

A normative ethical framework in climate change

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Abstract The article spells out four domains of international distributive justice and the consequent criteria of equity, the purpose being to identify a pluralistic normative ethical framework for climate mitigation and adaptation strategies. Justice and equity should play a major role in favouring collective action against climate change, because the more the various dimensions of such action are just, the more any international climate initiative is feasible in principle. As far as mitigation is concerned, the definition of a just initial allocation of endowments focuses on the criterion of differentiated equality, taking account of undeserved inequalities as suggested by Rawls' theory of justice as fairness. With regard to the subsequent exchange of endowments, the Pareto principle, supplemented by the envy-freeness one, is a viable option. Possibly a sound reference for the just financing of adaptation activities is the criterion of differentiated historical responsibility, backed by Rawls' theory of justice as fairness. As regards the allocation of adaptation resources, the criterion of lack of human security, as substantiated in Sen's capability approach, seems promising.

1 Introduction

It is claimed that the impacts of climate change and variability will be heavier on poorer countries (Grubb 1995; IPCC 2001a; Huq and Reid 2004; Baer 2006; Paavola and Adger 2006), which are more vulnerable because of their closer dependence on agriculture, lack of financial resources, technological and institutional backwardness (Richards 2003), and low knowledge and research capacity. Poverty-related climate effects include reduced crop yields which give rise to food insecurity, lower incomes, scant economic growth, the displacement of people from coastal areas, exposure to new health risks, and an increase in the frequency and severity of extreme climatic events (Richards 2003, pp. 5–6). This exceedingly

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unbalanced distribution of negative impacts will widen the gap between the North and the South¹ even further, thus confirming the view that climate change is essentially a matter of justice (Shukla 1999; Gupta 2000; Parikh 2000; Muller 2002).

The chances of the adverse effects of climate change actually taking place are rather poorly understood, and the ensuing socio-economic outcomes are even less foreseeable. Therefore, each country pursues different interests and objectives, and has different perspectives on climate policy. At the same time, the United Nations Framework Convention on Climate Change (UNFCCC) requires that these various claims must not hinder collective actions against climate change. Although both rich and poor nations are in principle willing to act cooperatively against climate change (Shue 1999, p. 531), the voluntary consent implied by the Westphalian principle, to the effect that obligations may be imposed on a sovereign state only with its consent, suggests that no supranational institution can, unilaterally and legitimately, adopt a climate treaty and bind states to comply with it: such a treaty can depend only on voluntary agreements² (Nordhaus 1999, p. 4). Moreover, appeals to global economic efficiency are not sufficient on their own to mobilize countries, given the wide disparities in their well-being due to different mitigation capacities and vulnerability levels, and the diversified costs of adapting to climate change impacts (Rose et al. 1998, p. 25).

Therefore, since there is no global institution enforcing an international climate agreement, the latter should be self-enforcing. And a self-enforcing commitment is in general more likely when the risk is clear and present, when the stakes are relatively low, and when the incentives for free-riding are negligible (Shogren and Toman 2000, p. 30). Regrettably, this is not the case of global climate change. Consequently, any climate agreement should be widely shared, a situation which is certainly more likely when the agreement is informed by principles of justice, shaped by criteria of equity, and perceived to be fair in both its process and outcomes³ (Shue 1992, 2001; Paavola 2005). Climate change is basically an ethical issue, in fact, for justice and equity imply greater legitimacy and can persuade parties with conflicting interests to cooperate more closely on collective actions. Justice should consequently play a major role as a unifying principle which facilitates collective actions against climate change: the more climate negotiations are informed by principles of justice, the more numerous the participants will be, and the more a global manageable solution can in principle be achieved (Grubb 1995, pp. 464, 473; Pan 2003, p. 3; Gardiner 2004, p. 556). Global problems require global solutions and hence the broadest possible consensus: “even if the grounds for consensus differ among different people, and each may use different arguments for accepting the schemes, they may agree on the very principle of justice” (Rawls, in Benestad 1994, p. 726).

In the policy arena, justice and equity are not the main drivers or goals of international agreements. The parties concerned, especially when a global public good like climate stability is at issue, pursue their own interests and priorities in order to minimize their

¹ Not of course in geographical terms, but rather in ones of wealth and economic development.

² This contention is partly disputed by the Stockholm Declaration on the Human Environment (1972), whose principle 21 asserts: “States have the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states.”

