

Globalizing Responsibility for Climate Change

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Who should pay the costs associated with anthropogenic climate change, how much should they pay, and why? This burden-distribution problem has become the central question of climate justice among scholars and activists, and it remains the primary obstacle to the development of an effective climate regime.¹ The costs are expected to be significant and varied, but can generally be categorized in terms of *mitigation*—that is, those costs associated with reducing further human contributions toward the increasing atmospheric concentrations of heat-trapping greenhouse gases (GHGs) that cause climate change; and *adaptation*—that is, those costs that result from attempting to insulate humans from the harms associated with the anthropogenic environmental damage of climate change.² Since mitigation actions undertaken by developed countries under the auspices of the Kyoto Protocol are self-financed and mitigation targets accepted by developing countries are widely viewed as contingent upon financing from developed countries, imperatives to reduce GHGs are fundamentally matters of allocating mitigation costs. Adaptation intervenes in the causal chain between climate change and human harm, allowing the former but preventing the latter, but when this is not possible, a third category of *compensation* costs must be assigned in order to remedy failed mitigation and adaptation efforts. Because the formulas for assessing liability for adaptation and for compensation are identical,³ and since climate justice requires adaptation efforts that render compensation unnecessary,⁴ for the purposes of this essay the category of adaptation shall be understood to include prevention of harm as well as *ex post* compensation for it. As expected, the “Copenhagen Accord” that emerged from the Fifteenth session of the Conference of the Parties (COP15) to the 1992 UN Framework Convention on Climate Change (UNFCCC) in December 2009 failed to satisfactorily address this core burden-allocation issue,⁵ making its resolution

the primary problem to be addressed at the COP16 in Cancún, Mexico, at the end of 2010.

Sufficient mitigation actions must stabilize atmospheric concentrations of carbon dioxide at levels that “avoid dangerous anthropogenic interference” with the planet’s climate system, as declared by the UNFCCC and as quantified at COP15 as an atmospheric increase of no more than 2°C. To achieve this goal, GHG emission reductions of approximately 80 percent from 2000 levels will be needed by 2050, and such reductions will require significant infrastructure investments and/or forgone consumption, although these actions also yield long-term net benefits.⁶ Likewise, the UNFCCC estimates adaptation costs at between \$40 and \$170 billion per year, which some critics suggest is a significant underestimation.⁷ Whatever the total costs of sufficient mitigation and adaptation efforts, these costs must be fully assigned and undertaken if climate injustice is to be avoided, for to fail in mitigation is to allow catastrophic environmental damage, and to fail in adaptation is to wrongfully allow avoidable human suffering to occur. The human community must ask and answer this question of fair cost allocation for, as Simon Caney writes, “we cannot accept a situation in which there are such widespread and enormously harmful effects on the vulnerable of this world.”⁸ If we do not act in accordance with our answers, the way those costs will be allocated by the global calamity of unmitigated climate change will be inexcusably unjust, and will very likely be worse than even the most misguided remedial efforts.

To be effective the regulatory framework of any global climate policy must be accepted by all national parties, and to be acceptable to all it must offer terms that are fair to each. For such reasons, philosophical inquiry into justifiable burden-allocation formulas is an eminently practical exercise, as the most defensible allocation formula is no more important than its reasoned justification. Some scholarly analysts turn to equity-based principles of distributive justice in an effort to give a principled account of justly allocated burdens or costs, treating the basic problem as one of equitably allocating atmospheric space among current and future parties, which is understandable in view of the fundamentally distributive problem that burden allocation typically entails. Others invoke corrective justice, arguing that responsibility rather than equity ought to be the guiding principle for assigning climate-related costs. Since distributive and corrective justice focus on different facts and invoke different normative principles, these two approaches prescribe disparate burden-allocation formulas, with the former setting aside each country’s historical emissions as irrelevant to future emissions entitlements

and the latter taking historical emissions as the cornerstone for remedial liability. As I have argued elsewhere and shall further explicate below, both principles apply to the allocation of overall climate-related burdens, with distributive justice appropriate to mitigation costs and corrective justice to those associated with adaptation.⁹ These two categories of climate-related burdens are often conflated, with imperatives to mitigate or adapt to climate change seen as interchangeable or fungible, as if there was no moral difference between the two kinds of activities or distinction between the formulas for assigning each.¹⁰ As I argue here, a more careful separation of the normative grounds for undertaking mitigation and adaptation activities is needed if the relation between the two is to be properly understood, and if the combined force of these two climate justice imperatives is to be defensibly applied to policy solutions.

Mitigation and adaptation costs borne by states fund different kinds of activities, benefit different parties, serve different climate justice imperatives, and may be discharged by liable parties in different ways. In the context of climate change, mitigation requires setting a global cap on annual greenhouse gas emissions, then allocating those allowable emissions among the world's peoples and persons. Mitigation costs thus arise insofar as persons or peoples must undertake GHG abatement action in order to comply with their assigned caps. Compliance might involve economic costs, such as for infrastructural upgrades or replacement of carbon-intensive energy sources with low-carbon ones, or for the purchase of offsets or tradable emissions credits. But mitigation can also involve behavioral change that reduces carbon footprints without economic outlays, or innovation that reduces emissions without either a costly deployment of technology or widespread behavioral change. Regardless of where they take place, mitigation activities have the same effect on the global climate, so they can be assigned and measured in terms of avoided greenhouse pollution, and structured in terms of emission caps.

