice's *currency*. For instance, in outlining his "just saving principle" (which he finds necessary given the "present time of entry interpretation" and subsequent risk that, following the difference principle alone, the parties to the original position might "favor [the least advantaged members of] their generation by refusing to make any sacrifices at all for their successors"[146]), Rawls asserts that

> Each generation must not only preserve the gains of culture and civilization, and maintain intact those just institutions that have been established, but it must also put aside in each period of time a suitable amount of real capital accumulation. This saving may take various forms from net investment in machinery and other means of production to investment in learning and education.[147]

Earlier, Rawls observes that "questions of social justice" arise not only within generations but also "between generations… for example, the question of the appropriate rate of capital saving and of the conservation of natural resources and the environment of nature… [and] the question of a reasonable genetic policy." Rawls discusses these "questions," which seem to point readily to specific elements of his proposed currency of intergenerational justice, in an effort to justify

[146] *Ibid.*, p. 121.
[147] *Ibid.*, p. 254.

his decision to extend the veil of ignorance by obscuring from the parties in the original position all information about the generations to which they belong.[148]

At first glance, then, Rawls's currency of intergenerational justice includes "the gains of culture and civilization," "just institutions," monetary, infrastructural, and cultural "capital," "natural resources," and "a reasonable genetic policy." This seems a useful preliminary index of the things the present generation owes to the future, but does it differ in any meaningful way from the basic currency of resources refuted in the last section? If the aforementioned items were the only components of Rawls's currency of justice, the answer would indeed be "no." Rawls's currency of justice, however, is vastly more developed than this simple index of intergenerational goods reveals. The following paragraphs outline the origins and specifications of the "social primary goods," which are the basis of Rawls's currency.

The foundations of Rawls's account of justice lie with the two principles of justice he outlines in §46 of his *Theory of Justice*: first, that "each person is to have an equal right to the most extensive total system of basic liberties compatible with a similar system of liberty for all," and, second, that

> social and economic inequalities are to be arranged so that they are both:
> (a) to the greatest benefit of the least advantaged, consistent with the just savings principle, and
> (b) attached to offices and positions open to all under conditions of fair equality of opportunity.[149]

These principles are "ranked in lexical order" such that efforts to secure compliance with the second principle are legitimate only if they do not compromise compliance with the first; in other words, "basic liberties can be restricted only for the sake of [greater overall] liberty," not for the

[148] *Ibid.*, p. 119.
[149] Rawls, *A Theory of Justice*, p. 266.

sake of improving the material well-being of any group or individual.[150] The two principles, which Rawls believes are those that free, reasonable, rational, equal parties would select to govern their society from the standpoint of the original position,[151] provide a preliminary sense of the currency of justice that Rawls believes society must distribute.

Rawls finds it necessary to specify some "objective grounds" for comparisons of individuals' levels of advantage, comparisons that society must inevitably make if it is to adhere to the difference principle. Indeed, he writes, "these estimates cannot be left to our unguided intuition." To provide these "objective grounds," Rawls offers a set of "social primary goods," which are consistent with the general sense of justice he outlines via the two principles. The goods are general by design; Rawls notes that it would be "unreasonable to demand great precision" in outlining such goods, given the veil of ignorance, which obscures not only the parties' positions in the society they are to inhabit but also their individual conceptions of the good.[152] (These conceptions, if they became known to the parties in the original position, might lead the parties to adopt governing principles biased toward their own preferences, in violation of the different but reasonable beliefs that others in their society might possess.) Consequently, Rawls specifies that the social primary goods are "things which it is supposed a rational man wants whatever else he wants," or, in other words, "things which he [will] prefer more of rather than less" no matter what specific "rational plans" he possesses.[153] It is in this sense that the goods are "primary."

[150] *Ibid.*, p. 266.
[151] Rawls writes that the two principles of justice "would be agreed to rather than the principle of utility" in the original position, since "only by this agreement can the parties be sure that their highest-order interest as free persons is guaranteed." *Ibid.*, p. 132.
[152] *Ibid.*, p. 78.
[153] *Ibid.*, p. 79.

What are the social primary goods? In *A Theory of Justice*, Rawls initially groups them into two "broad categories:" first, "rights, liberties, and opportunities," and, second, "income and wealth" and the "rights and prerogatives of authority." The goods are "social" in view of the role society must play in providing them; indeed, writes Rawls, "liberties and opportunities are defined by the rules of major institutions and the distribution of income and wealth is regulated by them."[154] Later in the work, Rawls also provides a detailed discussion of the "social basis of self-respect," which he considers the most important primary good of all; I discuss this third good and its components shortly. Rawls does not discuss in much detail his initial decision to group the social primary goods into two categories, but his later comments make the distinction between them clear enough. The first category—"rights, liberties, and opportunities"—comprises things that individuals simply possess or simply lack, and which do not lend themselves to accumulation (and thus unequal distribution) in the way that material resources do. The second category—"income and wealth," and the "rights and prerogatives of authority"—contains goods that "vary in their distribution."[155]

A third and separate primary good, which Rawls considers "most important," is self-respect, without which "nothing may seem worth doing… [and] all desire and activity becomes empty and vain."[156] The "social basis of self-respect" consists in both "a person's sense of his own value, his secure conviction that his conception of the good, his plan of life, is worth carrying out," and "a confidence in one's ability… to fulfill one's intentions."[157] As Amartya Sen observes, and as I discuss shortly, Rawls thusly "motivates [his] focus on primary goods by

[154] *Ibid.*, p. 87.
[155] *Ibid.*, p. 80.
[156] *Ibid.*, p. 386.
[157] *Ibid.*, p. 386.

discussing what the primary goods enable people to do;"[158] in this regard, the elements of Rawls's currency that involve self-respect seem to draw more from the "capabilities and functionings" approach of Sen and Martha Nussbaum than they do from the broader currency of "goods" to which Rawls claims to subscribe. This would please Sen and Nussbaum considerably if Rawls's notion of justice's currency did not address capabilities and functionings in what they judge to be an "incomplete, vacillating, and misleading way."[159] The following sections explore this and other critiques Sen and Nussbaum level against Rawls's currency of social primary goods; later, they examine some divergent and seldom-discussed features of the philosophers' basic approaches that seem to render Sen and Nussbaum's claims irrelevant.

2. Capabilities

In the landmark lecture "Equality of What?", Sen famously criticizes Rawls's currency of social primary goods for the "element of 'fetishism'" it contains. Rawls, Sen notes, "takes primary goods as the embodiment of advantage, rather than taking advantage to be a *relationship* between persons and goods."[160] Relatedly, he fears that Rawls's critique of utility as a parameter of justice is too harsh; "while utility in the form of happiness or desire-fulfillment may be an *inadequate* guide" to justice, Sen writes, "the Rawlsian framework asserts it to be *irrelevant*… which is, of course, a much stronger claim."[161] Though Sen shares Rawls's reservations about the utilitarian currency of justice—utility—he also believes utility, in the forms of "happiness" and "desire-fulfillment" (which are analogous to the aforementioned currencies of "conscious-states welfare" and "success welfare"), may constitute at least a small piece of the currency that

[158] Amartya Sen, *Resources, Values, and Development*, Oxford: Blackwell Publishers, 1984, p. 320.
[159] David Crocker, "Functioning and Capability: The Foundations of Sen's and Nussbaum's Development Ethic," *Political Theory*, 20:4, 1992, p. 596.
[160] *Ibid.*, p. 216.
[161] *Ibid.*, p. 216.

justice should seek to provide for people. More importantly, Sen implies that Rawls's rejection of utility stems from an essential unwillingness to look beyond goods to the effects these goods have on people.[162] Sen finds this stubbornness problematic.

As an alternative to Rawls's currency of social primary goods, Sen proposes a currency of "basic capabilities," where a "capability reflects a freedom to choose between [both] alternative lives"[163] and alternative actions, including moving freely, being nourished, being clothed and housed, and "participating in the social life of the community."[164] Sen finds this approach preferable to all currencies of goods—even currencies that include non-material goods like rights and liberties—since such currencies necessarily focus on "good things" to the neglect of "what these good things *do* to human beings."[165] As mentioned previously, Sen believes currencies of utility *do* focus on goods' effects on people, but argues—rightly, I think—that it is impossible to construct a utilitarian currency that does not fail before the "cheap tastes" and "expensive tastes" objections. Though Sen does not explicitly address equality of *opportunity* for welfare in "Equality of What?", if we interpret "opportunity" as a largely material construct—that is, if we believe (as I think we must) that one person cannot be said to have the same opportunities for welfare as another person if one enjoys an abundance of food while the other starves for the lack of it—then Sen's objection to the "fetishism" of Rawls's social primary goods approach seems to apply also to equality of opportunity for welfare.