³ Carraro and Buchner (2002, p. 10) instead conclude that cost-effectiveness is more likely than ethical considerations to induce more countries to enter an international climate coalition. However, their conclusion holds only with regard to the outcomes of the mitigation process for the three equity criteria that they adopt (equal average abatement costs, equal per capita abatement costs, equal abatement costs per unit of GDP), and within the limits defined by the RICE simulation model.

contribution (or to free-ride). Nonetheless, ethical issues are believed to represent, protect and promote the needs and concerns of parties and “...in structuring negotiations and formulating broadly acceptable agreements on cooperation to reach these objectives (climate stability, clean air, disarmament, market access), justice and fairness have almost always been necessary to take into account” (Albin 2001, p. 7). Hence, on a complex issue like global climate change, referring to a normative ethical framework seems a useful and promising way to address the ‘common but differentiated responsibilities’ required by the UNFCCC, especially in regard to the future necessary involvement of the South: “A just burden sharing regime is vital to ensure the wide participation from developing countries” (Shukla 1999, p. 7). The unsatisfactory fulfillment of the UNFCCC commitments on justice, in fact, “could prove an obstacle in future international negotiations on the participation of developing country parties in mitigation to climate change” (Paavola 2005, p. 317).

In the light of these considerations, the aim of this article is to ethically justify and describe a normative pluralistic framework for international distributive justice, and to define the consequent equity criteria possibly determining global initiatives against climate change. It will do so both in terms of mitigation, “an anthropogenic intervention to reduce the sources of greenhouse gases or enhance their sinks” (IPCC 2001c, p. 3) and their concentration in the atmosphere, and of adaptation, the development of adaptive capacities for vulnerable natural and human systems in order to combat the physical effects of climate change and variability.⁴ The domains of justice entailed by the two climate strategies will be, in principle, analyzed *per se*,⁵ i.e., in a ‘stand-alone’ perspective independent of their mutual relationships, the purpose being to offer a separated normative view of the respective ethical issues involved.

Some specifications are in order: in the climate debate the term ‘justice’ is often used interchangeably with ‘equity’ and ‘fairness.’⁶ However, although these notions are indisputably interconnected and complementary (Pan 2003, p. 1), principles of justice – on their own or in composite theories of justice – exist independently before any process of judgment or interpersonal comparison has begun. ‘Equity’ instead refers to normative criteria used to orient the implementation of principle(s)/theory(s) of justice, whilst ‘fairness’⁷ pertains to the individual’s perception arising from a judgmental process, and is defined as “the rules relevant to a procedure, and....as the correct application of such rules to all cases...” (Hay 1995, p. 501). Therefore, the article is concerned with normative ethics, or the branch of ethics that seeks to determine the rightness (or wrongness) of human

⁴ These two notions obviously reinforce one another: “Adaptation is a necessary strategy at all scales to complement climate change mitigation efforts” (IPCC 2001a, p. 23). According to Jamieson (quoted in Gardiner 2004, p. 573) “...the choice cannot be seen as being one between abatement and adaptation, since advocates of abatement generally support a combination of strategies. The real issue is rather whether adaptation should be our only strategy, so that abatement is ignored.”

⁵ However some considerations on the intertwined dynamics of the domains of justice entailed by mitigation strategies will be made in Section 3.1, whereas no such considerations will take place in the adaptation domains as envisaged by this article (*infra* 4).

⁶ See, for instance, Muller (2001b, p. 273), Ashton and Wang (2003, p. 1, note 1). This perspective can ultimately be ascribed to Adam Smith’s impartial spectator with impartial judgment (Konow 2003, p. 1189).

⁷ According to Albin (2001, p. 4), fairness is a ‘micro’ concept suggesting what is right and wrong in particular circumstances for specific parties on specific issues, and it relates mostly to the structure and the process of the negotiation. It is for this reason that in what follows, given that procedural issues are not addressed (*infra* 2), the focus is on distributive justice and the associated criteria of equity.

behaviour. Specifically, it adopts a consequentialist perspective by focusing on extrinsic outcomes as the yardsticks with which to evaluate actions.

The article begins by stating the notions and domains of justice that can substantiate the ethical cores of the climate change debate (“Section 2”). It then describes the various domains of international distributive climate justice, doing so according to principles and theories of justice, and identifies the consequent notions of equity that can shape mitigation (“Section 3”) and adaptation (“Section 4”) strategies. The “Section 5” briefly suggest some international climate policy implications entailed by the normative framework sketched.