Under a cap, nations or persons can be granted wide autonomy in choosing the means of their compliance, whether through capital improvements, forgone consumption, or other economic or noneconomic activities. Adaptation costs, by contrast, are fundamentally different, in that liable parties are expected to undertake the burden of *assisting others* (including citizens of other states) in adapting to climatic changes, so appropriate activities take place in specific regions and are intended to benefit specific vulnerable populations. Since the central imperative is to shield humans from climate-related harm, based on some combination of

reactive aid to victims of climate-related emergencies, such as floods and droughts, and *proactive* capacity-building and infrastructure projects designed to minimize the future need for such reactive measures, compliance with adaptation imperatives allows for less flexibility on the part of liable parties, with economic expenditures the typical metric by which adaptation liability is assigned. In determining each state's fair share of overall adaptation costs, such costs are quantified in economic terms, and shares are calculated on the basis of either strict or fault-based liability for climate change, based on each state's historical emissions.¹¹

In talking about the total costs of responding to climate change, the categories of adaptation and mitigation must be kept distinct normatively and practically for three reasons, as I explain below. While there is a tendency within the climate justice literature to convert the emissions quotas of mitigation into economic costs by reference to a market price for carbon, this assumes that states would achieve their GHG cuts through offsets and trading rather than austerity or policy action. The first reason to distinguish these two categories of burdens, then, concerns their incommensurability in effect. Resources devoted to GHG abatement might reduce future climate impacts but do nothing to assist vulnerable peoples in adapting to climate changes that result from already accumulated atmospheric gases, and so cannot substitute for current adaptation imperatives. The second reason concerns the trade-off between mitigation and adaptation, which requires a complex algorithm for calculating total climate-related burdens. Given the imperative to prevent avoidable climate-related harm, adaptation programs should be committed to funding fully all necessary adaptation activities for any given level of climate change. Hence, adaptation costs increase as mitigation efforts are underfunded or otherwise fail, and improved mitigation should result in lower overall adaptation costs.

This trade-off, however, should not be taken to indicate a moral indifference between mitigation and adaptation, such that parties are assigned some set of total costs and allowed to apportion those between the two efforts in any way they see fit. For precautionary reasons, mitigation is thought to offer an ethically superior alternative to adaptation, since the latter allows for avoidable anthropogenic damage in which the full deleterious consequences are at present imperfectly understood. Even if humans could be shielded from harm through adaptation, it seems reasonable to say that it would be better to avoid causing the damage and imposing the risks for which adaptation is a second-best remedy, further undermining the commensurability of these two categories of climate justice actions.

Furthermore, total annual adaptation costs—and thus each state’s cost, holding their fair share of total costs constant—will depend on what others do in a way that mitigation costs do not. Suppose, for example, that mitigation targets are set through national emissions reduction trajectories that identify some goal (for example, two degrees of warming or stabilization of atmospheric CO₂ at 450 parts per million) and a timetable (say, by 2050), so that annual emissions quotas are determined by the paths needed to reach this goal by the target date. Annual national emissions targets for the next several decades could thus be identified and assigned, and these targets would presumably not be raised or lowered merely because of noncompliance with targets by other states. At issue is each state’s greenhouse emissions entitlement, and as a matter of justice this cannot decline merely because other states claim more than they are entitled to emit. Some state might incur greater adaptation costs by virtue of its mitigation shortcomings, but these mitigation burdens cannot defensibly be shifted to other states that are meeting their mitigation obligations. Adaptation costs are not insulated from the actions of others in the same way. Even with declining national emissions trajectories, there are certain to be adaptation costs until stabilization goals are reached, and such costs are likely to be permanent insofar as a positive temperature increase is allowed as a goal. As noted above, overall adaptation costs to be allocated among states increase with noncompliance, and are contingent upon future climate impacts that are not fully understood and are highly uncertain. Hence, total annual adaptation costs cannot be known until after the fact, and so cannot be assigned over future decades, as mitigation targets can. Allowing states to treat mitigation and adaptation imperatives as commensurable, and to shift resources between the two at will, imposes externality costs when adaptation efforts displace required mitigation actions. For this reason, such cost-shifting should be prohibited, and mitigation and adaptation burdens separately assigned.

Largely because of the refusal by developed countries to accept any formula for assigning adaptation burdens other than voluntary contributions by presumably charitable parties, none of the international agreements made under the auspices of the UNFCCC have provided grounds for specifying the exact link between mitigation and adaptation responsibilities. Furthermore, since liability for adaptation is not recognized in international agreements and has not been tied to past, present, or projected future national emissions, deficiencies in mitigation efforts have no effect on ongoing adaptation responsibilities under current international policy frameworks. This is objectionable from the perspective of corrective justice,

however, since failure to undertake one's assigned mitigation burdens results in greater fault-based liability for climate-related harm, which would, according to corrective justice, result in greater adaptation burdens. This burden-allocation policy problem reflects a deep theoretical incommensurability between the requirements of distributive and corrective justice, on which climate change-related mitigation and adaptation imperatives are based. Both are properly seen as aspects of justice writ large, but their fundamentally different structures complicate the parsimonious combination of distributive and corrective justice within a single conception of justice, as mitigation and adaptation imperatives based on them have likewise proven difficult to combine within a single climate justice metric. Nonetheless, they must be combined in some way, insofar as a responsibility-based account of adaptation liability depends not only on historical emissions but on recent mitigation efforts, as I have argued they must.¹² For reasons suggested above, greater recent mitigation efforts ought to reduce future national adaptation burdens as a matter of justice, but this draws on a comprehensive notion of justice that is able to successfully combine its distributive and corrective aspects.

