

CLIMATIC JUSTICE AND THE FAIR DISTRIBUTION OF ATMOSPHERIC BURDENS: A CONJUNCTIVE ACCOUNT

1. Introduction

Any plausible theory of climate justice must explain how the burdens associated with climate change and policies for its management should be allocated amongst agents with competing interests, entitlements, resources, and responsibilities. Providing this explanation involves answering several connected problems. How much are these burdens likely to cost to discharge? Which agents should cover these costs and why? How great a burden can each of these agents reasonably be asked to bear?

Climate burdens can be defined as the costs that agents bear when they attempt to neutralize the injustice associated with adverse anthropogenic interferences in the climate system. *Mitigation burdens* arise from measures designed to reduce atmospheric stocks of greenhouse gases in order to prevent physical changes to the earth's atmosphere (such as rises in average global temperature) that trigger adverse effects for existing or future generations (Klein and Huq 2007, 750). Recent research suggests that stabilizing atmospheric stocks of greenhouse gases in order to prevent a greater than 2°C rise in global temperature would cost at least 1 per cent of global world product each year (roughly \$600 US billion in 2009) over the next century (Baer et al. 2009, 57–58; 109n; Stern 2007, 258–62). *Adaptation burdens* arise from measures designed to manage impacts that are no longer avoidable or too costly to avoid with existing technology so that adverse impacts for present and future generations are reduced (Klein and Huq 2007, 750). Depending on the methodology adopted, the annual cost of climate adaptation based on a 2°C global warming is projected to be \$70–\$100 billion between 2010 and 2050 (World Bank 2010, 10). *Compensatory burdens* are financial, technological, or symbolic measures designed to recompense agents experiencing undeserved adverse climatic impacts or risk. Such measures are designed to redress past injustice (ex

post compensation) or remedy harmful exposure to ongoing or future risk (ex ante compensation). The scale of the climate problem is such that both ex ante and ex post compensation claims could run into many hundreds of billions of dollars if recent litigations associated with trans-boundary pollution, slavery, racial discrimination, and oil spills are taken as analogues (Farber 2008, 1619–34).

Who should bear the burdens of climatic mitigation, adaptation, and compensation if the background for this question is the objective of limiting global warming to 2°C or less? To retain a clear focus on the normative bases of differentiated burden distribution, rather than the problem of which type of agent bears burdens of which category, the focus of this article will be the special responsibility that *states* bear to shoulder all three categories of burden. A number of specific burden-sharing principles have been invoked to specify and justify the duties of states to bear climate burdens. The two most popular principles, based on capacity to act and historical responsibility, are often held to converge in terms of the burden attributions they recommend. That is, much of the normative literature¹ and international legal documentation² has assumed that national historical responsibility and national wealth isolate developed states as bearing the primary duty to bear climate burdens.

Whilst it is true that both principles provide principled reasons to reject a *strictly egalitarian* approach—where climate burdens are allocated so that each state faces equal burdens of mitigation, adaptation, and compensation—I argue below that the distributional implications of each principle diverge markedly in terms of the burdens attributed to developed and developing states in a range of hypothetical and actual circumstances. I further argue that in response to such divergence we have reason to look more closely at competing interpretations of each principle; to ask if there are other principles that should regulate the distribution of climate burdens; and to consider pluralist approaches that attempt to harness the strengths of key burden-sharing principles in order to avoid the weaknesses of each applied in isolation either in isolation. In this vein, I go on to defend the controversial idea that the receipt of benefits created by activities involving greenhouse gas emissions should play some role in our account of climate burdens; and I go on to outline a ‘conjunctive account’ of burden sharing that assigns a specific role to agential wealth, historical responsibility, and benefit recipience in successive stages of the process whereby climate burdens are identified, allocated, and discharged.

2. Contribution to Problem: Why the Polluters Should Pay

Since 1750, human activities have been responsible for introducing over 1200 billion tonnes of carbon dioxide (tCO₂) into the atmosphere through fossil-fuel combustion, cement production, and gas flaring (Boden, Marland, and Andres 2011). The total CO₂-equivalent concentration of all greenhouse gases in the atmosphere (CO₂^e) have also risen in this period from 280 parts per million, in 1750, to 455 parts per million, in 2005 (Rogner and Zhou 2007, 102). Although the CO₂^e emissions of all states have contributed to these trends, states do not bear equal physical responsibility for climate change. Over 70 per cent of CO₂ currently in the atmosphere emanated from actors operating in developed states (Hansen et al. 2007, 2306–307); and whereas 27 states emitted less than 0.01 billion tCO₂ between 1900 and 2005, 70 states emitted over 1 billion tCO₂ in the same period (WRI 2009a).