2 Notions and domains of justice in climate change

Political philosophy devotes a great deal of effort to the exploration of justice issues. It has produced a number of ‘theories of justice’, by which term is meant a set of principles with which to address and organize the various aspects of justice.⁸

The main philosophical approaches adopted in the debate on justice can be generally grouped into four theoretical ‘families’. The first focuses on consequences and end states and can be paradigmatically represented by utilitarianism and welfare economics. The second category is based on individual responsibility and proportionality: Nozick’s entitlement theory epitomises this libertarian perspective. The third group of approaches centres on equality, needs, opportunities and freedom and displays a general concern for the least well-off members of society. Rawls’ theory of justice as fairness, and Sen’s capability approach,⁹ are probably the most significant examples of liberal theories of justice. Finally, there is a group of theories which stress that the notion of justice is context-related;¹⁰ this, however, I do not consider relevant when the discussion concerns common resources, global public goods and supranational issues.¹¹

The purpose of this paper is neither to analyze these various families and theories of justice nor to formulate an exhaustive theory of justice. Rather, its intention is to describe the dominant dimensions of international distributive justice, and the consequent criteria of equity with respect to the specificity of global climate change, in order to identify a comprehensive normative framework for international climate-related actions.

In the climate debate, justice concerns are rooted in a fundamental difference in the balance of power and in the perception of climatic issues between the developed and developing countries (Tata Energy Research Institute (TERI) 1999; Muller 2002). Power results from natural and historical processes, and it is unevenly distributed in favour of rich

⁸ Equality and liberty are often the most important issues dealt with by these theories. Unsurprisingly, the main difference among them is the way in which they articulate and balance equality and liberty.

⁹ Although, according to Sen (1999) himself, the capability approach simply specifies an evaluative space (*infra* 4.2) and therefore cannot be considered a complete theory of justice. Rather, it is an essential constituent of a new general theory of justice, and it is for this reason that I consider it important for the climate debate on justice.

¹⁰ Some authors have attacked (from particular perspectives, for instance feminist or communitarian) the abstractness of general theories of justice – Rawls himself has oxymoronically described his theory of justice as ‘realistically utopian’ – proposing alternative, more concrete and contextualized approaches (Ali 2001). On this ground these critics increasingly dispute the universalism of liberal theories of justice.

¹¹ At least at this general level. Instead, when the concern is with the details of an operational ethical framework, they may prove very useful in dealing with particularisms.

countries, which can in principle use their greater influence to define international positions convenient to them. Widespread in the industrialized North is an ecological view of the effects of climate change, which is therefore seen as essentially a threat to the environment. Accordingly, environmental effectiveness is a key criterion in assessment of the appropriate measures. In the South, by contrast, climate change is perceived as an issue that most affects human well-being: the harm is caused to humans, who must suffer the physical impacts generated primarily by others, namely the rich countries of the North (Muller 2002, p. 39). Hence, the North's usual conception of justice as the sharing of mitigation costs is at least incomplete. It must be supplemented with the South's conception more closely centred on the right to use the atmospheric capacity and on the disproportion between the responsibility for, and efforts of adaptation to, climate impacts (Grubb 1995; Shukla 1999).

What specifically is it that must be distributed? The notion of distributive justice is a substantive moral category that concerns the allocation of "wealth, rights, honors and other benefits, and also duties" (Cullen 1992, p. 15). In particular, environmental distributive justice is a social concept regarding the distribution of environmental benefits, costs, risks and harms among human beings¹² (Ali 2001, p. 2). In the case of climate change, the sharable units consist of the costs and benefits both of mitigation efforts to reduce carbon emissions, and of adaptation attempts to prevent the harmful effects of climate change and to compensate for residual non-adapted impacts.¹³ Regrettably, despite the evident complementarity of these two domains of justice that springs from the complementarity of mitigation and adaptation strategies to cope with climate change (IPCC 2001a, p. 23), climate justice has been viewed mainly, if not solely, as a problem of mitigation (Muller 2002, p. 39). Mitigation, however, is only one side of the justice issue. Adaptation and the compensation of residual damages are the other (Shukla 1999, p. 1). The former issue concerns the minimization of global mitigation costs by equalizing the marginal cost of abatement, and the use of (i.e., the possibility of releasing greenhouse gases (GHG) into) a common resource like the atmosphere. The latter issue concerns the perceivably fair distribution of adaptation processes, in terms of both the funding of prevention activities and the allocation of resources to adaptation activities and compensation for residual damages. Moreover, the global public good nature of climate stability gives rise to a spatial and temporal asymmetry between actions and their external effects¹⁴ (Grubb 1995, p. 465; Shukla 1999, p. 1). Hence the distribution of impacts does not depend on the specific nature of each country's emissions. This circumstance, in my opinion, reinforces the need to link the two climate strategies into a pluralistic ethical framework. Only if a comprehensive (though erected on independent domains of justice) ethical framework exists can a global climate agreement become acceptable, at least in the normative sense, in spite of the great variability of climatic outcomes and of countries' capacities to cope with mitigation and

¹² In order to make the problem more tractable, I go no further than the level of human beings and intra-human relationships, accepting the inevitable charges of anthropocentrism and cultural 'west-centrism.' I nonetheless acknowledge the risk of human supremacism, which considers nature as merely a resource to be used indiscriminately and which, in that it treats non-humans as inferior and replaceable, is intrinsically unjust and potentially destructive.