Exacerbating this theoretical incommensurability between distributive and corrective justice is the disparate impact of mitigation and adaptation activities in practice. Because they involve different kinds of activities and stand to benefit different groups of persons—with mitigation yielding primarily global benefits from diminished climate disruption, and adaptation producing local benefits from specific projects—any commensurability in terms of costs would not be reflected in terms of benefits. Should states be allowed to rectify insufficient mitigation efforts with increased adaptation activities, their total costs might be kept constant but the beneficiaries of their combined activities could change. Especially if they are allowed to count domestic adaptation activities toward combined mitigation and adaptation burdens, states could continue to cause global harm through their inadequate mitigation activities while shielding only their domestic populations from climate impacts, clearly transgressing the demands of climate justice. Insofar as justice is concerned with the allocation of benefits as well as the assignment of burdens or costs, the use of a single metric for calculating and discharging climate-related remedial obligations ignores this problem of benefit distribution. Thus, it would seem that climate justice requires fully adequate action in mitigation *and* in adaptation, rather than some fungible overall national burden that can be divided at will between the two. However, this

again raises the question of how national inadequacy in performance of one climate justice imperative affects the ongoing assignment of burdens in the other, which is of tremendous policy relevance in ensuring that the normative objectives of global climate policy are achieved.

The normative concept of responsibility offers the value basis for linking mitigation and adaptation efforts under a single overarching conception of justice, transcending the distributive and corrective conceptions and providing a coherent account of climate justice capable of resolving the difficulties noted above. This view of climate justice as being linked by an account of responsibility can be stated in brief: justice demands that persons and peoples voluntarily take or be made to bear responsibility for all and only the climate change that they culpably cause, or be held responsible for it by others. If this can be done for all persons and peoples that affect or are affected by climate change, then climate justice can be usefully understood as an effort at ensuring globalized responsibility. Being responsible, in this sense, requires that persons and peoples avoid harming others through the environmental externality of anthropogenic climate change, whether by paying the relevant mitigation costs needed to avoid causing climate change or by paying the adaptation costs needed to avoid this resulting in human harm. Insofar as persons and peoples fail to do their share in mitigating this global environmental problem and/or controlling its effects, they can be held responsible by others through assessments of liability to pay such costs, or through compensation for harm not averted by mitigation or adaptation.

THE NORMATIVE GROUNDS OF MITIGATION AND ADAPTATION

As noted, mitigation efforts aim to reduce ongoing contributions to climate change, and require net GHG emission reductions. Applied to states, net reductions can be accomplished through several strategies, all of which have roughly equal climate effects per unit of avoided emissions. Per capita national emission rates could be reduced through behavioral change (for example, by driving less) or through the development and deployment of more efficient technology (for example, by driving the same distances but in more fuel-efficient automobiles). Holding per capita emission rates constant, net national emissions could be reduced by decreasing population size. The enhancement of carbon sinks, whether through the reforestation projects that enhance natural sinks or through the carbon capture and sequestration technologies that engineer artificial

ones, reduces net emissions with constant gross emissions. Of course, reductions from current emissions baselines merely slow the current rates of growth in atmospheric GHG concentrations, but do not reverse that growth, and so do not reduce the probability or severity of climate impacts. Carbon dioxide remains in the atmosphere for over a century after first being emitted, so decreasing atmospheric concentrations of such gases will require far more substantial cuts from current rates, as noted above. As used here and elsewhere in climate policy debates, the term “mitigation” connotes only reductions from projected “business as usual” increases in anthropogenic interference with the climate system, not the avoidance of climate change altogether. Even successful mitigation efforts will require ongoing adaptation measures, and the most ambitious mitigation goals are set by reference to atmospheric GHG stabilization targets that balance mitigation and adaptation.

Hence, stabilization targets serve as the focal point for many climate justice campaigns. In September 2010, atmospheric concentrations of carbon dioxide (the primary greenhouse gas) were approximately 388 parts per million (ppm), up from a preindustrial equilibrium of 280 ppm and increasing at a rate of about 3 ppm per year.¹³ Stabilizing carbon at any atmospheric concentration requires that these growth rates eventually be brought to zero, with some stabilization targets requiring significant periods of decreasing concentrations. To meet the 2°C global temperature increase goal set at COP15, for example, the Intergovernmental Panel on Climate Change (IPCC) estimates that stabilization below 450 ppm will very likely be required,¹⁴ and many now claim that a return to 350 ppm is needed in order to avoid catastrophic climate impacts.¹⁵ According to the IPCC, stabilization at 450 ppm requires a 25–40 percent decrease from 1990 emission rates by 2020 and an 80–95 percent decrease from those rates by 2050. To illustrate the challenges of meeting this stabilization target, U.S. national emissions rose from 5,022 million metric tons of CO₂ in 1990 to 6,017 million metric tons in 2007—an increase of nearly 20 percent.¹⁶ Thus, a 38–50 percent reduction from those rates by 2020 would be required to meet that 450 ppm target, if all nations were to likewise reduce their emissions by the same percentage from that 1990 baseline. Understood in terms of the declared objective of “avoiding dangerous anthropogenic interference” with the planet’s climate system, mitigation will require substantial cuts in net national emissions over the coming decades, reducing but not eliminating the need for adaptation measures. The imperative of climate justice ought to guide this balancing of mitigation and

adaptation, offering principles that can inform the assignment of national burdens associated with each.

The essential mitigation policy tool is the GHG emission cap—or, viewed positively in terms of entitlements rather than negatively in terms of constraints, the emission right—which allocates shares of allowable aggregate emissions among various parties. To minimize further anthropogenic contributions toward climate change, states or persons must comply with caps that measure net emissions, counting the effects of initial GHG emissions into the atmosphere as well as their sequestration in sinks, such as forests or underground storage facilities. Within the net allowable annual GHG emissions associated with this primary objective, the cap is (unlike burdens associated with adaptation efforts) fundamentally concerned with justly distributing the common resource of atmospheric absorptive capacity needed to accommodate ongoing human greenhouse emissions without deleteriously affecting global climate. Thus, its fundamental normative question is: How much of this finite, common resource is each of us entitled to claim through our GHG-emitting activities? Viewing such entitlements as rights, we can pose the same question in another way: At what point do we exhaust our emission rights and begin to wrongfully produce excessive emissions, for which we may be liable? Climate justice imperatives demand that emission caps eventually be set at such sustainable thresholds, and may temporarily require caps to be set below such thresholds in order to decrease atmospheric concentrations of GHGs.¹⁷