According to the ‘contribution to problem principle’ (CPP), the burdens each state bear in managing climate change should reflect the share of total stocks of atmospheric greenhouse gas for which it can be held responsible. In this way, the CPP is effectively an extension of three more general principles of responsibility-centred justice. First, the ‘outcome-responsibility principle’ according to which moral agents should be held responsible ‘for what they do or cause’ (Honoré 1999, 7). Second, the ‘polluter pays principle’ according to which outcome responsible agents must internalize the costs they impose on others through the way in which they interact with the natural environment (De Sadeleer 2002, 23ff; Faber 2008). Third, the ‘national responsibility principle’, according to which states can be viewed as agents capable of bearing responsibility for adverse outcomes that originated in the conduct of agents operating within their borders.

At first glance, the CPP seems to provide a powerful interpretation of the principle of ‘common but differentiated responsibilities’ that lies at the heart of the international legal framework devoted to climate change and its management. The principle also draws strong intuitive support from its invocation of normative ideals of harm avoidance and agential responsibility; and develops an account of burden sharing that links the burden-sharing question to the physical processes that actually cause climate change (Neumayer 2000, 187). Nevertheless, both the theoretical and practical problems raised by the CPP are significant.³ I focus here on two sets of

problems that indicate that the CPP cannot provide an intuitive or comprehensive approach to climate burden sharing in isolation of other principles.

2.1 Blocking the move from pollution to polluter: the causation problem

One problem with basing climate-burden attribution on the causal process whereby a state's cumulative CO₂^e emissions causes adverse future outcomes associated with global warming is that there is reason to doubt whether states ought to be held responsible for the greenhouse gases emitted within their borders between 1750 and 2010. Consider, firstly, the many instances when the continuity of state identity has broken down during the timeframe in which the CPP must operate. The CTP, as a 'backward-looking' approach to climate burden sharing, does not cope well with the changing landscape of international relations. There have been numerous changes in international boundaries due to wars and secessions, as well as internal political events that have transformed regimes or the institutional character of states, since the beginning of the industrial revolution. This seems to undermine the case for holding an existing state responsible for the cumulative emissions of ancestral geopolitical units as if they were one and the same entity (Caney 2006, 469ff; Miller 2009, 151ff). This is the 'disappearing-perpetrators' problem.

Shifting state boundaries and fundamental constitutional change pose a problem for the CTP since it presupposes that only agents that actually caused an environmentally adverse outcome can be held outcome responsible. To apply a burden to a different agent, then, would violate the ethos of outcome responsibility as 'being responsible for the good and harm we bring about by what we do' (Honoré 1999, 14). It has been suggested that the disappearing-perpetrator problem can be finessed if the CPP is restricted to national accumulations of CO₂^e after some point early in the twentieth century (Neumayer 2000, 189) or after 1990 (Caney 2005, 769). Yet, such moves indicate as much an abandonment of historical responsibility as its revitalization since any burdens attached to accumulations of CO₂^e before the year selected will be left undistributed.⁴ These moves also ignore the fact that there is no globally applicable moment in history where the problem ceases to apply but rather a series of state-specific moments.

A second problem arises from the absence of some of the basic elements of an outcome- responsibility approach to burden sharing in the climatic context. Outcome responsibility, in its most obvious form, pre-

supposes: (i) the existence of identifiable harmful acts or events which (ii) befall identifiable agents such that (iii) these harms can be traced back to the behaviour of specific agents who are thereby held outcome responsible. It is not sufficient, given the focus of the CPP on the relationship between polluter and polluted, that we can identify an elevated risk of harm unattached to a climate victim and untraceable to the actions of a climate villain. The problem in the climate context arises from integral features of the gases that cause climate change as they accumulate. Greenhouse gases are ‘stock pollutants’ in that the changes in climate variables they force are a function of their accumulation over many generations rather than of their release during any particular year. These gases are also ‘well mixed’ in that they become evenly distributed throughout the atmosphere shortly after being emitted irrespective of the nature of the activity involved or its geographical location. Since one tonne of CO₂^e emitted *anywhere* results in the same amount of climate-changing potential being exerted *everywhere*, it is not possible to trace any ‘signature’ climatic events (whether a windstorm, tidal surge, flood, or drought) to any individual state’s accumulated emissions.