¹³ I include among adaptation strategies also the compensation for damages deriving from residual impacts that cannot be adapted because of cost or impossibility (e.g., extreme and abrupt climatic events). From the theoretical perspective put forward here, they can be seen as ex-post forms of adaptation.

¹⁴ Indeed, most anthropogenic GHG emissions of past decades have been produced by developed countries, whereas the largest impacts will be suffered by poorer countries (Grubb 1995, p. 478).

adaptation efforts. Justice and equity should therefore be comprised in a pluralistic framework so that these substantial differences can be recognized and taken into account (Benestad 1994). Indeed, ethical pluralism can justify mitigation and adaptation strategies and better orient them to their goals. The former strategy, for example, ought to consider the moral unavoidability of certain basic energy needs and therefore be flexible in allocating endowments, whereas there should be a certain stringency in identifying the rules for subsequent allocations. The latter requires a solid basis for the allocation of adaptation resources, which again calls for flexibility as far as the financing of adaptation activities is concerned. On this I agree with Paavola and Adger (2002, p. 5): “We argue that only a broadly pluralistic approach that can acknowledge justice concerns on all of the foregoing approaches can adequately encompass all justice issues...”.

In the climate context, when looking for the entire picture, it is necessary also to consider the procedural (or formal, or abstract) notion of justice (Albin 2001; Paavola 2005; Paavola and Adger 2002, 2006), which is however not dealt with in the normative framework set out here.¹⁵ This concerns the fairness of the process by which a possible agreement is attainable and relates to the level of participation and recognition of all the actors involved in decisional processes.¹⁶ A viable climate treaty should grant all parties equal access, and ensure that issues raised by subjects who believe that they have interests at stake are dealt with fairly. Another, more problematic, aspect of procedural justice is the effective ability of parties to participate in the negotiation processes. Climate negotiations are extremely complex, so that it is usually only richer countries that can afford platoons of skilled negotiators, while poor parties can field only a few negotiators, if not only one (Paavola and Adger 2006). The climate change debate is mostly conducted by institutions, scholars and activists from the richest industrialized countries (and from the oil countries in recent years), whereas procedural justice requires that all the parties involved must have equal opportunities to protect and pursue their interests (Muller 2002).

International climate justice can be framed in the following domains,¹⁷ which refer to both distributive issues (related to mitigation and adaptation strategies) and procedural ones (the last one):

- just initial allocation of endowments,
- just exchange of endowments,
- just allocation of the costs of adapting to climate impacts,
- just allocation of the benefits (i.e., resources) for adapting to climate impacts,
- distribution of wealth and power allowing a just international negotiating process.

¹⁵ Nonetheless, I acknowledge the important role that it will play in climate negotiations.

¹⁶ Moreover, in a different perspective, justice has both a spatial dimension (within and between countries, the latter being the focus of this article) and a temporal one (between present and future generations). The temporal dimension – which is beyond the scope of this article – concerns the fact that, whereas actions against climate change and the resulting costs are shouldered by the present generation, the likely benefits of losses prevented will accrue mainly to future generations, without their knowing the risk that they will have to face because it ultimately depends on the unpredictable effectiveness of climate policies (Page 1999).

¹⁷ This taxonomy, synthesized in Table 1 as far as distributive justice is concerned, is similar, and indeed inspired by, the one put forward by Shue (1993, p. 40), who in fact identifies four domains of distributive justice: the allocation of GHG emissions; the allocation of wealth that would allow a fair bargaining of GHG emission quotas; the allocation of the costs of preventing avoidable changes; the allocation of the costs of coping with unavoidable changes.

Table 1 Strategies and domains of distributive justice in climate change

Strategy	Domains of justice
Mitigation	Initial allocation of endowments Exchange of endowments
Adaptation	Financing of adaptation activities Allocation of adaptation resources

The strategies and domains of distributive justice are set out in Table 1. The first two domains concern the mitigation of GHG emissions, the others concern adaptation issues. They are analyzed, respectively, in Sections 3 and 4.