What are the distributive implications of adopting Sen's currency of capabilities rather than Rawls's currency of social primary goods? Sen acknowledges that the distributive outcomes of the use of his approach would differ minimally from those of Rawls's approach "if human

[162] Sen, "Equality of What?", p. 216.
[163] Sen, "Justice: Means Versus Freedoms," *Philosophy and Public Affairs*, 19:2, 1990, p. 117.
[164] Sen, *Equality of What?*, p. 218.
[165] *Ibid*., p. 218.

beings were very like each other."[166] In reality, he argues, people differ significantly in their abilities to convert goods into valuable mental states and functionings, and their differences track along both societal and individual lines. As David Crocker puts it, "the clothing that promotes basic functioning differs in the rainforests of Costa Rica and the tundra of Alaska,"[167] just as the nutritional requirements of any individual woman differ from those of her newborn child. A system of justice that seeks to distribute goods without considering the *uses* of those goods from society to society and individual to individual may crucially misestimate what packages of goods to provide in particular places. Following the 2004 tsunami that struck southeast Asia, for instance, "inappropriate aid" undermined the international response considerably: relief agencies sent canned pork to heavily Muslim Aceh, Indonesia, and bulky sweaters to sweltering southern India.[168] Sen's currency of basic capabilities requires that providers of justice consider, with as much resolution as possible, the items and positive and negative freedoms (that is, both freedoms *to do* certain things and freedoms *not to have* certain burdens imposed) that people need to acquire basic human capabilities. For Sen, these capabilities, not the goods that provide for them, are the ultimate ends of justice.

Sen's account of the currency of justice is both plausible and question-begging: if justice consists in basic capabilities, what exactly are these basic capabilities? Though Sen acknowledges that "the issue of the indexing of the basic capability bundles is a serious one," he states that the lecture "Equality of What?" is "not the occasion to go into the technical issues involved such an indexing."[169]

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[166] *Ibid.*, p. 219.
[167] Crocker, *op. cit.*, p. 591.
[168] John Telford, John Cosgrave, and Rachel Houghton, *Joint Evaluation of the International Response to the Indian Ocean Tsunami: Synthesis Report*, London: Tsunami Evaluation Coalition, 2006, p. 52.
[169] Sen, "Equality of What," p. 219.

It is here that Martha Nussbaum comes to Sen's aid, summarizing the question that exercises both of them in their quest for an accurate index of the most basic human capabilities:

> We must ask which things are so important that we will not count a life as a human life without them?[170]

In response to this question, Nussbaum advances a set of "basic capabilities," which she believes are innate to healthy people, and which she distinguishes from "internal capabilities"—capabilities that people build through training—and "combined capabilities"—internal capabilities made actionable by the presence of certain external conditions, such as, for example, the freedom to elect one's political representatives.[171] (In this example of a combined capability, the internal capability in question is that of comparing and expressing preferences for potential representatives, an activity that is of little direct practical value if one does not also enjoy the underlying opportunity to vote these preferences in a free, fair election.) Nussbaum lists the following ten "basic capabilities:"

> **1. Life.** Being able to live to the end of a human life of normal length . . . ; not dying prematurely.
> **2. Bodily health.** . . . Being able to have good health, including reproductive health; being adequately nourished . . . ; being able to have adequate shelter . . .
> **3. Bodily integrity.** Being able to move freely from place to place; being able to be secure against violent assault, including sexual assault . . . ; having opportunities for sexual satisfaction and for choice in matters of reproduction
> **4. Senses, imagination, thought.** Being able to use the senses; being able to imagine, to think, and to reason--and to do these things in . . . a way informed and cultivated by an adequate education . . . ; being able to use imagination and thought in connection with experiencing, and producing expressive works and events of one's own choice . . . ; being able to use one's mind in ways protected by guarantees of freedom of expression with respect to both political and artistic speech and freedom of religious exercise; being able to have pleasurable experiences and to avoid nonbeneficial pain
> **5. Emotions.** Being able to have attachments to things and persons outside ourselves; being able to love those who love and care for us; being able to grieve at their absence, to experience longing, gratitude, and justified anger; not having one's emotional developing blighted by fear or anxiety. . . .

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[170] Martha Nussbaum, "Human Functioning and Social Justice: In Defense of Aristotelian Essentialism," *Political Theory*, 20, 1992, p. 212.
[171] Nussbaum, *Sex and Social Justice*,, Oxford: Oxford University Press, 1999, p. 44.

> **6. Practical reason.** Being able to form a conception of the good and to engage in critical reflection about the planning of one's own life. (This entails protection for liberty of conscience.)
> **7. Affiliation.** Being able to live for and in relation to others, to recognize and show concern for other human beings, to engage in various forms of social interaction; being able to imagine the situation of another and to have compassion for that situation; having the capability for both justice and friendship. . . Being able to be treated as a dignified being whose worth is equal to that of others.
> **8. Other species.** Being able to live with concern for and in relation to animals, plants, and the world of nature.
> **9. Play.** Being able to laugh, to play, to enjoy recreational activities.
> **10. Control over one's environment.** (A) *Political*: being able to participate effectively in political choices that govern one's life; having the rights of political participation, free speech and freedom of association . . . (B) *Material*: being able to hold property (both land and movable goods); having the right to seek employment on an equal basis with others . . . [172]

Sen and Nussbaum believe these capabilities are "culturally invariant;" in other words, any human being may be called deprived if he or she lacks any of the ten listed capabilities. (Again, Sen and Nussbaum believe the packages of goods required to secure these capabilities *do* vary, at both the individual and cultural levels.)

Sen and Nussbaum's currency of capabilities has stimulated some controversy. Gerald Cohen, for instance, believes capabilities imply an inappropriately "athletic" conception of the substance of decent human life, citing the examples of babies and incapacitated adults who receive nourishment passively in the form of hospital feeding tubes. Despite the fact of their nourishment, Cohen believes the capabilities approach places these babies and adults beneath its threshold for decent living, since neither the babies nor the adults are "able" to feed themselves. Consequently, Cohen embraces a currency of "midfare," so called because it is "posterior to having goods and prior to having utility."[173] He includes in his definition of midfare the "capabilities properly so called" that goods give to people, the "valuable activities… and

[172] *Ibid.*, pp. 41-42, cited in Jan Garrett, "Martha Nussbaum on Capabilities and Human Rights," *Western Kentucky University Working Papers*, 2008, http://www.wku.edu/~jan.garrett/ethics/nussbaum.htm.
[173] Gerald Cohen, "Equality of What? On Welfare, Goods, and Capabilities," *The Quality of Life*, eds. Amartya Sen and Martha Nussbaum, 1993, p. 18.

desirable states" that people engage in by exercising these capabilities, and the desirable states that goods cause "directly, without any exercise of capability on the part of their beneficiary." For this last variety of midfare, Cohen provides an example with relevance for climate change: the average resident of the average developed country, he observes, enjoys freedom from malaria not because she has herself exercised any capability, but because "others have destroyed the malaria-causing insects" for her. Cohen fears that Sen's currency of justice fails to account for such vital states of being, which the individual person "neither brought about nor ever was in a position to bring about."[174] In light of Cohen's example, it seems a currency of intergenerational climate justice that failed to account for those benefits that governments and other institutions provide unconditionally for people—that is, without requiring any exercise of "capability" by these people—would indeed be flawed.

a. Misreadings: reconciling currencies of justice in the immediate and distant future

Despite its relevance for the context of climate change, Cohen's objection seems to necessitate, at most, minor revisions to Sen and Nussbaum's capabilities approach. In his response to Cohen's critique, Sen in fact argues that the term "capability," in its common usage, accounts for passive advantages like malaria avoidance:

> The fact that a person has the freedom to enjoy a malaria-free (or, to put it slightly differently, that his choice of a malaria-free life is feasible) may be entirely due to the actions of others... but that does not compromise the fact that he can indeed have a malaria-free life and *has the capability* (thanks largely to others) to achieve such a life.[175]

With a little linguistic flexibility, Sen and Nussbaum's approach is made to incorporate all of the advantages that people might require to maintain the basic capabilities previously listed. Cohen's

[174] *Ibid.*, p. 28.
[175] Sen, "Capability and Well-Being," p. 45.

objection thus seems trivial, and his currency of midfare too similar to Sen and Nussbaum's much more developed currency to justify a switch.