2.2 Blocking the move from casual responsibility to outcome responsibility

Although developed states may be causally responsible for the bulk of the cumulative CO₂^e emissions since 1750, it is not at all clear that they can be held outcome responsible for climate change and its adverse effects (Faber 2008, 1992). Attributions of outcome responsibility, whether directed to individual persons or states, presuppose some minimal standard of agential capability. That is, to be outcome responsible for redressing a disadvantage an agent has already caused, is in the process of causing, or is expected with great confidence to cause at some point in the future, requires that this agent possess the ability ‘to choose and to control his conduct in accordance with his choice’ (Honoré 1999, 32; Faber 2008). Agents that create harms as by-products of activities where these harms could not have reasonably been foreseen seem to lack this condition. So it seems that the CPP could only apply after a point in history had been reached where states could not reasonably claim that they were excusably ignorant of the climatic effects of their CO₂^e emissions (this might be called the ‘national excusable ignorance’ problem). A common claim is that the relevant point in history where this problem ceases to apply is

somewhere between 1900 and 1990 (see Baer et al. 2009, 46–8; Caney 2010, 210). Identifying the moment after which states could reasonably be assumed to understand, and therefore take responsibility for, the long-term consequences of CO₂^e emissions within their territories, however, presents serious theoretical and practical challenges not least because many billions of tonnes of CO₂^e could be excluded from the burden distribution analysis depending on our choice of temporal threshold.

A second problem arises when we consider states that are causally responsible for harmless accumulations of CO₂^e emissions. The idea is that, even if the relevant state governments were aware that their accumulated CO₂^e emissions had the capacity to modify the climate system in combination with those of other states who emit far more, the former cannot be said to be fully in control of their conduct in a way that triggers outcome responsibility for climate change. Oxfam International, for example, argue that every state has an annual entitlement to emit 2 tonnes of CO₂^e per capita without penalty since this modest level of emissions could be enjoyed by all states, over an indefinite time period, without prompting a global warming of 2°C or more. In Oxfam's estimation, only states with per capita emissions above the 2 tonne threshold should be attributed burden-sharing duties; and these duties should be determined in proportion to the associated overshoot (Oxfam International 2007, 37). While the exact threshold of well-being needed for such 'nonharmful emissions' is under dispute, partly because of the different ways in which dangerous climate change might be conceived, the problem it raises for the CPP is that a large slice of the CO₂^e that actually causes climate change (12 billion tonnes in 2010, rising to 18 billion tonnes in 2050) would be excluded from the burden distribution process. Although this would be consistent with the desire to avoid the unfairness of asking developing states to bear burdens in direct proportion to their cumulative emissions when their emissions per citizen 1750–2010 were a fraction of those typical of developed states, it also flies in the face of climate science for the atmosphere does not discriminate between 'luxury' and 'subsistence' emissions.

3. Ability to Pay: Why the Wealthy Should Pay

According to the 'ability to pay principle' (APP), states should shoulder climate burdens according to their capacity to do so. That is, states with the broadest shoulders, as measured by national wealth or some other indicator of capacity, should bear the greatest burden of mitigation, adaptation, and

compensation. The APP is in this sense a 'forward-looking', rather than 'backward-looking', justification of differential climatic burdens: the burdens associated with climate change should be borne by the most able regardless of how much good, or bad, they have done or caused in the past.

There are effectively two variants of the APP. Each purports to explain how burdens should be distributed amongst those states that have sufficient resources to finance climate policies without compromising the basic needs of their own citizens. The first variant of the APP holds that simply being wealthy (in total or per capita terms) confers on a state the burden of playing a leading role in climate mitigation and adaptation. The greater their absolute wealth, that is, the greater the burden they can be reasonably asked to bear (Shue 1999, 537–40). We might call this the 'absolute wealth' approach. The second variant of the APP holds that it is the opportunity cost of action in terms of financing or implementing climate policies that should specify burden shares. This 'effective wealth' approach is grounded in the thought that if one state has the opportunity to reduce its emissions, or undertake adaptation, more cheaply than another then it should be asked to bear a greater burden (Claussen and McNeilly 2000, 18–22; Miller 2009, 146–51). The strength of the absolute wealth approach is its simplicity and relative ease of operationalisation. The strength of the effective wealth approach is that it can incorporate the thought that a multitude of factors (technological development; natural resources; income distribution; social and political stability) mediate the ability of each state to harness its national wealth to manage climate change.