Most scholarly commentators defend some version of the equal emission rights (EER) thesis, arguing that all persons are entitled to equal shares of atmospheric absorptive capacity, such that national emissions caps should be calculated on an equal per capita basis. Sometimes a modified version of EER is defended, with minor deviation from this equal per capita standard, taking into account geographic differences that influence national energy consumption patterns or controlling for disparity in benefits derived from domestic renewable energy resources or carbon sinks. Others defend a version of EER over a long period of compliance, such that higher past national per capita emissions must be offset by lower caps in the future.¹⁸ My own view assigns national emissions caps on a modified EER basis, but in terms of equitably allocated luxury emissions, defined in contrast to the survival emissions that are required to meet basic human needs, to which I claim that persons have rights.¹⁹ Regardless of the version of the EER thesis, all such approaches treat mitigation as fundamentally a distributive justice

problem that requires egalitarian distributive principles in order to solve. The question of how much of this shared resource each state or person is entitled to claim if climate change is to be sufficiently mitigated is categorically different from the question of what to do if we together fail to avoid that problem. The latter question is one for corrective justice, and shall be considered below.

Greenhouse emission caps entail burdens in proportion to the gap between current GHG emissions and rates at which parties are entitled to emit, given marginal costs of abatement, but provide benefits for those whose emissions are currently at rates below those assigned under a cap-and-trade system, in proportion to surplus entitlements. Since the aim of mitigation is to minimize further contributions to the problem, not to assign fault and assess liability for past actions, its focus is on closing gaps between current and sustainable emissions. “Historical responsibility” or “carbon debt” approaches to EER that look to high past national emission rates in order to justify lower future emission caps do so from distributive and not from corrective justice, since they merely extend the compliance period for equitably assigned caps such that past claims count against current and future entitlements. For all versions of EER, past actions are relevant to mitigation burdens only insofar as they define the gap between current emission rates and the equitably allocated shares around which future caps are set; assigned burdens are a function of excess in current emissions, not judgments about responsibility for climate change. Once GHGs are released into the atmosphere, adaptation activities alone correct for each state’s historical emissions, which thus form the basis of adaptation burdens. So understood, the polluter-pays principle makes polluters pay for the *effects* of past pollution on the basis of their contributions to those effects, not for the costs of avoiding future pollution, which are captured through the mitigation imperative of equitably allocating atmospheric space or assigning emission entitlements.

Distributive justice is forward-looking and based on considerations of equity, but is not remedial in regards to past inequity, and so requires a corrective component in order to rectify past injustices. In theory, distributive justice principles yield no directives for what to do when their requirements are violated, since they are derived under ideal theory assumptions of full compliance with their terms. Climate change mitigation targets are likewise distributive but not fundamentally remedial—they look forward rather than backward, so to speak—and so require a remedial component to rectify past and ongoing mitigation failures. In the context of climate change, corrective justice imperatives are not satisfied by merely

extending the temporal scope of distributive justice obligations, which does nothing to avoid the local effects of accumulated greenhouse pollution. Since proactive prevention is often more efficient in avoiding harm than reactive adaptation, \$1 spent on mitigation could spare the need for \$5 in adaptation. At minimum, climate justice imperatives must specify separate mitigation and adaptation burdens along with principles for assigning each, but should also provide a formula for converting deficiencies in one category into additional burdens in the other. But distinguishing mitigation and adaptation in this way again raises the question of how two distinct climate justice imperatives based on distinct conceptions of justice can be reconciled, rather than being considered as alternative policy options or commensurable moral obligations.

JUSTICE, REMEDIAL RESPONSIBILITY, AND LIABILITY

In order to flesh out the conceptual links between the normative bases of mitigation and adaptation imperatives, I draw on a view of responsibility taken from luck egalitarian theory for its instructive emphasis on remedies that restore distributive justice as various events cause initially just holdings to become unjust over time. The core premise concerns the links between voluntary control, responsibility, and entitlement: it presumes that control can be the source of entitlement and moral responsibility, but that factors outside of an agent's control (defined as *luck*) cannot.²⁰ Standard luck egalitarian theories remain entirely within a distributive justice framework rather than developing corrective justice principles—relying, however, on a periodic redistribution of resources to maintain distributive equity over time. Since such approaches find no direct link between distributive injustice and harm to others—indeed, the injustice that they identify involves no interpersonal harm or injury, but instead involves a violation of entitlement—the account of justice that they develop requires only that equity be restored by neutralizing the effects of luck on holdings, not that responsibility for harm be established or that compensation be provided by culpable parties. Such theories, however, suggest the overarching account of responsibility that can provide a conceptual bridge between the demands of distributive and corrective justice, even if they never fully develop it. To develop it here, and thereby to conceptually link the normative bases of mitigation and adaptation imperatives, corrective justice-based theories of responsibility will be canvassed for their use of these links between voluntary action, harm, and the remedial measures of corrective justice.

The overarching view of responsibility that encompasses the distributive and corrective justice elements of climate change mitigation and adaptation imperatives depends on three related meanings of the term. The first concerns *causation*, wherein a person or group is said to be responsible for some outcome if they are a necessary cause of that outcome, whether through their acts or omissions. Whereas this sort of responsibility appears to be purely empirical and relatively straightforward, in the case of complex chains of causation, such as those in global climate change, it can raise problematic questions about agency and causality. The second concerns a moral judgment about *fault and assessment of liability*, and typically depends on causal responsibility as a necessary but insufficient condition. Third is *remedial responsibility*, wherein responsible agents are required to do something in response to past outcomes for which they are responsible, and so depends on the first two. Specifically, the form of remedial responsibility relevant to climate-change cost allocation is that which justifies assessments of liability to pay damages, and does not concern apologies, agent regret or contrition, criminal culpability or liability to punishment, or the fitness of moral praise and blame. This limited purview is justified by the task at hand: we need to know what responsibility theory can say about how to allocate adaptation burdens among those contributing toward climate change. Whether or not people should feel guilty about contributing toward climate change, or apologize for it, is beyond the scope of this paper. If the core imperative of climate justice is ensuring that those not responsible for causing climate change be insulated from having to bear its costs—as I claim that it is—then such ancillary questions about other forms of responsibility are beside the point.