At the microscopic level of the individual, I believe the capabilities approach is a finer and more accurate guide to justice than Rawls's currency of social primary goods. The hungry victim of a climatically exacerbated future crop failure will indeed need "income and wealth" and "natural resources" if he is to acquire enough food to survive, but these categories will prove vague to the point of uselessness when it comes time to feed him. The particular food items the victim will need to survive, and the particular political rights and amounts of money he will need to acquire them, will necessarily depend on his individual and cultural circumstances. Sen and Nussbaum acknowledge this, emphasizing only that determinations about these particular needs must proceed with the satisfaction of capabilities as their objective. In the context of climate justice, Sen and Nussbaum's currency appears to have an important role to play. By specifying the objective of adaptation to climate impacts—that is, the fulfillment of people's capabilities to achieve functionings despite these impacts—Sen and Nussbaum's currency can ensure that aid is both sensitive to the particular needs of impacted populations and comprehensive in its effort to provide individuals of these populations with all ten of the basic capabilities outlined earlier in this chapter. The attractiveness of the currency of capabilities is evidenced by the fact that institutions working to facilitate development and climate change adaptation have already incorporated capability fulfillment into their objectives. According to Sakiko Fukuda-Parr, the capabilities approach provided the "conceptual foundation" of the United Nations Development Programme's Human Development Index, which has come to rival per-capita gross domestic product as a measure of development. Sen has helped the Programme produce its annual Human

Development Reports since it began publishing them in 1990.[176] A browse of the World Bank's "Rural Institutions and Adaptation to Climate Change" program website reveals that the capabilities approach has influenced also the discourse of climate adaptation.[177] This is unsurprising, since the primary tasks of climate adaptation—building institutional capacity and improving infrastructure, to name a few—differ minimally from those of traditional development work.

But the revelations of Sen and Nussbaum do not render Rawls's currency useless. In particular, the currency of social primary goods seems well-adapted for considerations about just climatic interactions between the present and the relatively distant future, which must consist largely of efforts to *mitigate* climate-changing activities.[178]

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[176] Sakiko Fukuda-Parr, "The Human Development Paradigm: Operationalizing Sen's Ideas on Human Development," *Feminist Economics*, 9:2-3, 2003, pp. 301-317.

[177] A "sustainable livelihood," the Rural Institutions and Adaptation to Climate Change program overview remarks, "includes the idea of coping with and recovery from external stresses so as to maintain or enhance existing *capabilities* and assets." (Italics added for emphasis.) World Bank staff, "Rural Institutions and Adaptation to Climate Change," from the website of the World Bank, 2008, http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTSOCIALDEVELOPMENT/0,,contentMDK:21555832~isCURL:Y~pagePK:210058~piPK:210062~theSitePK:244363,00.html.

[178] It stands to reason that the present generation can ameliorate injustices arising from expected future climatic harms in two ways: first, it can seek to prevent the climatic harms from occurring later by *mitigating* its emissions now; and, second, it can establish institutions designed to minimize the human toll exacted by these harms—that is, institutions designed to assist human *adaptation* to future climate change.

Since a certain measure of climate change is now unavoidable, and since climate change has already begun to cause injustices, no generation—not even the present one—can afford to pursue mitigation to the exclusion of adaptation. Nonetheless, it seems the particular time scale at which a generation seeks to ensure justice must help specify the balance of mitigation and adaptation measures the generation adopts. Climate justice within the present seems most ably ensured through adaptation, since mitigation can do almost nothing to soften climatically exacerbated natural impacts occurring today. Climate justice between the present and the relatively distant future, however, seems best provided by the preventative measure of mitigation. Nicholas Stern's report on the economics of climate change demonstrates that mitigation is a much more cost-effective approach to preventing unjust climatic harms than adaptation. Over long time scales, mitigation also renders possible a greater measure of justice than adaptation, since unabated climate change is sure to involve impacts—sudden hurricanes, rapidly changing agricultural conditions, and the like—to which complete adaptation is impossible.

Even if it appeared cheaper in total, over time, for the present generation to prepare future generations for coming climate impacts (by expanding climate adaptation programs and increasing rates of long-term saving) than to prevent the climate impacts from happening in the first place (through mitigation), it would be unjust for the present generation to pursue adaptation exclusively. As Brian Barry puts it, "the principle of responsibility says that, unless people in the future can be held responsible for the situation that they find themselves in, they should not be worse off than we are." Even if the present generation were to provide many of the means of climate adaptation to the future, such as effective disaster relief programs and large supplies of cash, the actual conversion of these resources into the currency of justice would remain a difficulty for the future alone. Consequently, to build up

Rawls derives his currency from the perspective of the original position, in which the deliberating parties lack particular knowledge of the society whose principles they must select. His decision to add this "veil of ignorance" arises from his desire for a society in which all people can live according to their own "rational plans of life."[179] Rawls's social primary goods are thus designed for broad utility, not the fulfillment of specific needs; they are the "things that every rational man is presumed to want,"[180] "whatever else he wants."[181]

With respect to the distant future, the generation now living occupies a position similar to that of the parties in Rawls's original position. Those of us living today cannot say with any specificity what needs and conceptions of the good the world's peoples will possess in one hundred years, nor can we determine exactly which sets of goods, liberties, and opportunities these peoples will enjoy. Our climate-changing activities will certainly affect future distributions of burdens and benefits, but it is unknowable to us precisely *how*. Already human-induced climate change is triggering natural responses in the world, including hotter, longer, and more frequent heat waves, more intense hurricanes, cyclones, and high sea events (including tsunamis), and wider-reaching droughts and disease outbreaks.[182] At the most, scientists can predict malaria outbreaks four months before they strike.[183] They can predict droughts up to one month in advance;[184] hurricanes and cyclones, up to five days in advance;[185] and heat waves, up

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adaptive capacity without also pursuing mitigation would be to saddle the future with massive logistical (if not economic) headaches for which the present, not the future, would be responsible.

Evidently, then, an intergenerationally just climate policy must combine both mitigation efforts and adaptation efforts. The coming pages provide some general principles for specifying just balances of mitigation and adaptation over time. Barry, *op. cit.*, p. 106.

[179] Rawls, *A Theory of Justice*, p. 54.

[180] Rawls, *A Theory of Justice*, p. 54.

[181] *Ibid.*, p. 79.

[182] Intergovernmental Panel on Climate Change, "Summary for Policymakers," *Fourth Assessment Report*, from the website of the IPCC, 2007, http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf, p. 12.

[183] Andrew Githeko and William Ndegwa, "Predicting Malaria Epidemics in the Kenyan Highlands Using Climate Data: A Tool for Decision Makers," *Global Change and Human Health*, 2:1, 2000, pp. 54-63.

[184] National Drought Mitigation Center staff, "What is Drought?", from the website of the National Drought Mitigation Center, 2006, http://www.drought.unl.edu/whatis/predict.htm.

to 60 hours in advance.[186] (Tsunamis, which scientists expect to yield larger impacts as the climate warms and sea levels rise, arise from fundamentally unpredictable ocean-floor earthquakes, and are thus almost impossible to forecast.[187]) Beyond the next days, weeks, and months, then, we can only refer to climate change's future impacts in the language of broad trends. We know our actions today are triggering biophysical responses that will harm people in the future; we cannot say precisely who these responses will harm, or when, or how, or where they will harm them. The language of capabilities and functionings, with its emphasis on tailoring development solutions to the particular needs of specific populations, is thus ill-suited for considering the obligations of those living today to these yet-unspecified future people. Rawls's currency of social primary goods provides a level of generality that is consistent with our merely general knowledge of the needs future climate change will threaten.

What I am proposing is that we should adopt for our considerations about intergenerational climate justice *two* currencies—Sen and Nussbaum's basic capabilities to function at the microscopic individual scale on which adaptation must occur, and Rawls's social primary goods at the more macroscopic scale at which mitigation must occur—even if we believe (as I do) that basic capabilities to function ultimately provide the most accurate account of the currency of justice. At the macroscopic scale of mitigation, an exclusive focus on capabilities to function would not bring us any nearer to understanding what justice requires us to provide for future people than a focus on social primary goods would, since the particular needs and vulnerabilities of future people remain to be determined. And problematically, the

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[185] National Oceanic and Atmospheric Administration staff, "Predicting Hurricanes: Times Have Changed," from the website of the National Oceanic and Atmospheric Administration, August 1, 2007, http://celebrating200years.noaa.gov/magazine/devast_hurricane/welcome.html#times.
[186] Science Daily staff, "Forecasting Killer Heat: UD Systems Predict Deadly Weather Worldwide," from the website of Science Daily, February 1, 1999, http://www.sciencedaily.com/releases/1999/02/990201073210.htm.
[187] Robert Roy Britt, "Tsunamis: The Grave, Global, and Unpredictable Threat," from the website of Live Science, January 13, 2007, http://www.livescience.com/environment/070113_tsunami_threat.html.

phrase "capabilities to function" does not come as close to describing the resources, institutions, and other crucial goods that climate change threatens as Rawls's currency of social primary goods does. Indeed, it is impossible to consider how climate change threatens future capabilities without turning first to the resources, institutions, and goods it threatens and, next, to the ways in which absences of these goods might undermine future capabilities. Taking goods as the currency of intergenerational climate justice may be "fetishistic" (insofar as the ultimate objective of justice is capability fulfillment), but it is also consistent with the realities of climate change, the real, physical ways in which it threatens people.