At first glance, the CPP has much to recommend it. The APP, as a 'forwards-looking' approach, is not subject to the problems associated with national excusable ignorance, boundary changes, or nonharmful emissions; but, like the CPP, the APP is already entrenched in the international climate architecture in the 'common' dimension of the 'common but differentiated responsibilities' principle. Nevertheless, the APP is questionable as a monistic approach to climate burden sharing for at least two reasons. First, a burden-differentiation problem arises between 'responsibly rich states' and 'irresponsibly rich states.' Suppose two states have the same high standard of living and opportunity to respond to climate change. However, it transpires that one developed using the most efficient (climatically less damaging) technology available while the other developed using far less efficient (climatically far more damaging) technology. Although the first state will have contributed far less to climate

change, both variants of the APP applied in isolation imply that the climate burdens each should bear will be similar if not identical. Although merely a thought experiment, the responsible/irresponsible state example can be illustrated empirically in the diverging cumulative emissions records of developed states with similar effective wealth (Boden, Marland, and Andres 2011). One interesting real world pairing is that of Australia and Germany (see Table 1). The APP implausibly suggests that a higher per capita climate burden be allocated to Australia despite its markedly smaller contribution to climate change even after adjusting for population size.

Second, a burden differentiation problem arises between ‘responsibly poor states’ and ‘irresponsibly poor states.’ Here, a similar set of worries as to those noted above arises when the developing world is disaggregated into those that have used the best available technology in the way they have developed and those that have not. In circumstances where all states are attributed at least some burden, it seems unfair to those states that developed in a cleaner manner that they bear the same burden as those that did not. This thought experiment can also be illustrated empirically since significant differences in cumulative emissions records exist amongst developing states with similar effective wealth (Boden, Marland, and Andres). An interesting real-world pairing is that of South Africa and Mexico (see Table 1). The most obvious interpretation of the APP would allocate a slightly larger per capita burden to Mexico than South Africa despite the latter emitting far more CO₂ since the beginning of the industrial revolution.

Table 1	Cumulative CO₂ emissions 1900–2004 (million tonnes)	2006 GDP per capita \$US	2007 Population
Australia	11,929	\$35,547	20,600,000
Germany	73,626	\$32,322	82,700,000
South Africa	13,242	\$9,087	47,000,000
Mexico	11,458	\$12,177	109,600,000

Source: WRI, 2009a; WRI, 2009b; United Nations, 2007.

How should proponents of the APP respond to these two problems? One response would simply be to ‘outsmart’ opponents by insisting on burden sharing in proportion to wealth even in the face of apparent unfairness to

responsibly rich and poor states. An alternative, subtler, response would be that we should modify the climate burdens faced by rich and poor states through a restricted application of the CPP. Simon Caney takes this approach when he defends a modified APP designed to channel the thought that the ‘responsibly rich’ owe less than the ‘irresponsibly rich’ because their wealth arose in a less climate-endangering way. The former have more reasons than the latter, Caney argues, ‘to justify their view that they should not have to pay for the mitigation and adaptation costs needed to address the ill effects of climate change’ (Caney 2010, 215). The idea here is that the APP can play a valuable role in generating intuitive burden distributions in circumstances where the CPP is either inapplicable (because some climate changes arose as a result of the CO₂^e accumulations of excusably ignorant states) or would lead to counterintuitive results if applied unilaterally (because some states have caused a lot of climate change but cannot afford additional burdens).

Neither response is satisfactory. The former, outsmarting approach, while at least possessing a sort of brutal consistency, commits the proponent of the APP to the absurd implication that we cannot differentiate between wantonly wasteful states and states that have at least made some effort to develop sustainably when both are equally well-off. The latter, pluralizing approach, begs the question of why the CPP principle should not replace the APP altogether, or, more to the point, why we should not simply search harder for a third burden-sharing principle that can operate unilaterally. More troublingly, Caney offers no argument for why we should not view the APP as the fundamental principle generating small anomalies for the CPP to solve since no deeper reasons are offered for the primacy of historical responsibility over capacity in the allocation of climate burdens.

4. Benefiting From Cumulative Emissions: Why Beneficiaries of Industrialization Should Pay

The two derivations of the APP discussed above leave unanswered the deeper question of *why* those who have the most resources should bear the greatest climate burdens other than because they *can*. One neglected answer to this question, which generates a third principle of burden sharing, focuses on those who benefit the most from the activities that have caused, and continue to cause, climate change. Put simply, the idea

is that beneficiaries of the activities that caused climate change should shoulder the burdens associated with its management. This is the ‘beneficiary pays principle’, or BPP (Caney 2006, 472–76; Page 2008, 562–24).