These three models—causal, liability, and remedial responsibility, respectively—are distinct but interrelated in ways that I discuss below. Joel Feinberg describes the relationship between the first two in noting the conditions in this standard legal model of liability based on *contributory fault*:

First, it must be true that the responsible individual did the harmful thing in question, or at least that his action or omission made a substantial causal contribution to it. Second, the causally contributory conduct must have been in some way *faulty*. Finally, if the harmful conduct was truly “his fault,” the requisite causal connection must have been directly between the faulty aspect of his conduct and the outcome. It is not sufficient to have caused harm *and* to have been at fault if the fault was irrelevant to the causing.²¹

According to this model, agents are responsible for the bad consequences that they cause through their faulty actions, and so are liable for providing the appropriate remedy. If Jones burns down Smith's house by her negligent action (Jones had been burning leaves in her yard, for example), she becomes liable for compensating Smith for the loss that she has caused. But when applied to climate change, this liability model of responsibility breaks down. It is difficult if not impossible to establish direct causality between any individual GHG-emitting act and harm, as climate-related harm is the cumulative result of a great many separate emissions rather than any discrete action committed by any distinct person. My excessive use of fossil fuels may contribute to climate change, but it lacks the direct causal connection that Feinberg's model requires, since it would be impossible to identify any climate-related harm that would not have obtained in the absence of my profligate pollution. Thus, it is difficult to identify any noncircular account of how individual acts can be faulty, since assessments of fault typically depend on judgments about what persons *should* have done to avoid exposing others to risk of harm, particularly since many polluting acts are widely tolerated and even encouraged by existing social norms. By the standard legal model of liability, at least, it does not seem that persons can be held responsible for climate-related harm through fault-based liability.

These problems with the liability model of responsibility have been noted elsewhere. Working within the corrective justice paradigm of tort law, for example, Matthew Adler doubts that individual liability for climate-related harm can fit within existing legal norms. For one thing, he notes, U.S. tort law focuses on "personal injury or property harms" rather than "losses to well-being *per se*" or "pure economic loss." But the expected harms associated with climate change include such collective damage as "sea level rise, harm to natural systems such as coral reefs or glaciers, and drought or loss of water supplies," which as collective impacts "are not themselves losses to individuals' paradigmatically protected interests."²²

If tort damages were to be based on personal rather than collective harm, as with property damage from storms that are expected to be more frequent and intense with climate change, Adler argues, the direct causation requirement of fault-based liability would pose the obstacles noted above, since "the causal links between a particular set of GHG emissions and those protected interests will generally be more attenuated than the links between those emissions and environmental damage."²³ Moreover, torts offer a remedy to existing but not

possible future harm, and “tort law generally does not compensate for pure risk imposition,” whereas climate change imposes risk by raising the probability of such harmful weather events as heat waves, storms, or droughts, none of which can be directly attributed to climate change, much less to specific polluting actions. For such reasons, Adler suggests a novel form of collective fault-based liability for collective rather than individual climate-related damage through a new tort mechanism based on “compensation by governments to other governments for past (not expected) environmental damage,”²⁴ suggesting that diffused responsibility need not diminish fault so much as weigh in favor of a moral accounting system whereby it is ascribed collectively rather than individually. The account of corrective justice that combines causal, liability, and remedial responsibility by assigning adaptation burdens to those responsible for causing climate change through their faulty actions need only be applied to states rather than individual persons, as it is under the UNFCCC framework.

The key for linking the distributive justice basis of mitigation burdens with the corrective justice basis of adaptation burdens lies in the role that responsibility plays in each. In a formulation of what he takes to be the core moral claim of distributive justice, Brian Barry here identifies an account of responsibility that links distributive with corrective justice:

A legitimate origin of different outcomes for different people is that they have made different voluntary choices. . . . The obverse of this principle is that bad outcomes for which somebody is not responsible provide a *prima facie* case for compensation.²⁵

Notice that Barry’s principle refers to individual persons and not to groups, so it is grounded in a theory of individual but not collective responsibility. While this formulation subsumes remedial responsibility within distributive justice rather than maintaining an independent account of corrective justice, its reference to grounds for compensation suggests how fault-based liability may be applied. For Barry, compensating the effects of bad luck is a social task, as when those born into poverty or stricken by disease are due redistributive transfers, and assigning individual liability for such compensation is unnecessary when bad luck for victims does not result from the faulty acts of others. Distributive injustice, by this account, is a function of unequal outcomes in the absence of responsibility for them.

By invoking a luck egalitarian basis for principles of distributive justice—claiming that persons are entitled to all and only those benefits and burdens

that result from their voluntary choices rather than those resulting from acts or events for which they are not responsible—Barry suggests how a single account of responsibility can generate both distributive and corrective justice principles. For what looks like bad luck from the perspective of its victim can sometimes be attributed to culpable choice from the perspective of its perpetrator. Smith's claim for compensation for her lost home depends only on the fact that she was not responsible for the fire that destroyed it. If no one was responsible for the fire, society must compensate her for her loss as a matter of *distributive justice*, and would typically do so without identifying fault or assigning individual liability, employing risk-pooling schemes, such as hazard insurance, to share costs widely among faultless others. But since Jones caused the fire through her faulty action, Smith's claim for compensation entails individual liability and *corrective justice*, restoring the balance between offender and victim on the basis not only of the absence of responsibility (by Smith) but also its presence (by Jones).