As time progresses, of course, projections that were once general and uncertain give way to tangible occurrences. The climatically strengthened hurricanes predicted for years by global circulation models suddenly strike land, creating new human needs that, for all their previous unknowability, are vivid and terrible. It is here that the focus on capability fulfillment becomes necessary. But is such a focus perhaps also necessary before such things occur? The answer, it seems to me, is yes, since place-specific preparation improves responses to both sudden disasters and gradual changes in, for instance, food growing conditions. We must therefore ask *when* the focus on general goods might give way to the focus on capabilities. It is impossible to provide a single unconditional answer to this question. "As soon as possible" is one conceivable response, but it is quite unsatisfying given the many different things peoples must spend their time and resources on besides adaptation to climate change. "As soon as *profitable*" seems a better answer, where "profitable" means that an adaptation response's likely benefits outweigh its likely costs. For example, efforts to stock a coastal city in Bangladesh with extensive emergency rations of food, water, medicine, and clothing—all of them tailored as best as possible to the purpose of satisfying individual and collective capabilities within that particular population—

would seem profitable; devastating hurricanes have struck Bangladesh before and will strike it again, creating significant new demands for stockpiled items when they do. Creating such stockpiles in landlocked agrarian countries to prepare for droughts that may by a slim chance occur there in, say, a hundred years would seem less profitable; it would be more sensible to wait until greater certainty exists about the particular places and periods these droughts will affect before establishing extensive stockpiles in such places. In the meantime, countries like these might instead concentrate a greater share of their resources on reducing emissions, which is a necessarily goods-focused (rather than capabilities-focused) endeavor.

This is not to say these countries should not consider other sorts of adaptation initiatives in the short term; human-induced climate change began some time ago, and there is nary a country in the world that does not have one climatically-exacerbated natural threat or another to worry about. Consequently, for most populations the question is not whether to select the adaptation-oriented lens of capabilities *or* the mitigation-oriented lens of social primary goods, but rather *how heavily* to employ each lens in its considerations about climate action.

The "profitability" criterion, as I have defined it, is surely question-begging. For starters, what exactly does the phrase "likely benefits" mean? How "likely" do an action's potential benefits have to be before one can say that they outweigh its more certain costs? This is a heavily loaded question, and it would be impossible to answer it exhaustively here. Multiplying the potential costs and benefits of an action by the likelihood of their occurrence and then comparing the probability-weighted costs with the probability-weighted benefits is one simple but effective approach to decisionmaking under uncertainty. As long as it is accompanied by a Rawlsian or similarly contractual consideration about the justice of the distribution of costs and benefits, and so long as it is *not* accompanied by a present-oriented temporal discount rate, I see no reason to

call it unjust. The much harder problem facing the probabilistic approach, it seems, is that of assigning values to potential costs and benefits in the first places. What price are we to place on a human life? What price on freedom? I make no assertions here about whether such questions are morally legitimate, though if they are I side with Frank Ackerman and Lisa Heinzerling in contending that ethical arguments, *not* utilitarian market valuation techniques, must specify the answers.[188]

There are surely other solutions, rooted in economics and public policy studies, to the problems of policymaking under uncertainty. I cannot address them here; my primary assertion for the present section is that the capabilities approach and the social primary goods approach can serve as effective lenses for considering intergenerational obligations of, respectively, adaptation and mitigation. My secondary assertion is that it is possible and likely necessary to specify a balance between the two approaches, much as one specifies thicknesses of glass in a pair of bifocals. The preliminary basis of "profitability," outlined above, can help guide this act of balancing, though I leave it to future researchers to demonstrate precisely how.

Another problem remains. Rawls's currency of social primary goods does focus more directly than Sen and Nussbaum's currency of capabilities on those relatively tangible goods and resources—natural resources, rights, liberties, and opportunities, and so forth—that climate change threatens directly. But it is still too vague to be serviceable in any process of determining whether particular tradeoffs between benefits and burdens experienced in the present and the future are just. To say that climate change threatens "natural resources," for instance, is tantamount to saying nothing at all; to provide a workable prescription for an ethical climate

[188] "…the market cannot tell us how to make the trade-off between the present and the world of our descendants many generations from now… A different style of decision making is required, explicitly based on our value judgments about equity between ourselves and the future." Frank Ackerman and Lisa Heinzerling, *Priceless: On Knowing the Price of Everything and the Value of Nothing*, New York: The New Press, 1994, p. 187.

policy, one must delve with as much specificity as the mists of time allow into the *kinds* of natural resources climate change threatens, the value of these threatened resources to human beings, and the probability that the threat to these resources will give way to actual destruction. (This third question—the question of probability—is a challenge that I leave to future researchers to sort out.) It is here that Brian Barry's discussion of sustainability and intergenerational justice becomes useful.

3. Vital interests

In the essay "Sustainability and Intergenerational Justice," Brian Barry contends that the present generation owes future people, as a requirement of justice, "the opportunity to live good lives according to their conception of what constitutes a good life." Thus, he argues, the currency of justice "needs to be read as some notion of equal opportunity across generations."[189] Barry finds it impossible to spell out *what* such opportunities would ideally enable future generations to do, be, or experience without calling forth his own personal opinions on what matters most in life; to do so would be clearly inappropriate, in his view, given that "one of the defining characteristics of human beings is their ability to form their own conceptions of the good life."[190] Barry's desire to remain general in defining the "opportunities" to be distributed between generations is consistent with both the general knowledge we possess about future climate impacts and the logic of Rawls's veil of ignorance. But his efforts to remain appropriately general do not prevent him from specifying (in somewhat greater detail than Rawls does) the basic material contents of "equal opportunity:"

[189] Brian Barry, "Sustainability and Intergenerational Justice," in Fairness and Futurity, ed. Andrew Dobson, Oxford: Oxford University Press, 1999, p. 104.
[190] *Ibid.*, pp. 103-104.

> …we cannot imagine in any detail what may be thought of as a good life in the future. But we can be quite confident that it will not include the violation of what I have called vital interests: adequate nutrition, clean drinking water, clothing and housing, health care and education, for example.[191]

In the context of intergenerational climate justice, Barry's "vital interests" offer a link between Rawls's currency of social primary goods and Sen and Nussbaum's currency of capabilities, insofar as these "vital interests" are general enough to cohere with our general current knowledge of future climate impacts while simultaneously being directly connected to the human capabilities—nourishment (via "adequate nutrition"), bodily health (via "clean drinking water, clothing, and housing, [and] health care"), and the exercise of sense and thought (via "education"), among other things—whose fulfillment I believe ultimately constitutes justice. Unlike Rawls, who selects resources and institutions for inclusion in his index of social primary goods on the basis of whether or not the hypothetical "rational man" would want them "whatever else he wants,"[192] Barry chooses the items that all people *need*, the items that are "vital" in any pursuit of a decent human life. This is a small but salient distinction; it demonstrates that Barry's currency falls closer to that of capabilities than Rawls's does.

Barry's currency of "vital interests" is also more clearly and readily connectable than either capabilities or social primary goods with the real-world impacts we expect climate change to produce. As mentioned previously, it is not human capabilities that climate change threatens, but the resources and institutions that enable these capabilities' fulfillment; thus capabilities themselves fail to provide a suitable lens for understanding what is unjust about climate change, even if capability fulfillment is (and I believe it is) the proper aim of justice at the level of the individual. Rawls's currency of social primary goods surpasses capabilities insofar as it consists directly of resources, institutions, freedoms. But, given the vagueness of the categories into

[191] *Ibid.*, p. 105.
[192] Rawls, *A Theory of Justice*, p. 79.

which Rawls groups the social primary goods, these goods admit of only broad-brush characterizations about the likely effects of climate change on future individuals. Indeed, it is impossible to consider how climate change actually harms people without first breaking Rawls's non-descript categories of goods, such as "natural resources," or "rights, liberties, and opportunities," into the more tangible goods and institutions of which they are composed, and which climate change actually threatens—like clean drinking water, as an example of a clearly necessary good from the category of "natural resources," or the right to receive disaster relief (during a hurricane or heat wave, for instance) from a reasonably responsive government, as an example of a good from the category of "rights, liberties, and opportunities." Barry describes his "vital interests" in such tangible, climate change-relevant terms, and though this does not differentiate his currency of justice from Rawls's in any dramatic way—both are, ultimately, speaking of basic, intrinsically desirable goods, rights, liberties, and institutions—I believe it renders it superior for the purposes of this thesis.