As described, the BPP is neither subordinate to, nor identical in application with, the APP or CPP even if the three principles will often converge in the national burden allocations they recommend. A convergence between the principles arises at the current time because developed states possess the *ability* to bear climate burdens largely as a consequence of *benefiting greatly* from economic development driven by over *two hundred years of fossil-fuel emissions*. Nevertheless, in both theory and practice the three principles are likely to diverge in their implications. The BPP will depart from the CPP since, for the latter, it is not necessary that agents benefit from inflicting damage on the climate system for them to be held to account. The key issue, for the CPP, is the amount of damage done and whether the emitting agent conforms to the relevant criteria to hold them outcome responsible for the harms caused by their cumulative emissions. The strength of the BPP, by contrast, is that it can hold present states responsible for tackling climate change even if they cannot be held outcome responsible for the emergence of the climate problem. In this way, the BPP finesses the problem of disappearing perpetrators, excusable ignorance, and nonharmful emissions since the focus of burden attribution becomes the relationship between victim and beneficiary rather than victim and perpetrator. The BPP will depart from the APP because, for the latter, the source of differential ability to respond to climate change is irrelevant. The key issue for the APP is rather the resources a state has at its disposal to bear climate burdens. The strength of the BPP, by contrast, is that it can explain why states with superior resources ought to bear a greater burden in terms of the global climate response so long as it can be assumed that much of the wealth of the former came about as a by-product of past activities that we now know are changing the climate system.

On what deeper normative grounds might the BPP rest? According to what we might call the ‘unjust enrichment argument’, benefiting from climatic injustices perpetrated by past generations triggers a duty on the part of beneficiaries to undertake measures that reduce the damage sustained by innocent victims of these injustices. Receiving benefits from unjust practices, that is, imposes a duty on an agent [A] to compensate victims of the original injustice [B] up to the point where this duty is

exhausted either because the injustice has been fully rectified or the benefits that triggered the duty have been exhausted. This moral relation exists, it is argued, even where a third party [C] was causally responsible for the original injustice (Butt 2007, 140–46; Butt 2009, 117–21). In the climatic context, the injustice that underpins the BPP is the appropriation by many states of an unfair share of the capacity of the atmosphere to store greenhouse gases without triggering climate changes that will have a range of adverse effects on existing and later generations.

The unjust enrichment justification of the BPP rests on a subtle distinction between just and unjust holdings such that much of the wealth of the developed world can be traced to a continuous line of unjustly acquired benefits arising from generations of agents failing to internalize the full social costs of activities that release CO₂^e into the atmosphere. We might compare the situation of the developed states to agents in receipt of the interest accruing from stolen property since these states continue to enjoy huge benefits as a result of the absorptive capacity of the atmosphere being appropriated beyond sustainable levels at the cost of developing states (who emitted far less than their fair share of CO₂^e) and future generations (who will be the primary victims of climate change). It is important to note that the unjust enrichment argument does not assume that existing states are *directly* at fault for the historical climatic injustice perpetrated by ancestral political units. Rather, the idea is that existing states are *indirectly* at fault so long as they continue to enjoy the benefits generated by this injustice without undertaking measures of mitigation, adaptation, or compensation. Benefit recipience is a controversial basis for climatic burden attribution; and a full examination of the BPP is beyond the scope of the article. Instead, I focus here on three problems with the BPP conceived as a comprehensive solution to climate burden sharing and outline some responses to these problems.

The first problem is that the duties defined seem quite weak in situations where the apparent beneficiaries are comparatively, or absolutely, poor since it is hard to justify asking a state to mitigate, adapt, or compensate if the benefits that drive its climatic duties are dwarfed by its incapacity to meet the basic needs of its citizens. At first glance, this objection might seem spurious since it is common to assume that the states that have benefited the most from fossil-fuel based industrialisation

must also be the wealthiest. However, it is clear that a number of once affluent states have surrendered much of the wealth they enjoyed as a result of industrialisation as a consequence of physical, environmental, and geopolitical contingencies beyond their control ('brute bad luck') as well as some factors within their control ('option bad luck') that should not be used to justify differentiated burdens.⁵ It could also be maintained that developing states have benefited from industrialisation in the sense that their populations would be even worse off today had it not occurred. The BPP, however, seems unable to deal intuitively with either case for, as long as some benefits persist at the time the burden-sharing analysis is performed, the present benefits accrued to poor nations will be open for redistribution in the fight against dangerous climate change.

The existence of 'once rich, now poor' and 'always poor' beneficiary states suggests that the unjust enrichment derivation of the BPP may struggle to provide a comprehensive and intuitive solution to climatic burden sharing in all contexts, but it does not show that the BPP cannot play a key role in such a solution. It would be natural to stipulate that the BPP (as the CPP and APP before it) obliges states to bear burdens only up to the point where they can still provide for the basic needs of their populations. The BPP merely adds that these burdens will cease even earlier if the benefits that they have received from past generations are exhausted.