As applied to climate change, Barry's principle of responsibility provides a conceptual bridge between the corrective justice account of fault-based liability that is used to assign national climate change adaptation burdens and the distributive justice account of responsibility that justifies the imperative to refrain from using more than one's share of atmospheric absorptive capacity. It rejects the arbitrary fact of national membership as the basis for wide current disparities among national per capita GHG emissions rates, and the consequently wide variation in life prospects that granting entitlements on the basis of past use rates would confer. Instead, it grounds the case for equitable GHG emissions rights or entitlements in the same luck egalitarian conception of responsibility that can also justify remedial adaptation obligations when parties cause climate change by appropriating more atmospheric space than they are entitled to on the basis of these distributive justice principles. The world's poor are not responsible for causing climate change, despite their greater expected vulnerability to its effects, so they should not be made to bear responsibility for it by suffering its related harm or undertaking the burdens necessary for avoiding it. They would thus have a justified claim to adaptation resources even if climate change was natural rather than anthropogenic in its causes.

The world's affluent *are* responsible for causing climate change, by contrast, and have done so through past and ongoing claims to atmospheric space that far exceed their fair shares to that common resource. Equity considerations require

that they undertake mitigation actions so that those not responsible for climate change will not be held responsible for it by being made to suffer its effects, and responsibility considerations require that they fund adaptation efforts designed to insulate those vulnerable to climate-related harm from suffering those unjust consequences—and to do so in proportion to their fault-based liability. At the core of this overarching view of the related but conceptually distinct demands of mitigation and adaptation lies a luck egalitarian account of responsibility—developed from the perspective of victims of bad luck but applicable also to judgments of fault and imperatives to rectify or compensate for resulting harm—capable of unifying distributive and corrective justice, showing how each relates to the other without conflating the two.

GLOBALIZING RESPONSIBILITY

Returning to the burden-allocation question with which this essay began, we must ask how this responsibility-based conception of justice would allocate the costs associated with climate change and then consider whether it is superior to its alternatives. If we assume, as the account of justice that I have sketched above does, that persons should not be subjected to climate-related harm for which they are not themselves responsible, then we must begin with the strong imperative to avoid causing climate change. This is an imperative of justice, based on the negative responsibility to avoid causing harm. In this sense, it is of the most robust variety of justice-related obligations, potentially giving rise to what Andrew Dobson calls “thick cosmopolitanism”:

Causal responsibility produces a thicker connection between people than appeals to membership of common humanity, and it also takes us more obviously out of the territory of beneficence and into the realm of justice. If I cause someone harm, I am required as a matter of justice to rectify that harm. If, on the other hand, I bear no responsibility for the harm, justice requires nothing of me—and although beneficence might be desirable I cannot be held to account (except in the court of conscience or God) for not exercising it.²⁶

As Dobson suggests, causal responsibility for harm may give rise to duties of corrective justice, even in the absence of fault, in order to rectify the injustice of harming innocent victims. Where contributory fault can be assigned, however, connections between victims and those responsible for harming them become thicker still, solidifying the case for assigning liability to faulty parties.

All persons have widely recognized and basic rights not to be harmed, so this primary imperative is grounded in an uncontroversial injunction that is justified by any plausible normative theory. Meeting this objective requires some allocation of mitigation burdens, in the form of GHG emission caps, which when fully allocated curtail avoidable harm, making distributive fairness instrumental to harm avoidance rather than intrinsically just. These caps should be allocated first among the world's states and then among its peoples and persons in an equitable manner. Mitigation costs follow directly from gaps between current emissions and these caps, whether for nations or persons. Bigger greenhouse polluters thus must bear larger mitigation burdens, but for reasons related to the costs of compliance with equity imperatives in the assignment of emission rights, not based on past responsibility for climate change. Responsibility enters the picture in assigning adaptation burdens, as I discuss below, not those related to mitigation.

Recognizing that it is now too late to avoid environmental damage from climate change, as some such damage has already occurred and more will certainly result from greenhouse gases that have already accumulated in the atmosphere, the human community must take proactive and reactive steps to satisfy or approximate that same primary imperative. Adaptation is inferior to mitigation in that it allows the *prima facie* bad outcome of environmental damage without the worse outcome of climate-related human harm, but becomes essential once that damage becomes unavoidable. Further, compensation is inferior to adaptation since it allows environmental damage and human harm, but it is a requirement of corrective justice and so forms an essential response to any harm that is not prevented through mitigation or adaptation. Liability for adaptation should be assessed collectively among states in the first stage of a dual-stage procedure, based on their respective contributory fault, since the causes and effects of climate change can only be comprehended in terms of aggregated emissions and both damage and harm across a large territory. (The full costs of current adaptation needs are assigned as adaptation liability based on post-1990 luxury emissions, for which nations and/or persons can be faulted. This excuses pre-1990 and survival emissions, acknowledging that fault cannot be assigned for actions that are unavoidable or were committed prior to the point at which agents could reasonably be expected to anticipate their resultant harm, even if these actions contribute to climate change.) In the second stage, states should assign their collective fault among their citizens on the basis of differential individual fault, accounting also

for irreducibly collective enterprises (such as national defense) that are shared by all.