This article concentrates on international distributive justice among states: this is not to imply that the question of justice can be defined regardless of the individuals or local communities directly affected by climate impacts and with diverse levels of vulnerability, and that are therefore the ultimate subjects of any climate policy. I admit that the process of anthropomorphising nations is, as Sen puts it (in Eyckmans and Schokkaert 2003, p. 14), a ‘fantasie’ which distorts sub-national and inter-individual issues. In fact, the belief that states are internally homogeneous conceals, both within developed and developing countries, the great disparities among classes – and which, moreover, may not be represented equally by governments (Paavola 2005). Therefore, taking account of sub-national circumstances is a crucial issue for climate justice studies, especially for the detailing of adaptation initiatives, which necessarily involve individuals, communities and organizations.

Having acknowledged as much, I nevertheless maintain that the ethical issues dealt with in this article operate mainly at the state level. This assumption belongs within the realist tradition of international relations which views international governance solutions as the outcomes of voluntary collective action among nation states, and where the ethical issues are mainly resolved among states themselves (Paavola 2005). In international climate-related justice disputes, states are in fact expected to mediate between supranational interests (e.g., emission abatements, adaptation patterns) and those of individuals and communities, which essentially relate to the distribution of the costs and benefits deriving from the pursuit of those general interests. States are effectively able to deal with global scale problems on behalf of their citizens (Rayner and Malone 1998, p. xv), and in this sense justice and equity, although they are notions that ultimately refer to individuals and communities, can be synthesized, regulated and eventually analyzed at the national level: “For better or worse, we generally accept national sovereignty as a basis for determining the internal allocation of resources” (Baer 2002, p. 403).

Besides, there are also intrinsic philosophical reasons that suggest, in my opinion, the choice of state as the *locus* of climate justice. The perspective of the traditional liberal approach to global justice, which underpins the normative ethical framework that I adopt, clearly recognizes states as the actors of international justice (Caney 2001, p. 974). Recently, however, this standpoint on international distributive justice has been challenged by different competing schools of thought (Caney 2001). In a normative perspective like mine, however, climate justice, or more precisely climate stability, the common interest necessary to substantiate the scope of justice in the climate debate, remains a moral imperative that should operate at state level, as upheld by the ‘national duties thesis’ of the nationalist perspective of international distributive justice (Miller 1988, 1995; Tamir 1993). A nation, on this view,

Table 2 Domains, theories of justice (TJ) and criteria of equity in mitigation

Domains of justice	Theory of justice	Criteria of equity
Initial allocation of endowments	Rawls' TJ as fairness I and II principles	Differentiated equality (equality taking into account undeserved inequalities)
Exchange of endowments	Utilitarian TJ welfare economics	Pareto optimality supported by Envy-freeness

consists of the shared beliefs of a group of people whose association is neither transitory nor instrumental, and who have a sense of loyalty and solidarity that can justify the sacrifice of individual interests for the common one/s¹⁸ (Miller 1988, p. 648). This suggests that, in a normative stance, climate justice makes sense mostly within the boundaries of states, because only individuals living within the same political community can have a shared understanding of the complex and intertwined issues that they will jointly undergo. Ultimately, the state has ethical significance (Miller 1988), because it can synthesize all the diverse duties and claims of individuals and provide the basis for solidarity which is necessary to support the individual sacrifices which mitigation and adaptation strategies require, especially in developed countries, whose citizens are expected to give up larger quotas of their wealth (i.e., that should sacrifice the more) for the sake of climate justice.

3 Justice and equity in mitigation

The domains of distributive justice in mitigation set out in Table 1 can be framed, I believe, in terms of theories of justice and the consequent criteria of equity listed in Table 2.

The issue of justice in mitigation can be seen as a problem of defining a just initial allocation of endowments and equitable consequent exchange patterns. The first domain, the one most widely considered (Helm 2003, p. 1), has generated considerable debate and a large body of literature (not surveyed here) which centres on the efficiency and flexibility of a tradable permits scheme to lessen the cost of attaining specific emission targets.¹⁹ This raises a major question of distributive justice: proportionality according to morally relevant quantifiable attributes (Muller 2001b, p. 273). As Aristotle puts it: “what is just is what is proportional, and what is unjust is what violates the proportion” (in Muller 2001b, p. 273). Alas, no agreed solutions exist. Some prioritize an initial allocation of emissions rights according to past or other (say prospective) levels of emissions. Some take a libertarian stance to assert rights to the atmosphere. On this latter perspective, a just distribution of endowments depends on entitlement to use the atmosphere by virtue of being the first to do so. Therefore the *status quo* is the reference for emissions, and developed countries have the right to emit at current levels, regardless of any past or present responsibility. Other solutions envisage the arbitrary distribution of the social, environmental and economic characteristics of the parties involved.

¹⁸ This concept of nation as an ethical community is, according to Miller himself (Miller 1995, p. 11), very close to Rawls' notion of 'people.'