A second problem is that there appears an air of paradox in the requirement that states that have benefited most from greenhouse-driven industrialisation should pay the most to tackle climate change when, given the sensitivity of personal identity to events before conception, none of their existing citizens would have enjoyed the benefit of life had industrialization not occurred. The upshot of this particular application of the 'non-identity problem' is seemingly that there are no existing individual beneficiaries from which we can coherently seek recompense in the form of transfers between the states and it seems odd to maintain that a state can benefit from past activities or events even if none of its citizens has benefited (Caney 2005, 757ff; Caney 2006, 474–76).

The non-identity problem undoubtedly has curious, and disquieting, implications for a range of debates in environmental and intergenerational ethics; but in this particular context the relevance of considerations of personal identity seem exaggerated. The BPP, for one thing, can fairly easily

be developed in impersonal terms where the focus is on the rightful spatial and temporal location of the benefits themselves rather than a person-affecting analysis of the life histories of those to whom the benefits are currently attached. It is known with some confidence that persons belonging to existing and future generations will experience adverse states of well-being as a result of episodes of extreme weather, coastal erosion, and rising sea-levels even if these events will not predictably make them worse off than they would have been had these events not occurred. These adverse states of well-being originate in activities that created the conditions for positive states of well-being for persons more fortunately placed in the historical timeline; and the BPP can be seen as a method specifying how well-being should be transferred amongst these populations that is not sensitive to person-affectingness at the level of donor or recipient. It might also be added that, as a state-based approach, the distribution of climate burdens resolved by the BPP is not subject to the non-identity problem since states do not possess the properties of agents whose coming into existence is sensitive to minor historical events or decisions (Page 2006, 153–58).

A third problem for the BPP is that it does not seem possible to separate the part of the present wealth of developed states that arose from activities that caused climate change from the part that can be attributed to other factors. The BPP, then, seems incapable of being fully operationalised. One dimension of the problem is that distinguishing between the two types of wealth presupposes a distinction between ‘automatic benefits and costs’ (outcomes uniquely created by fossil-fuel driven industrialisation) and ‘nonautomatic benefits and costs’ (outcomes that would have occurred anyway or had multifaceted origins including those unrelated to climate-change producing activities).⁶ If no clear distinction can be made between automatic and nonautomatic benefits then it will not be possible to distinguish between benefits an agent should be prepared to sacrifice to combat negative externalities associated with their production and benefits that an agent should be permitted to retain because their origins are independent of harmful accumulations of CO₂.^e Since the CPP and APP do not trace climate burdens to the receipt of climate benefits, they do not face the problem of benefit identification or disaggregation. In absence of such an account, it appears that the BPP is plausible only as one part of a pluralist approach to burden sharing.

5. *Towards a Conjunctive Approach to Burden Sharing*

This section addresses the possibility that an account of burden sharing incorporating all three principles may provide the most reliable basis for widespread agreement on differential climate burden sharing. The first approach, *priority ordering*, appeals to two or more principles such that there are clear priorities evident in their importance and the way they are applied. The most obvious way a priority system would work would be to apply one principle, say the CPP, and then apply a subsequent principle, say the APP, if there are any climate burdens that are left unallocated by the prior principle. Caney (2010, 213) refers to such troublesome burdens as ‘the remainder.’ Caney himself, as we saw above, endorses a primary and a secondary principle of burden sharing. According to the primary principle, agents ‘should bear the burden of climate change that they have caused so long as doing so does not push them beneath a decent standard of living’ (2010, 218). According to the secondary principle, burdens that remain unallocated by the primary principle

should be borne by the wealthy, but we should distinguish between two groups—(i) those whose wealth came about in unjust ways, and (ii) those whose wealth did not come about in unjust ways—and we should apportion greater responsibility to (i) than to (ii) (Caney 2010, 218).

This is undoubtedly a promising approach to burden-sharing pluralism. One problem, however, is that Caney fails to explain *why* the first principle (a modified CPP) is treated as conceptually prior to the subsequent principle (a modified APP). He does not, for example, address the possibility that the APP should be the prior principle with the ‘remainder’ being handled by the CPP. An additional problem is the way in which Caney’s modified APP absorbs the BPP without explaining why the latter modifies, not replaces, the former.