Nothing in the assignment of collective liability for climate change to states or peoples or the payment of collective damages to the same precludes the internal distribution of these costs and benefits according to the same principles that are sketched above. Indeed, the same considerations of responsibility and justice would require such an internal distribution. The mere fact that the United States is liable for x in adaptation and compensation costs does not entail that each American is liable for exactly the same share of x .²⁷ Newborns would not bear any liability for climate-related harm, as they cannot yet be faulted for causal contributions toward climate change; rather, what they do over the course of their lifetimes, in terms of voluntary greenhouse-emitting acts, will determine how much they will owe for their share of climate-related harm that the nation collectively causes. Likewise, the funds raised through assessments of liability must be distributed according to principles that emanate from the same conception. Potential victims of allowed climate change are entitled to funds for adaptation assistance to prevent their becoming victimized, or to compensation in the amount of their injury if they are harmed. The global annual total raised through assessments of liability must correspond to the global total needed to perform these adaptation and compensation objectives, after a one-time liability assessment based on luxury emissions since 1990 (the year in which the first IPCC assessment report was published, when the effects of climate change became widely known) is made. This one-time assessment should be used to initiate the remedial fund and establish its institutional support structure, pay for current climate-related adaptation and existing compensation claims, and then be targeted toward the development of capacities and technologies that will hopefully one day make its continued existence unnecessary.

This dual-stage formula of using collective liability in assigning state liability and then making internal individual liability assessments to allocate this national liability among each nation's resident population preserves the philosophical advantages of an individualist normative framework while acknowledging the fundamentally aggregative nature of climate-related harm and the social and collective nature of some of its primary causes (public policies, social norms, collective efforts toward sustainability, and so on).

The formula contains an additional advantage, which may be its most important feature, in that it binds together residents of states in relationships of

solidarity and creates incentives for them to work together toward ecological sustainability by binding their fate through a kind of collective responsibility. As Michael Walzer has observed in describing responsibility for unjust war, “citizenship is a common destiny” and democracy is “a way of distributing responsibility.”²⁸ If liability for climate change were assessed only individually, citizens would have no incentive for taking political responsibility to work together toward cooperative social and public policy solutions. The dual-stage liability allocation model, on the other hand, makes it rational for all persons to work toward reducing their own personal contributions to climate change *and* reducing those of their nation of residence. It encourages states to work together with each other to reduce global emissions, as the total liability to be allocated among states depends on the success of all in promoting sustainability. In so doing, it fosters a sense of responsibility that is prospective, looking forward to a more just and sustainable future, and not merely one that is retrospective, looking backward to ensure that past harm is compensated and past environmental damage is controlled. It also reminds us that we are all citizens of the same finite planet, bound together in relationships of interdependence and mutual responsibility.

NOTES

- ¹ As Stephen Gardiner notes in his overview of the research area, the “core issue concerning global warming is that of how to allocate the costs and benefits of greenhouse gas emissions and abatement.” Stephen Gardiner, “Ethics and Global Climate Change,” *Ethics* 114 (2004), p. 578. Controversy around financing issues, whether in terms of developed country assistance for developing country mitigation and adaptation activities or in terms of domestic mitigation actions, were largely responsible for the failure at COP15 in Copenhagen to reach any legally binding mitigation or adaptation protocol.
- ² For a more extensive treatment of equity and responsibility in climate change, see Steve Vanderheiden, *Atmospheric Justice: A Political Theory of Climate Change* (New York: Oxford University Press, 2008).
- ³ As I shall argue below, both turn on judgments of fault-based responsibility for climate change, which is a function of post-1990 luxury emissions. The common normative basis for adaptation and compensation obligations can thus be usefully contrasted with those for mitigation, which are based in equity.
- ⁴ Here, I assume that harm prevention is always morally preferable to allowing for avoidable harm and then attempting to compensate its victims.
- ⁵ The draft version of the “Copenhagen Accord” omits any reference to legally binding mitigation actions and calls for Annex I parties to jointly commit \$30 billion toward financing developing country mitigation and adaptation efforts by 2012 and \$100 billion by 2020, without any specification for how these amounts are to be assigned among developed country parties to the convention. See United Nations, “Copenhagen Accord (Draft decision),” December 18, 2009; available at unfccc.int/resource/docs/2009/cop15/eng/107.pdf.
- ⁶ The Stern Review estimates the cost of stabilizing emissions at 550 ppm by 2050 to be approximately 1 percent of gross world product, but also estimates that costs associated with unabated climate change to exceed this amount, resulting in significant net benefits from strong mitigation actions. See Nicholas Stern, *The Economics of Climate Change: The Stern Review* (Cambridge: Cambridge University Press, 2006).
- ⁷ See Martin Parry et al., *Assessing the Costs of Adaptation to Climate Change: A Review of UNFCCC and Other Recent Estimates* (London: International Institute for Environment and Development, 2009). Parry, who chaired the IPCC’s working group on impacts, vulnerability, and adaptation, estimates that full adaptation costs will be two to three times higher than UNFCCC estimates once the full range of climate-related impacts are taken into account.