¹⁹ Even though, according to the seminal work by Weitzman (1974), a proper international carbon tax (a price mechanism) is more appropriate than a quantity mechanism like the one envisaged by international trading schemes. In fact, all the scientific evidence demonstrates that the marginal cost curve of emission abatement is very steep, while the marginal benefit curve for reducing emission is very flat, thus showing the greater efficiency of price mechanisms in the climate context.

The second domain – the subsequent exchange of endowments – has to date been underestimated,²⁰ at least in a *per se* perspective. In fact, the market is usually assigned the role of ensuring efficient transactions of emissions rights, and of bringing about any desired distribution of resources potentially envisaged by initial allocations (Helm and Simonis 2000, p. 4). On this view, international resource transfers are by and large the best way to achieve efficient and equitable outcomes (Grubb 1995, pp. 488–489); and justice concerns, inspired by Pareto-efficiency as the foundation for optimal social states, are usually defended on the basis of welfare economics theorems (Schokkaert 1992, p. 74).

It is worth pointing out that when these two domains of justice are analyzed *per se*, they entail commitments that imply value judgments. The initial allocation of rights to emit GHG into the atmosphere is based on a weak (i.e., widely acceptable) value judgment, and it is recognized as an effective criterion for the fair distribution of access to the common resource ‘atmosphere’ among countries. More forceful is the value judgment backing the subsequent allocation of endowments. This, in a general sense, is supported by the internal (contextual) principle of justice of ‘mutual advantages’ which states that actions (and therefore agreements) should have positive net benefits for all (Gauthier 1986). Endowments can be understood as ‘sovereignty rights’ (Pan 2003, p. 6) and thus as being “tradable but subject to collective or political restrictions” (Pan 2003, p. 6). Moreover, Muller (1999) identifies the ethical argument underpinning emission trading as the entitlement theory of justice: from a libertarian perspective (Nozick 1974) the transfer of justly acquired emission rights is morally legitimate and intrinsically just. By contrast, according to other ethical standpoints, justice can demand that subsequent exchanges of endowments must not be allowed. For instance the “notion of equality as ‘equal shares’ advocates the uniform distribution of resources regardless of differences in needs, preferences, or other considerations” (Pruitt, 1981, in Albin 2001, p. 5), and discourages any redistribution. Furthermore, trading also raises controversial issues of environmental justice,²¹ which should be weighed against its Pareto-optimal welfare consequences (*infra*, 3.2). The most debated and feared concern relates to the commodification (i.e., the attribution of an economic value to something that traditionally would not be considered in economic terms) of the atmosphere brought by a surrender to neoliberal ideology (Athanasίου and Baer 2002, p. 99) that would allow developed countries to “buy their way out of their commitments” (Ott and Sachs 2000, p. 17) without substantially reducing their emissions. However, the point is not trading in itself: for without trading, abatement costs would be unnecessarily high (Athanasίου and Baer 2002, p. 100). Rather, the requirement is to find a balance between economic efficiency and environmental effectiveness: an equilibrium, I believe, that should ultimately be assured by the fairness of carbon markets. And this is a further reason for grounding the domains of justice in mitigation on principles of justice and criteria of equity.

3.1 Initial allocation of endowments: Rawls’ theory of justice as fairness

The initial allocation of endowments is an extremely controversial topic in the climate change debate. The main general rules for granting GHG emission rights are: allocation proportional to a past or future (on the basis of projected emissions) reference year, and

²⁰ This issue “has thus far not attracted any attention” (Helm and Simonis 2000, p. 4).

²¹ For a thorough analysis of the debate and of the possible alternatives to international carbon trading, see Athanasίου and Baer (2002, Chapter 6).

allocation on an equal *per capita* basis, with or without historical accountability (Neumayer 2000, p. 186).

The equal *per capita* allocation (without historical accountability) of emission rights is deemed the option that best favours the ‘meaningful participation’ of all parties demanded by the UNFCCC, especially the least developed parties (Baer et al. 2000; Aslam 2002). Indeed, it is an equitable solution for a resource allocation problem²² (Muller 1999, 2001a). Equals should be treated equally, according to the Aristotelian formal principle of justice.