The second approach, *weighting without ordering*, determines the role and moral importance of each principle by intuitive balancing or by pre-determined weightings. Claussen and McNeilly (2000, 20–22), for example, adopt an intuitive balancing approach towards a number of burden-sharing principles including the APP and ATP. They do not, however, advocate priorities amongst these principles since they adopt the view that an agent has a greater burden the more of these conditions they satisfy. Next, Caney himself, in earlier work (2005, 769), proposed a three principle

approach, one of which is linked to the CPP and two of which are linked to the APP. Yet, like Claussen and McNeilly, Caney also declined to offer further guidance as to how potential conflicts between these principles might be resolved. Finally, Baer et al. (2009) defend a more determinate burden allocation model that assigns states burdens to states in terms of a weighted combination of the CPP (measured by cumulative emissions from 1990–2010) and the APP (measured by the aggregated income of citizens earning more than €7500 per annum). Problems arise for each of these derivations of ‘weighting without ordering.’ In intuitive balancing mode, the approach gains in flexibility but loses determinacy since it will not generate a consistent method of distributing burdens. In fixed weighting mode, the approach gains in determinacy but loses in coherence since it generates clear rankings of state burden responsibility without explaining why the weightings were preferred to rival options.

Third, *conjunctive accounts* appeal to different principles to solve puzzles arising at successive stages of the burden-attribution process and in this way can be seen as a hybrid of weighting- and priority-based accounts. The basic idea, echoing H.L.A. Hart’s influential approach to the justification and systematization of criminal punishment, is that a ‘conjunctive answer’ should be given to the ‘single question’ of how the burdens of climate change should be distributed amongst atmospheric users who can afford to bear them (Hart 1968, 3). Hart himself proposed a reconciliation of superficially contrasting principles such as retribution and utility maximization in order to explore the legitimate limits of punishment in the context of problems similar to those faced by theorists of climate burden sharing (Hart 1968, 9–10). Hart’s idea was that the multifaceted problem of criminal punishment is soluble only if it is assumed that the key normative principles in play are separated by contrasting domains of application rather than by any prior evaluation of their relative moral weight. The three key stages in Hart’s pluralist elaboration of a just system of punishment were: (i) the justification of the practice of criminal punishment in general terms (the general justifying aim); (ii) identifying which agents could legitimately be punished (the question of liability); and (iii) establishing how severely we may punish (the question of mitigation/aggravation) (Hart 1968, 10).

I would argue that it is fruitful to develop an account analogous to Hart’s to solve some of the problems of burden sharing raised above. In both instances, more than one normative principle can be identified that attract considerable, if not universal, support amongst moral agents. However, each

principle is also associated with gaps in application, or absurd consequences, when applied in isolation. The guiding assumption, then, is that the CPP, APP, and BPP each possess significant value in a way that cannot be ranked or mutually offset. What is needed, therefore, is a burden-differentiation process that applies each principle to solve the aspect of the burden-sharing problem to which it is most suited. A full account of the full process is beyond the scope of the article, but the idea is that the burden-sharing problem is far more complex than is generally recognized; and only the second of an essentially four-stage process will be handled by the type of principle discussed above. The four stages are outlined in Table 2.

Table 2: The ‘conjunctive account’

1. *The burden-identification stage:* What are the climate burdens that require distribution amongst states and how much will they cost to bear?
2. *The general burden-distribution stage:* What justifies differential climate burden sharing in preference to an *equal* system of burdensharing or *no* system of burden sharing?
 - a. *The scope question:* What agents should bear *any* burdens of climate change?
 - b. *The liability question:* How should climate burdens be distributed amongst agents before claims of mitigation or aggravation are considered?
 - c. *The mitigation/aggravation question:* How might the initial burden distribution be made fairer?
3. *The revenue-generation stage:* How can we generate the revenue stream from states (in the proportions identified by stage 2) to find a comprehensive global fund (of the value identified in stage 1)?
4. *The climate-policy stage:* How should the proceeds of a global burden fund (generated by stage 4) be distributed amongst policies of mitigation, adaptation, and compensation?

Putting aside stages 1, 3, and 4, the key elements of the conjunctive approach are, firstly, the normative justification of introducing *any* process of burden sharing amongst states previously untouched by such burdens (stage 2); and, secondly, the specific role in the process played by each of the burden-sharing principles discussed above (substages 2a, b, c). The overriding justification for a system of burden sharing is remedying existing, or preventing future, undeserved disadvantage resulting from human interference with the climate system in a manner that respects norms

of equality, dignity, and fairness. It is only in this way that unequal burdens can be accepted by states and their populations as an expression, rather than a violation, of their equal standing (Miller, 2009). In terms of the specific roles of each burden-sharing principle, the suggestion is that the APP be used to screen out states that have insufficient resources to be placed under a duty to bear burdens of climate mitigation, adaptation, or compensation (2a); the CPP be used to determine the fundamental distribution of burdens amongst those states with sufficient resources to bear climate burdens (2b); and the BPP be used to adjust the fundamental burden distribution in order to reflect the aggravating (or mitigating) factors associated with a state being a major (or minor) beneficiary of past activities that caused climate change.