D. Currency in review

In this chapter, I have explored both simple and sophisticated accounts of justice's currency—the actual stuff in whose distribution justice and injustice consist—in the context of long-term climate change. The "simple" currencies of *resources*, *welfare*, and *opportunities for welfare* suffer from flaws that I believe make them unsuitable guides to intergenerational climate justice. *Resources* fails to account for liberties and rights and, particularly relevant for the matter of climate change, harms—two non-material categories items that, despite their relative intangibility, powerfully determine the extent to which situations are just. The currency of *welfare* embraces non-material benefits and harms, but suffers from the "cheap and expensive

tastes" problem, in which the differing welfare functions of individuals make it so that different amounts of resources must be spent on them in order to enable them to arrive at equivalent levels of welfare. The distributions of wealth and resources arising from a solely welfare-centric system of justice seem likely to be both unjustly unequal and, furthermore, difficult to assign: are people simply to be believed, for instance, when they claim that they require more resources than their neighbors in order to match them in welfare?[193] The currency of *opportunity for welfare* neutralizes the "cheap and expensive tastes" objections by shifting its focus from increasing welfare to increasing individuals' chances for welfare, which are bound to be easier to identify and distribute without bias than welfare itself. However, as I have said, *opportunity of welfare* does not—cannot—describe in any greater specificity than *welfare* did what welfare actually consists of. Consequently, it too is unacceptably ambiguous about the stuff of justice to be of use for determinations about just long-term climate solutions.

The three more sophisticated currencies I have discussed—Rawls's social primary goods, Sen and Nussbaum's capabilities, and Barry's "vital interests"—all make valuable contributions to our understanding of justice. Rawls argues for a clear and reasonably tangible index of goods with which to weigh justice, in rejection of the idea that just distributions may occur through "unguided intuition" alone.[194] He persuasively contends that justice must assign to people basic rights, liberties, opportunities, and access to institutions as well as basic material goods. Sen and Nussbam find this more layered index of "social primary goods" agreeable, but argue that Rawls is mistaken in believing these goods to be ends in themselves, rather than (as they contend) necessary means to the ultimate end of capability fulfillment. Though I believe Sen and Nussbaum are correct to emphasize capability fulfillment—and though I argue that it is most

[193]See Page, *op. cit.*, pp. 54 and 55.
[194] Rawls, *A Theory of Justice*, p. 78.

appropriate to adopt this currency for tasks of relatively near-term humanitarian relief, including climate adaptation assistance—I believe nonetheless that a focus on capabilities alone can be of little use to planners concerned about protecting the future world from the impacts of climate change. These planners' responsibility is to ensure that future generations receive the tangible resources, institutions, and social traditions that will require to enjoy capability-filled lives—not to deliver the capabilities themselves, which can only be realized in vivid detail once these future peoples have come into being.

Rawls's social primary goods—an index of resources and institutions specified concretely enough to provide "objective grounds" for evaluating justice, but also generally enough to be of service to all people, regardless of their conceptions of the good—would be perfect for such considerations about the long-term impacts of climate change were it not so vaguely and distantly connected to the real-world harms climate change is producing. Brian Barry improves upon the objective of the social primary goods by considering the ways in which climate change threatens such general goods and adopting "vital" human needs—for nourishment and education, for example—as the criterion by which to include goods and institutions in his index of justice. In this way, Barry refines the appropriately general currency of the social primary goods through a humanitarian, capabilities-oriented emphasis on "vital interests." Simultaneously, he explicitly links his hybrid of Rawls' and Sen and Nussbaum's currencies to the challenges of long-term environmental change, contending that environmental harm is wrong insofar as it threatens the general sets of resources and institutions that future people will need to live decent lives—in other words, their "vital interests."

In summary, the challenges of climate justice are best considered using currencies that vary with temporal scale. At the microscopic scale of climate adaptation, which seeks to help

people cope with immediate climate impacts, Sen and Nussbaum's currency of capabilities is most appropriate, since it ensures the level of consideration for varying cultural and individual needs that is necessary for such assistance to do its job. At the more macroscopic level of climate change mitigation, which seeks to prevent potential climate impacts from occurring in the first place, Barry's more material currency of "vital interests" (which, again, consists of minor revisions to Rawls's social primary goods) is most appropriate. Indeed, the present can only guarantee the capabilities of future people by ensuring that they inherit the tangible of resources, institutions, and traditions they will *need* to fulfill these capabilities for themselves (or that their governments or other social institutions will need to fulfill the capabilities for them). Barry's currency coheres best with this reality—better than social primary goods, which is too vague, and better than capabilities, which deals poorly with the limits on the present's ability to guarantee capability fulfillment for future peoples.

1. The lingering challenge of harm

In my critique of the simple currency of *resources*, I observed that biophysical *harms*, not just shortages of resources and institutions, characterize the way in which climate change undermines intergenerational justice. Harms are well accounted for by the capabilities approach of Sen and Nussbaum, which I have claimed to be the most appropriate currency for considering climate justice at the microscopic level of mitigation: Nussbaum's index of the basic capabilities includes both "life" (specifically, "not dying prematurely") and "bodily health."[195] According to this index, justice is violated when human-induced climate change impacts kill, sicken, or injure human beings.

[195] Nussbaum, *Sex and Social Justice*, p. 41.

At the more macroscopic level of mitigation, however, climate harms are not so well accounted for. Rawls and Barry's currencies are appealing for the task of weighing climatic obligations between generations because their contents, which include resources, liberties, institutions, and traditions, are clear and reasonably tangible. Consequently, they enable us to take a straightforward view of what precisely is unjust about human-induced climate change: it threatens the resources, liberties, institutions, and traditions that people need and will need in order to lead decent, capability-filled lives.

Harm, however, is not captured in Rawls or Barry's currency in the neat and tangible way that resources, institutions, and the like are. As I alluded in my critique of basic resourcism, one cannot simply argue that climatically-induced harm is unjust because it threatens the ability of future generations to enjoy the resources, institutions, and practices that comprise Barry's "vital interests." This is for the simple reason that climatic harms, such as heat waves and sudden floods, often harm people quite directly, in ways that have less to do with threats to quantifiable, tangible goods (however broadly defined) than with bodily trauma.

Neither can one argue, from the perspective of the present-day policymaker seeking to justly balance the interests of her contemporaries with those of future generations, that climatic harm is unjust because it threatens future opportunities for capability fulfillment. Such an argument would smack strongly of the "unguided intuition" of which Rawls is so wary.[196] Indeed, though it is clearly true that climatic harm threatens the fulfillment of capabilities—namely "life" and "bodily integrity," following Nussbaum's index[197]—stating this as fact does not provide any basis for weighing present and future advantages and disadvantages. (Except, perhaps, through a direct numerical comparison of the lives being preserved in the present

[196] Rawls, *A Theory of Justice*, p. 78.
[197] Nussbaum, *Sex and Social Justice*, p. 41.

through sustained carbon-intensive economic activity and the number of lives expected to be lost to climatically exacerbated biophysical harm over the course of the future as a result of this carbon-intensive activity. I assume such a comparison would be technically impossible to execute, given the massive number of assumptions that would have to be adopted for the production of "lives preserved/lost" numbers to be compared against each other. I also believe such a comparison would, as a simple form of utilitarianism, be incompatible with any serious effort to compare preserved and lost political liberties and other not-so-quantifiable considerations.)

A simple potential solution for addressing climatic harm within the framework of Barry's "vital interests" is to define "safety" as one of the vital interests, and to provide for "climate safety" through the use of defined per-capita shares of the global atmospheric commons that people can safely fill with greenhouse gases. In doing so, we would begin by determining a degree of climate change for which we believe we can adapt to and ultimately tolerate the associated damages to human life and health—including both expected biophysical harm from hurricanes and other climatically exacerbated disasters *and* damages to such original "vital interest" goods as clean drinking water. This is a tremendously complex task, and one that I cannot describe in detail in this paper. For the purposes of the current argument, it suffices to say that the European Union and a range of scientific bodies believe we must limit global warming to about 3.5º F beyond pre-industrial levels if "worst impacts" are to be avoided. This figure corresponds—roughly, and relatively uncertainly—with a stabilization of atmospheric carbon

dioxide (and carbon dioxide equivalent) concentrations at about 450 parts per million by 2025.[198] [199]

The next step, after selecting a stabilization target, would be to develop annual carbon dioxide and carbon dioxide equivalent emissions targets consistent with the goal of stabilization, and to divide these targets into per-capita targets. As Anil Agarwal and Sunita Narain note, the IPCC has estimated that the world must limit its carbon dioxide emissions to between 5.73 and 5.91 billion tons (GtC) annually if it is to achieve the 450 ppm stabilization goal, taking into account the greenhouse gases that the Earth's oceans, soils, and organisms absorb naturally each year—a range would have "provided in 1990 a per capita entitlement of 1.08-1.12 [tons of carbon dioxide equivalents]"per year.[200] Such a per capita entitlement to the atmospheric commons could be added to the set of "vital interests," providing an objective framework for evaluating present and future climate risk.