Unfortunately, the equal *per capita* approach is far from being generally accepted: it would in fact result in a very large wealth transfer from the developed to developing countries²³ (Panayotou et al. 2002, p. 440) and would therefore be adamantly opposed by the rich and influential countries. Nonetheless, if the equal *per capita* allocation scheme were corrected in order to take account of the main differences among the demands of GHG emitting activities by countries, and if these corrections were also defensible on ethical grounds, such a scheme would possibly weaken the resistances of wealthier countries and gain theoretical, if not yet practical, consensus.²⁴

My point is that a just initial allocation of endowments can be usefully set within an ethical framework based on Rawls’ theory of justice as fairness (RTJF). I now turn my attention to the RTJF because it sums up both equality and liberty (flexibility, in the climate debate), and these I consider essential for any emission rights allocation proposal to be acceptable to the largest possible number of parties. In fact, Rawls’ system calls explicitly for “the old and relatively uncontroversial Aristotelian notion of treating equals equally, in strict accordance with the rules, to ground a theory of justice which allows considerable discrepancies in equality.” (Cullen 1992, p. 19).

I shall consider the account of justice as fairness put forward in the path-breaking book *A Theory of Justice* (1971). Rawls (1999), in his *The Law of Peoples*, presented a framework of international justice that extended his previous account of justice as fairness. The RTJF gives individual persons the task of producing different declinations of equality and liberty so that they can define alternative basic structures for their society. Instead, in *The Law of Peoples* parties are actors which seek to shape liberty and equality among ‘liberal and decent peoples’ (Beitz 2000). The dimension of the climate debate is indeed supranational; nonetheless, I refer to the older, domestic, notion of justice as fairness because I deem it more appropriate as a morally acceptable referent for the design of an institutional order, be it at the national or the supranational level. It should be borne in mind that any climate strategy is primarily an institutional effort. On the other hand, the concept of justice as delineated in *The Law of Peoples* seems more appropriate to the morally acceptable rules that ‘liberal and decent people’ should honour in order to protect their independence, and to maintain the equality and stability of liberal decent domestic national orders. In short, the reference is to the notion of justice as fairness because it is institutional and can furnish a flexible structure for any empirical context of application, whereas the

²² According to Helm and Simonis (2000, p. 6) “In the international climate policy debate an equal per capita distribution of emission rights is ... the most commonly voiced proposal.”

²³ According to Aldy et al. (2001) this criterion would generate other problems. The emission limit would not be binding on developing countries for a long time; the allocation scheme might foster population growth; it would give a large share of the permits to a very limited number of countries (38% to China and India); finally, it would not consider the circumstances of different countries.

²⁴ Furthermore, according to some preliminary figures (Grasso, M., ‘An ethics-based climate agreement for the South Pacific region’, forthcoming ‘International Environmental Agreements: Politics, Law and Economics’) these corrections would also lessen the redistributivity of a pure equal per capita allocation scheme.

notion put forward in *The Law of Peoples* is interactional and provides a general scheme of international rules (Pogge 2004).

RTJF defines justice as fairness, and it is based on two principles of justice which guide equal, free, and mutually disinterested rational individuals in their judgments concerning their social contract and their economic and social arrangements. The first – the egalitarian principle – states that all individuals have the same right to the most extensive system of equal basic personal and political liberties, rights and duties, compatible with a similar system for all. The second – the difference principle – holds that inequalities are tolerable only if they satisfy two conditions. First, legitimate inequalities can characterize only situations open to all, under conditions of fair equality of opportunity. Second, inequalities must be to the greatest benefit of the least advantaged members of society.²⁵ In short, “An injustice is tolerable only when it is necessary to avoid an even greater injustice” (Rawls 1971, p. 4).

These principles form the basic structure of societies, in that they:

are to regulate all further agreements; they specify the kinds of social cooperation that can be entered into and the forms of government that can be established. This way of regarding the principles of justice I shall call justice as fairness (Rawls 1971, p. 11).

In particular, the difference principle requires a socio-economic system that reduces illegitimated and undeserved inequalities. Put slightly differently, it holds that inequalities owing to differences in the contingencies of social and natural fortune must be minimized. Eventually, the two principles state that (principle I) in order to ensure real equality of opportunity to all individuals, (principle II) society must pay more attention to those whose lives are most affected by the “arbitrariness of natural contingency and social fortune” (Rawls 1971, p. 96), i.e., people with fewer assets and born in disadvantaged circumstances.

Furthermore, Rawls points out that each and every individual “possesses an inviolability founded on justice that even the welfare of society as a whole cannot override” (Rawls 1971, p. 3). Therefore, central to the difference principle is definition of the essence of this inviolability in terms of advantages. Being advantaged is basically determined by the availability of primary goods and services. Each individual should be entitled to a certain minimum amount of basic goods and services, such as food, clothing, shelter, social services, health, education, income. But I believe that in current societies there is another fundamental basic need: energy, that is, the availability of energy services.