How might stage 2 of the burden-sharing process be operationalised? First, the APP would be invoked in stage 2a to separate the poorest states from those enjoying medium and high levels of prosperity. Asking the former to bear climate burdens would be unfair, and a violation of their dignity, even if they were responsible for significant accumulations of CO₂^e. One interesting possibility, here, would be to appeal to an analysis of global poverty, such as Paul Collier's influential analysis of the 'bottom billion' states, for this purpose (Collier 2007, 6–8). On Collier's analysis, there are presently 58 states, home to 980 million of the most impoverished citizens in the world, subject to multiple 'development traps' associated with poor governance, civil strife, and natural resource dependence. These states, under a modified APP, would be exempt from undertaking climate burdens.

Second, the CPP will be invoked in stage 2b so that all remaining states are assigned a percentage share of the total cost of effective policies of mitigation, adaptation, and compensation calculated in terms of each state's cumulative CO₂^e emissions between 1750 and 2010. To reflect the problem of nonharmful emissions, states that have yet to emit more than 2 tonnes per person in any particular year will be exempt from burdens.

Third, the resulting burden distribution is adjusted in stage 2c according to what might be called the 'beneficiary dividend'. This is the benefit that each state has experienced as a direct result of industrialisation. In advance of a comprehensive account of such automatic benefits, the idea would be to lower or raise each qualifying state's burden according to their comparative wealth in terms of productive assets. The higher (or lower) the beneficiary

dividend relative to the global median level, the higher (or lower) the aggravation and hence the higher (or lower) the burden to be borne (see table 3).

Table 3	Total Wealth per capita in 1994	Human Resources (% of total wealth)	Produced Assets (% of total wealth)	Natural Capital (% of total wealth)	'The Beneficiary dividend' (value of produced assets per capita in 1994)
North America	\$326,000	76	19	5	\$62,000
Western Europe	\$237,000	74	23	2	\$55,000
Middle East	\$150,000	43	18	39	\$27,000
South America	\$95,000	74	17	9	\$16,000
Global median					\$12,000
Central America	\$52,000	79	15	6	\$8,000
East and Southern Africa	\$30,000	66	25	10	\$7,000
South Asia	\$22,000	65	19	16	\$4,000

Source: Kunte et al. 1998.

In many respects, the conjunctive approach sketched above bears great similarity to those proposed earlier by Caney (2005; 2009), Baer et al. (2009) and Oxfam International (2007). Each of these models rejected a single-principle account of burden sharing in favour of a pluralist reconciliation of the CPP and APP. Yet, none of these models gives a key role to the BPP or acknowledges the true extent of the incommensurability of values that underpin each principle. There is no 'super value' according to which losses in one of these separate values can be weighed against gains in the others; and none of the values stands out as more pressing than the others in terms of the general problem of burden sharing.

By contrast, the conjunctive approach attempts to reflect, rather than work around, these incommensurabilities by allocating each principle a unique task in a process that avoids overt priorities or weightings. In doing so, it has the potential to deliver, with appropriate operationalisa-

tion, a balanced explanation of why we impose differential climate burdens and an improved basis for a global political agreement on climate change that all parties have reason to accept. However, the account is not designed to replace a fair negotiation process amongst states concerning the future direction of global climate policy. Normative theorists are duty bound to participate in processes of clarification and conceptual development that underpin accounts of climate burden sharing. But the decision to adopt one method of burden sharing over another is ultimately a political decision. In this spirit, the aim of this article has been to provide a philosophically informed reconciliation of three key burden-sharing principles in order to serve as the basis for further debate both inside and outside the international climate negotiation process.⁷

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NOTES

1. See Shue (1999, 544–45); Singer (2002, 26–27); Garvey (2008, 66–83).
2. See United Nations (1995, 3, 5); United Nations (1997, Article 10); United Nations (2009, 1).
3. For in depth discussion of these problems, see Caney (2006, 467–91); and Caney (2010, 206–13).
4. By 1990, for example, over 800 billion tCO₂ had already been emitted into the atmosphere, thereby raising the atmospheric concentration of CO₂ by 36 per cent over its pre-industrial value (Blasing, 2011).
5. See Dworkin (2000, 73) for the distinction between brute and option luck.
6. For the distinction between automatic and nonautomatic benefits, see Butt (2007, 146ff) and Butt (2009, 130–32).
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