- ⁸ Simon Caney, "Cosmopolitan Justice, Responsibility, and Global Climate Change," *Leiden Journal of International Law* 18 (2005), p. 766.
- ⁹ Steve Vanderheiden, "Distinguishing Mitigation and Adaptation," *Ethics, Place and Environment* 12, no. 3 (October 2009), pp. 283–86.
- ¹⁰ For example, Baer et al. develop a single "burden-sharing" formula for financing mitigation and adaptation activities, but they neither distinguish between mitigation and adaptation burdens nor specify how funds would be allocated among mitigation and adaptation activities, in "Greenhouse Development Rights: A Proposal for a Fair Global Climate Treaty," *Ethics, Place & Environment* 12, no. 3 (October 2009), pp. 267–81. Similarly, the "Copenhagen Accord" notes only that international financing should be "balanced" between mitigation and adaptation (p. 3), implying an indifference or fungibility between them. In general, few treat mitigation and adaptation as involving morally distinct categories of action or overall climate-related burdens as dependent on the allocation of resources between them, with equity- and/or responsibility-based burden allocation typically disjoined from specific mitigation or adaptation goals.
- ¹¹ Strict liability formulas assign adaptation costs in terms of total historical emissions, whereas fault-based ones exempt basic "survival emissions," along with those released prior to some point at which ignorance concerning the causal relationship between polluting activities and climate-related harm became unreasonable (such as 1990).
- ¹² Vanderheiden, *Atmospheric Justice*, esp. chap. 7.
- ¹³ CO2Now.org, "Earth's CO₂ Home Page"; available at www.co2now.org/ (accessed September 15, 2010).
- ¹⁴ According to its most recent estimates, the IPCC projects that stabilization at 450 ppm will "very likely" lead to warming above 1°C, warming that is "likely in the range" of 1.4–3.1°, and a best estimate of 2.1°C in warming. IPCC Working Group I, *Climate Change 2007: The Physical Science Basis* (Cambridge: Cambridge University Press, 2007), pp. 10–18.
- ¹⁵ James Hansen et al., "Target Atmospheric CO₂: Where Should Humanity Aim?" *Open Atmospheric Sciences Journal* 2 (2008), pp. 217–31. Besides Hansen and the nine coauthors of this article, the 350 ppm target has been endorsed by Bill McKibben, Van Jones, Vandana Shiva, David Suzuki, and others. See www.350.org/.
- ¹⁶ U.S. Energy Information Administration, "Emissions of Greenhouse Gases Report"; available at www.eia.doe.gov/oiaf/1605/ggrpt/carbon.html.
- ¹⁷ For a rights-based analysis of these justice obligations, see Steve Vanderheiden, "Climate Change, Environmental Rights, and Emissions Shares," in Steve Vanderheiden, ed., *Political Theory and Global Climate Change* (Cambridge, Mass.: MIT Press, 2008), pp. 43–66.
- ¹⁸ For examples of this approach, see Peter Singer, *One World: The Ethics of Globalization* (New Haven, Conn.: Yale University Press, 2002); and Henry Shue, "Global Environment and International Inequality," *International Affairs* 75, no. 3 (1999), pp. 531–45.
- ¹⁹ Vanderheiden, *Atmospheric Justice*, chap. 7.
- ²⁰ For luck egalitarian accounts of distributive justice, see G. A. Cohen, "On the Currency of Egalitarian Justice," *Ethics* 99 (1989), pp. 906–44; Ronald Dworkin, "What Is Equality? Part 2: Equality of Resources," *Philosophy and Public Affairs* 10 (1981), pp. 283–345; and Brian Barry, *Liberty and Justice* (New York: Oxford University Press, 1989), pp. 142–58.
- ²¹ Joel Feinberg, *Doing and Deserving* (Princeton, N.J.: Princeton University Press, 1970), p. 222.
- ²² Matthew Adler, "Corrective Justice and Liability for Global Warming," *University of Pennsylvania Law Review* 155 (2007), pp. 1860–61.
- ²³ *Ibid.*, p. 1861.
- ²⁴ *Ibid.*, p. 1867.
- ²⁵ Brian Barry, "Sustainability and Intergenerational Justice," in Andrew Dobson, ed., *Fairness and Futurity* (New York: Oxford University Press, 1999), p. 97.
- ²⁶ Andrew Dobson, "Thick Cosmopolitanism," *Political Studies* 54 (January 2006), p. 172.
- ²⁷ The approximate U.S. population when I last checked the U.S. Census Bureau's real-time population estimator on September 15, 2010. See www.census.gov/population/www/popclockus.html.
- ²⁸ Michael Walzer, *Just and Unjust Wars* (New York: Basic Books, 1977), p. 297.

Climate change manifests itself in myriad ways, and it's the ultimate equalizer: a challenge faced by every living being. Here are the basics on what causes climate change, how it's affecting the planet, and what we can do about it. What is climate change? And while "climate change" and "global warming" are often used interchangeably, global warming—the recent rise in the global average temperature near the earth's surface—is just one aspect of climate change. How is climate change measured over time? The responsibility to reverse this worrying trend lies with us. At least 97 percent of actively publishing climate scientists endorse the consensus position that humans are the lead drivers of climate change. Considering climate change and globalization together as a research topic can illuminate the structures and processes of both. Globalization and climate change theories can be categorized as economic, political, and cultural on one dimension, and on another dimension as emphasizing the conflicts between the global and national/local levels, the dominance of the global, or the hybrids and pastiches created by mixing the global and local. Climate change, as an issue that creates and is created by a global sense of the world, is bound up in both its analysis and its policy proposals with the same. In distributing the costs associated with climate change, most scholars have focused exclusively upon mitigation burdens, which reduce ongoing contributions to climate change, primarily through greenhouse gas abatement efforts. Few consider the distribution of adaptation costs, which concern projects that seek to minimize harm from human-induced climate change. This article explores both, grounding each in the justice framework appropriate to each activity, with mitigation efforts based in distributive justice and adaptation activities in corrective justice, and outlines an overarching account. Global warming and climate change issues are perhaps the greatest threat to this planet. This section from globalissues.org looks into various aspects of this, such as the various international meetings to tackle climate change, the climate change convention and Kyoto Protocol, carbon sinks and flexibility mechanisms, developing countries and social justice and equity concerns, corporate influences, and more. Rich countries therefore face the biggest responsibility and burden for action to address climate change; and, Rich countries therefore must support developing nations adapt—through financing and technology transfer, for example. A mechanism suggested for tackling climate change and warming has been the idea of using Carbon Sinks to soak up carbon dioxide. If this can be done for all persons and peoples that affect or are affected by climate change, then climate justice can be usefully understood as an effort at ensuring globalized responsibility. Being responsible, in this sense, requires that persons and peoples avoid harming others through the environmental externality of anthropogenic climate change, whether by paying the relevant mitigation costs needed to avoid causing climate change or by paying the adaptation costs needed to avoid this resulting in human harm. The overarching view of responsibility that encompasses the distributive and corrective justice elements of climate change mitigation and adaptation imperatives depends on three related meanings of the term.