This move is appealing because it captures the likely present and future harms associated with unchecked climate change within an objective, distributable allotment of the atmospheric commons, which can be handled much in the way that "vital interests" like water, arable land, and institutions (be they hospitals or freedom-enabling government offices) are handled. If an individual or a nation emits more carbon dioxide and carbon dioxide equivalents per year than his or its per-capita allotment allows, it may be said that this individual or nation is acting beyond the threshold of climate safety—a vital interest of present and future peoples—and thus violating justice.

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[198] Susan Joy Hassol, *Questions and Answers: Emissions Reductions Needed to Stabilize Climate*, from the website of the Presidential Climate Action Project, Washington, DC: Presidential Climate Action Project, 2007, http://www.climatecommunication.org/PDFs/HassolPCAP.pdf, p. 2.

[199] It is not my intention here to endorse the stabilization target of 450 parts per million by 2025, but merely to demonstrate that it is possible to use such targets to account for climatic harm within a currency of justice like Brian Barry's "vital interests."

[200] Anil Agarwal and Sunita Narain, *The Global Atmospheric Commons: An Entitlement Framework for Management*, International Conference on Natural Assets Paper Series, Taygaytay City, the Philippines: December 2002, http://www.policyinnovations.org/ideas/policy_library/data/01133/_res/id=sa_File1/, p. 13.

The move is appealing for two additional reasons: first, it expresses the oft-unstated truth that access to fuel for warmth and transportation is itself a vital interest, quite apart from climate safety, and that such access frequently implies greenhouse gas emissions. And second, it clearly marks out the difference between such "subsistence emissions" and "luxury emissions,"[201] thus compelling a consideration of the distributive patterns that mark our current use of the atmospheric commons. These patterns are troubling indeed: as of 2002, the average American emitted five tons of carbon dioxide and its equivalents each year,[202] nearly five times the 1990 per-capita allotment referred to previously, and more than 100 times the annual emissions of the average Bangladeshi.[203])

The currency of intergenerational climate justice is now specified, and a solution to the problem of accounting for climatic harm proposed. The coming section examines the cyclone that struck Burma in May 2008, providing real-world evidence of the need to model preparations for and responses to climate change's effects on a sophisticated, rather than a simple, currency of climate justice.

E. Cyclone Nargis: a case study in currency

[201] Shue, *op. cit.*, pp. 449-459.
[202] Agarwal and Narain, *op. cit.*, p. 4.
[203] *Ibid.*, p. 3.

Few would disagree that clean drinking water and the means and conditions to produce food and other physical necessities belong among the vital interests that, as I have argued, best specify the currency of intergenerational climate justice at the macroscopic level of mitigation. And few would disagree that, at the more microscopic level of adaptation, nourishment is among the chief human capabilities about which we should be concerned when considering the effects of climate change.

More controversial, I imagine, is the contention that political rights and liberties are critical components of the currency of intergenerational climate justice. I believe they are, and in this section I support my belief with the example of Burma, where the cascade of death set off in May by Cyclone Nargis has been severely exacerbated by a lack of political rights and liberties among the country's citizens.

On May 2, 2008, Cyclone Nargis struck the coast of Burma, flooding the low-lying Irrawaddy Delta and drowning tens of thousands of people almost immediately.[204] In the days and months following the disaster, the Burmese military junta proved unwilling either to respond adequately to the needs of its citizens, or (perhaps more problematically) to allow other entities to respond where it refused to. Out of paranoia about the possibility of foreign interference in its internal affairs, the junta denied many foreign aid workers visas, ordered foreign volunteers already in the country to leave well before the humanitarian crisis had subsided, and denied American cargo ships bearing food, water, and medical supplies the permits they needed to dock and deliver their loads.[205] All the while, the junta failed to provide meaningful assistance of its

[204] Simon Montlake, "Burma (Myanmar) boots medics, citing no need," *Christian Science Monitor*, June 19, 2008, http://www.csmonitor.com/2008/0619/p06s02-woap.html.
[205] Eric Schmitt, "Gates Accuses Myanmar of Criminal Neglect," *The New York Times*, June 2, 2008, http://www.nytimes.com/2008/06/02/world/asia/02gates.html.

own, despite claiming to be engaged in "prompt work" to give adequate aid to "all citizens."[206] In view of these abuses, U.S. Secretary of Defense Robert Gates accused the junta of "criminal neglect" on Sunday, June 1, 2008.[207] Since the cyclone struck the Irrawaddy Delta on May 2 and 3, about 140,000 Burmese citizens have died or gone missing.[208] A great many of these deaths have occurred as a result of water-borne illnesses that might well have been prevented by a more serious governmental commitment to repairing water infrastructure and administering emergency vaccinations.[209]

What exactly was unjust about Cyclone Nargis and its aftermath, in the context of the currencies of intergenerational climate justice outlined previously? I believe the injustices of Cyclone Nargis occurred at a number of levels, some obvious, some less obvious. In the following paragraphs I analyze the more obviously unjust features of humankind's involvement in Cyclone Nargis. I then use these features as a springboard for considering the deeper injustices associated with Burma's poor political and social institutions, which I believe led quite systematically to the immediately apparent injustices of the cyclone.

1. Categorizing the obvious

The most obviously unjust feature of the events immediately following Cyclone Nargis, I believe, was the failure of the humanitarian response to protect people's basic capabilities—especially life and bodily health, in the phrasing of Martha Nussbaum[210]—in the days, weeks, and months following the cyclone. But it must be asked: was this failure a failure of *climate*

[206] *Ibid.*
[207] *Ibid.*
[208] Human Rights Watch staff, "Burma: Cyclone Donors Should Ensure Transparency and Accountability," from the website of Human Rights Watch, July 23, 2008, http://hrw.org/english/docs/2008/07/23/burma19442.htm.
[209] Saw Yan Naing, "Residents Say 22 Villages Destroyed in Laputta Township," *The Irrawaddy*, May 6, 2008, http://www.irrawaddy.org/article.php?art_id=11793.
[210] Nussbaum, *Sex and Social Justice*, cited in Jan Garrett, "Martha Nussbaum on Capabilities and Human Rights," *Western Kentucky University Working Papers*, 2008, http://www.wku.edu/~jan.garrett/ethics/nussbaum.htm.

justice? I believe the answer is yes. One cannot say conclusively whether human contributions to the greenhouse effect *caused* Cyclone Nargis. What one can say is that science has predicted continual warming-driven increases in the intensity and duration of such cyclones,[211] and that a certain portion of the devastation that occurs as a result of each contemporary cyclone is attributable to human-induced climate change. Thus Cyclone Nargis was, to some extent, a climate impact, and the Burmese military junta's inadequate response to it was, to a similar extent, a failure of *climate* justice.

As I have argued, the junta's failure is best characterized as a failure to protect human capabilities. As I have also argued, the language of capabilities is best suited to weighing justice at the level of climate adaptation. This connection seems to hold in the case of Cyclone Nargis: inadequate *adaptation* assistance was the most striking injustice of the period during and following the cyclone, and characterizing just adaptation as something like *resources*—that is, as something other than the fulfillment and protection of basic capabilities, which I regard as the proper measure of just adaptation—might have allowed us to classify inappropriate aid efforts (like the canned pork that made its way to Muslim communities in Aceh, Indonesia following the 2004 tsunami) as acts of perfect justice.

Though the aforementioned failures of climate adaptation were the most visible and tangible injustices of the period during and following Cyclone Nargis, I believe we must assume that unjust failures of climate *mitigation* occurred as well. Science tells us that human-induced climate change is making hurricanes and cyclones longer and more intense.[212] So while Cyclone Nargis might have happened even without human contributions to climate change, it most likely would not have been as long or as destructive as it was. The currency of vital interests seems to

[211] Webster *et al.*, *op. cit.*
[212] *Ibid.*

best capture the sense in which this (likely) human exacerbation of the cyclone was unjust, at the macroscopic level of mitigation.

Brian Barry includes "adequate nutrition, clean drinking water, clothing and housing… [and] health care" in his list of vital interests for living, though he emphasizes that these are not the only vital interests.[213] It would be possible to account for a large portion of the injustice that occurred as a result of the cyclone in Burma through the lens of these stated vital interests. Indeed, since the cyclone struck, many have perished because of lack of clean drinking water. One might therefore argue that the people who exacerbated Cyclone Nargis by emitting greenhouse gases (which is to say, you and me) deprived Burmese victims of clean water—a preventable and unjust deprivation, since the destruction of water infrastructure and encroachment of saline ocean water on fresh drinking water supplies are known to go hand in hand with many climate impacts, including cyclones and hurricanes.

At the level of mitigation, however, the injustice of Cyclone Nargis is not fully captured in terms of deprivations of clean drinking water and other purely "material" vital interests. Many Burmese citizens also died directly from the physical violences of the cyclone—from sudden drowning floods, and from ferocious winds that sent projectiles flying and caused houses to collapse. Some way of accounting for harm is therefore also necessary if the injustice of the storm is to be accurately accounted for. As I have said, the vital interest of a capped per-capita share of the atmospheric commons internalizes climate harm, which would be largely or completely avoided if every human being kept his or her annual personal emissions below such a common threshold. We are well aware that many of the world's people—in particular Americans—emit far more than any workable international emissions threshold allows, and that they have been doing so for many years, driving the rate at which the world collectively emits to

[213] Barry, "Sustainability and Intergenerational Justice," p. 105.

dangerous and ever-rising highs. We must assume, then, that the severity and length of Cyclone Nargis, and thus its immediate physical impacts on human beings, would have been lesser if certain people had not previously violated vital interests in this way.

The most immediate senses in which people added injustice to the events of Cyclone Nargis are now specified. At the level of adaptation, injustice consisted in the Burmese military junta's failure to help people to maintain and/or recover their basic human capabilities, especially life and bodily health. At the level of mitigation, "excess emitters" contributed more than they should have to the greenhouse effect, thus triggering a more or less predictable series of physical harms at various points in the future, including (it is only sensible to say) some measure of the harm that came with Cyclone Nargis.

2. Institutional failures

In a previous section about Brian Barry's elaborations on the Rawlsian currency of social primary goods, I cited the right to receive disaster relief from a reasonably responsive government as one example of the "rights, liberties, and opportunities" Rawls includes in his currency of justice. This is a right most Burmese citizens clearly did not enjoy in the aftermath of Cyclone Nargis. Here a crucial question arises: *why* was the Burmese military junta so unresponsive to its citizens in their time of need? The answer reveals a deeper set of injustices that, although not often considered in the context of climate change, bore heavily on the success of climate adaptation in the case of Cyclone Nargis.

The Burmese military junta has reigned since 1962, when the Burma Socialist Programme Party (BSPP) toppled the country's democratically elected parliament under the

direction of Army Chief of Staff General Ne Win.[214] Widespread anti-junta demonstrations and the subsequent installment of Dr. Maung Maung, a civilian, as president offered proponents of democracy a glimmer of hope in August 1988.[215] But the military quickly crushed these demonstrations and replaced Maung Maung and his newly reformed BSPP with the State Law and Order Restoration Council (SLORC), which renamed itself the State Peace and Development Council (SPDC) in 1997.[216] The SPDC remains in power today.

The anti-government protests of late 2007, which began in August after the SPDC removed a long-standing subsidy that caused the price of natural gas to quintuple and the price of gasoline to double,[217] provoked a murderous crackdown by the military junta.[218] This sparked an international outcry that grew louder as the junta's abuses of protesting Buddhist monks became more apparent.[219] The international response propelled junta officials into a state of high alert about the possibility of foreign intervention, somewhat in recollection of the 1988 protests, during which the United States terrified Burma's military government by sending an aircraft carrier into the Bay of Bengal to help evacuate foreign nationals.[220]

It was against this backdrop of inward strife and outward paranoia that Cyclone Nargis struck Burma. The hard-hit Irrawaddy Delta, a historic home to the Karen people and other marginalized ethnic minorities, was and is far from the seat of governmental power in

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[214] David Steinberg, *Burma: The State of Myanmar*, Washington: Georgetown University Press, 2001, p. 8.
[215] *Ibid.*, p. 9.
[216] John Pike, "SLORC Coup in Burma," from the website of GlobalSecurity.org, 2008, http://www.globalsecurity.org/military/world/war/slorc.htm.
[217] Human Rights Watch staff, "III. Price Hikes, Peaceful Protests, and the Initial Reaction of the Authorities," *Crackdown: Repression of the 2007 Popular Protests in Burma*, from the website of Human Rights Watch, December 2007, http://www.hrw.org/reports/2007/burma1207/6.htm#_Toc184530437.
[218] Human Rights Watch and the United Nations believe at least 31 protesters died between August and November, 2007. Human Rights Watch staff, "V. The Crackdown," *Crackdown: Repression of the 2007 Popular Protests in Burma*, from the website of Human Rights Watch, December 2007, http://www.hrw.org/reports/2007/burma1207/8.htm#_Toc184530446.
[219] In an effort to quash the uprising, SPDC soldiers de-robed and arrested hundreds of monks and conducted nighttime raids of several monasteries. *Ibid.*
[220] Steinberg, *op. cit.*, p. 11.

Rangoon.[221] It received almost no governmental assistance prior to the cyclone, enjoying only what minimal infrastructure its residents could build for themselves.[222] This neglect made the Irrawaddy Delta socially and physically vulnerable to natural disasters early on. Prior to the cyclone, it was reported that only one fully qualified doctor resided in the primary hospital of Laputta[223]—a southwestern Delta township that originally contained 350,000 people, and which (according to local sources) saw the total destruction of 22 different villages and the death of 60,000 people within just a few days of the cyclone's landing.[224] The shoddiness of the Irrawaddy Delta's physical infrastructure before the cyclone impelled the World Health Organization's Debarati Guha-Sapir to remark that "the villages are in such levels of desperation—housing quality, nutritional status, roads, bridges, dams—that losses were more determined by their condition rather than the force of [Cyclone Nargis]."[225]

3. Representation as a vital interest for living

In "Sustainability and Intergenerational Justice," Brian Barry states that the purpose of the vital interests is to ensure that human beings are "able to live healthy lives, raise families, work at full capacity, and *take a part in social and political life*," thereby assigning social and political life a measure of intrinsic value.[226] I do not disagree with this assessment. But I believe the case of Burma illustrates that active political life are often also fundamental *prerequisites* for access to seemingly more "basic" vital interests like clean drinking water, food, and healthcare. Therefore, I believe we must regard social and political rights as being just as "basic," just as

[221] Human Rights Watch staff, "Burma: Photo Slideshow of Cyclone Devastation and Ineffectual Response," from the website of Human Rights Watch, July 23, 2008, http://www.hrw.org/photos/2008/burma0708/.
[222] Montlake, *op. cit.*
[223] *Ibid.*
[224] Saw Yan Naing, *op. cit.*
[225] Andrew Revkin, "The Dangers of the Deltas," *New York Times*, May 11, 2008, http://www.nytimes.com/2008/05/11/weekinreview/11revkin.html.
[226] Italics added for emphasis. Barry, *op. cit.*, p. 97.

"vital," as the vital interests that comprise Barry's (and, at the macroscopic scale of mitigation, my) currency of intergenerational climate justice. The Burmese residents of the Irrawaddy Delta did not enjoy fulfilling political lives either prior to or during Cyclone Nargis, and they do not enjoy them now. The governmental neglect that went and continues to go unchecked as a result of this lack of political life has wrought deadly, devastating consequences on the Burmese. So political rights, liberties, and opportunities—the staples of any fulfilling political life—must also somehow be a part of the package of "vital interests." The writings of John Rawls provide some preliminary guidance about the form these staples might take as components of the currency of intergenerational climate justice.

As I have mentioned before, "rights, liberties, and opportunities" comprise one major category of Rawls's currency of social primary goods.[227] But from the perspective of present individuals seeking to determine what they owe to people in the relatively distant future—the temporal scale at which, I have argued, the matter of climate change *mitigation* is most salient—it may seem bewildering to speak of "rights, liberties, and opportunities," since it is not immediately apparent how the present should go about passing rights (for example) into the future. Rawls is cognizant of this difficulty, writing in a passage about the just savings principle and the intergenerational obligations it contains that "each generation must… maintain intact those just institutions that have been established."[228] Rawls, it seems, identifies *institutions* as the proper vehicles for the long-term preservation of rights, liberties, and opportunities. I believe his approach is indisputably logical.

But what *kinds* of institutions are we to consider just and therefore worthy of preservation? Rawls's writings in *The Law of Peoples* shed some light on the matter. Here,

[227] Rawls, *A Theory of Justice*, p. 80.
[228] *Ibid.* p. 254.

Rawls classifies both liberal democracies and "decent hierarchical societies" as "well-ordered peoples." To qualify as a "decent hierarchical society," a society must exhibit concern for the "human rights" of all its constituent groups.[229] It must also possess a reasonably responsive "consultation hierarchy" through which groups that do not enjoy full political representation can channel their requests and complaints.[230] (Here the proviso "reasonably responsive" indicates that a people's consultation hierarchy must link up with a state apparatus on which marginalized groups can rely for support and relief.) This is not a point I wish to revisit in detail here; my point is rather to recall that Rawls approves, at some level, of both liberal democracies and decent hierarchical societies.

Can the institutions of liberal democracies and decent hierarchical societies be counted on to provide future individuals with adequate protection and relief in the face of climate impacts like Cyclone Nargis? Are they, more pointedly, worth preserving as components of the currency of vital interests? These questions are answerable only on a case-by-case basis. Hurricane Katrina revealed that even the institutions of liberal democracies can badly neglect the needs of citizens during times of crisis. And the relatively advanced climate adaptation initiatives of Egypt, which is acutely vulnerable to global warming-induced sea level rise,[231] demonstrate that even executive-dominated, quasi-democratic states[232] with histories of neglecting minority groups[233] are capable of mounting laudable efforts to protect their citizens into the climatically burdened future. What the case of Burma makes clear, however, is that societies which deny their citizens *all* opportunities for meaningful political participation are susceptible to critical

[229] Rawls, *The Law of Peoples*, p. 109.
[230] *Ibid.*, p. 72.
[231] Mohammed El Raey, Khalid Dewidar, and Mohammed El Hattab, "Adaptation to the Impacts of Sea Level Rise in Egypt," *Climate Research* , 12, August 27, 1999, pp. 117-128.
[232] U.S. Department of State, Bureau of Near Eastern Affairs, "Background Note: Egypt," from the website of the U.S. Department of State, 2008, www.state.gov/r/pa/ei/bgn/5309.htm.
[233] Human Rights Watch staff, "Egypt: Human Rights Background," from the website of Human Rights Watch, October 2001, http://www.hrw.org/backgrounder/mena/egypt-bck-1001.htm.

failures of climate adaptation and disaster relief. Such dearths of political participation render governments deaf to the needs of their people.

As a general means of determining whether an institution is effective and reliable enough to qualify as a component of the intergenerational currency of vital interests, I recommend once again the evaluative framework provided by Rawls's original position. If an institution's climate adaptation services are so effective at protecting the vital interests of an entire society in times of crisis that representatives of all of the society's groups would agree to the long-term use of the institution in the original position, then it seems we would be correct to preserve the institution as a component of our currency of intergenerational climate justice. If not, our challenge would be to reform or replace the institution until it, or its successor, meets this criterion.

Such processes of reform (or, as the case may be, replacement) do not often take place overnight; the roots of appropriate, need-satisfying institutional responses to disaster can extend into distant history. (The same is true of *inappropriate* responses, as the Burmese military junta's 46-year history of oppression and neglect illustrates.) It would be incorrect to speak of climate adaptation as a solely short-term pursuit of intergenerational climate justice, just as it would be incorrect to speak of vital interests as a solely long-term means of ensuring it. The time required to build institutions capable of carrying out adequate climate adaptation links present-day adaptation efforts with the past—with history—and future adaptation efforts with the present.

Conclusion

A. Closing remarks

"We don't have any throw away resources. We don't have a throw away species. We don't have any throw away children. No. It's all sacred."

—Van Jones[234]

Discussions of what is practical and discussions of what is ethical do not always cohere. To practically minded individuals, ethics may sometimes seem like an imaginary and unrealizable set of strictures. To the ethically minded, the routines and practices of the world may appear monstrous.

Like the Van Jones quotation recited above, the principal arguments of this thesis have been unabashedly ethical. In making them, I have not proposed innovative climate policy mechanisms, nor pioneered new technologies for reducing greenhouse gas emissions. Instead, I have attempted to add to the small but growing ethical guidebook that I believe must steer such practical climate solutions. I have focused in particular on the segment of this guidebook that extends forward into time, expanding and improving on the moral case for intergenerational climate justice.

At the end of my introductory section, I explained the general ethical approach that my subsequent chapters employ in distinguishing justice from injustice: the original position of John Rawls.

In Chapter One, I sketched some of the contours of Earth's conceivable climate futures, demonstrating that the present generation possesses considerable (though by no means absolute) power to determine which future becomes reality. I also emphasized that a measure of human-

[234] See Anna Fahey, "A Green Wave Shall Lift All Boats, Says Van Jones," from the website of Sightline Daily, November 9, 2007, http://daily.sightline.org/daily_score/archive/2007/11/09/Van-Jones.

induced climate change is now unavoidable, providing grounds for my recurring claim that adaptation to the impacts of this climate change is as much a requirement of justice as mitigation.

In Chapter Two, I added to the existing ethical basis for including all subsequent generations, and all the people of the contemporary world, in the scope of climate justice. I proposed modifications to the intergenerational and international justice provisions of John Rawls—namely, the *just savings principle* and the *duty of assistance*—in an effort both to help these provisions protect a wider range of people throughout time and space, and to make the provisions more robust and appealing from the standpoint of rational self-interest. At the end of the chapter, I provided an ethical examination of the practice of discounting, which I determined to be almost totally inconsistent with the universal scope of intergenerational climate justice I outlined earlier.

In Chapter Three, I dug through some common ideas about the actual contents (or *currency*) of justice, revealing their inadequacies in the face of long-term climate change. I then crafted a hybrid of two more sophisticated notions of the currency of justice—Amartya Sen and Martha Nussbaum's *capabilities* and Brian Barry's very Rawlsian *vital interests*—in an effort to improve our understanding of what precisely is unjust about failures of climate mitigation and climate adaptation. I used this hybrid conception, this ethical pair of bifocals,[235] to analyze the natural and social catastrophe of Cyclone Nargis, which has directly or indirectly killed more than 140,000 Burmese citizens since striking southeast Asia last May. This tragedy, I determined, provides real-world evidence of the need to consider political rights, institutions, and opportunities (in addition to more obviously necessary goods and resources like food and water) as threads in the fabric of intergenerational climate justice.

[235] See Chapter Three, "Misreadings: reconciling currencies of justice in the immediate and distant future," p. 81.

Tapping out these closing sentences, I cannot help but notice the sounds of the cars, trucks, and SUVs that travel ceaselessly along the major suburban artery near my house. I cannot help but be reminded of the formidable gap that exists between the idealistic ethical guideposts I have sought to erect here and the many senseless, polluting, comparatively unethical practices and institutions of our contemporary society. Other authors have considered this disconnect as well; some, like Peter Laslett and James Fishkin,[236] and Bjorn Lomborg,[237] have interpreted it to mean that the flaws lie with the ethics as well as with the practices. I disagree with them. Ethical principles, I believe, should emerge from ethical arguments like the ones I have tried to provide in this paper, not from claims about what is currently possible. If our practices fail to cohere with our ethics, and if our ethics rest on rational foundations, logic compels us only to revise our practices—not the other way around.

The Van Jones quotation referenced a few pages earlier may seem brash to some. The notion of having no more children and no more generations to expend implies a need for radical changes to our individual and collective behaviors. But this does not make the notion wrong;

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[236] Laslett and Fishkin begin their introductory chapter to *Justice Between Age Groups and Generations* with a dreary observation about the range of beneficiaries that intergenerational environmental justice can practically embrace:

> …we start with what looks to be a defensible principle of justice over time… [under which] every member of every generation must have equal access to the resources of the world, quite irrespective of the generation to which he or she was, is, or will be born. We find, however, that a limit has to be set to the number of generations that we can take into account, because if we allow the series to be open-ended and therefore potentially infinite, we meet with absurdity forthwith. This is because the resources of the human world, social, political, and material, cannot themselves possibly be infinite… a finite quantity divided by an infinite number must have a zero result—[meaning] no one gets anything at any time."

Peter Laslett and James Fishkin, "Introduction," *Justice Between Age Groups and Generations*, eds. Peter Laslett and James Fishkin, New Haven: Yale University Press, 1992, p. 6.

[237] Lomborg writes:

> …it's tempting for us to say we should [focus our efforts on ameliorating both climate change and more 'immediate' problems like hunger and disease]. Morally, that seems compelling. But the truth is that's not realistic. The world lacks the resources and the will to solve all its major challenges…
>
> …This is the real moral problem of the global warming argument—it means well, but by almost expropriating the public agenda, trying to address the hardest problem, with the highest price tag and the least chance of success, it leaves little space, attention, and money for smarter and more realistic solutions.

Bjorn Lomborg, *Cool It: The Skeptical Environmentalist's Guide to Global Warming*, New York: Alfred A. Knopf, 2007, pp. 46-47 and p. 123.

indeed, as I have demonstrated through the arguments of this thesis, it is ethically quite correct. Today, as passing hurricanes fizzle, as new ones gather, and as old resource conflicts grow hotter for our emissions and our neglect, Jones's brashness seems consistent with the bold new work that justice demands of us.

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