My contention is that each individual is entitled to at least a certain amount of energy services, which are influenced by ‘undeserved inequalities’ such as different climatic conditions, or a greater capacity to absorb GHG emissions because of larger forested areas, or other sinks. At the same time, not all energy services produce GHG: the ones based on renewables do not, for instance; therefore energy services, as understood here, should be considered net of non-emitting ones. The uneven distribution of these characteristics prevents people from attaining genuine equality of opportunity, at least as far as access to energy services is concerned, as stated by principle I of RTJF.

There are other basic goods and/or services that I could have chosen: for example, the family of those deriving from the stability of social, environmental and economic systems with respect to climate change and variability which ultimately entail the rights to safety, health, security. However, I maintain that in the domain of the justice of ‘initial allocation of endowments’ it is advisable to concentrate on energy services since these relate directly

²⁵ These principles are supplemented by rules of priority, both between the principles themselves (the priority of liberty) and within the latter (the priority of justice over efficiency and welfare).

to GHG emissions – the ultimate concern of any mitigation strategy – and therefore are strictly consistent with its logic, discourse and metric.²⁶

If the initial distribution of endowments is to be grounded on (principles I and II of) RTJF, it is necessary to develop an equity criterion that encompasses all the elements determining the actual flow of energy services. I call this the criterion of ‘differentiated equality,’ which suggests that, according to the egalitarian principle, the benchmark must be an equal *per capita* distribution of endowments. On the basis of the difference principle, and of the ‘arbitrariness of natural contingency and social fortune’ that it encapsulates, this criterion should ultimately reduce undeserved inequalities.

In practical terms, the criterion of differentiated equality requires a rule that, taking account of the level of economic activity,²⁷ is neutral in respect, at least, of the most strikingly untenable inequalities, such as those among energy needs due to heating and cooling, and among the availabilities of sinks and of renewables. In a GHG emission rights scheme, endowments should thus be allocated among the parties according to a formula whose reference is equal *per capita* distribution and which includes the standard of living (measurable by GDP), corrected for the most evident circumstances that influence the demand for energy services, and therefore the consequent GHG emissions, of each country: the climatic conditions (measurable, for instance, by heating and cooling degree days, that is, by the average temperature departure from a human comfort level of 18 °C), the availability of carbon absorbing areas (proxied, for example, by the country’s forested area), and the availability of renewables allowing greater use.

Different perspectives on justice give rise to diverse criteria of equity in the allocating and trading of endowments, which have indisputably independent and intertwined ethical and economic implications for the use of the scarce atmospheric common and ultimately for countries and human beings both of the present generation and of future ones (DeCanio and Niemann 2006). I maintain that, by and large, claims to the atmosphere, be they based on its use as a carbon sink or as the source itself of climate stability, rely on the fair interdependence of every subject involved. When an initial equal *per capita* allocation of endowments is pursued, this interactional fairness seems achievable (Baer 2002). However, an initial allocation of endowments based on the criterion of equity of differentiated equality would be, in my opinion, more just and more feasible, as said. The question therefore becomes: is a ‘fair interdependence’ possible when this latter criterion for the initial allocation of endowments holds and when their subsequent trading is allowed?

The specific initial allocation envisaged by the criterion of differentiated equality would entail a scarcity of endowments in developed countries and a surplus in developing ones.²⁸ On ethical grounds it assumes a view of climate change as being more ‘resource sharing’ than ‘burden sharing’ (Baer 2002, pp. 395–396), because it ultimately refers to the

²⁶ Furthermore, the other basic goods and/or services mentioned above are, in my opinion, implicitly contemplated in the domain of justice of ‘allocation of adaptation resources’ (*infra* 4.2), where the entitlement to a certain basic amount of them can be pursued through the envisaged allocation of adaptation resources. In this case, the allocation of raised adaptation resources is carried out on the basis of the criterion of equity of ‘lack of human security’, which is based on the notion of social vulnerability defined as the ability of individuals or groups to respond, recover or adapt to any external climate stress (Adger 1999; Adger and Kelly 1999; Kelly and Adger 2000; Brooks 2003; Adger et al. 2006; Brooks et al. 2005; Paavola and Adger 2006). This emphasis of social vulnerability, in fact, ultimately implies and defends the right to a certain level of safety, health and security.

²⁷ Consideration of the level of economic activity ensures that a society’s welfare is not penalized.

²⁸ As emerges from the figures of the article ‘An ethics-based climate agreement for the South Pacific region’ (Grasso, M., forthcoming ‘International Environmental Agreements: Politics, Law and Economics’).

definition of a fair share of the benefits from using the atmospheric absorptive capacity independently from the contrary interests of those who see the atmosphere mainly as a carbon sink. However, the initial distribution of endowments based on the criterion of differentiated equality, like any possible alternative, cannot be analyzed in an operational perspective without taking account of the subsequent exchange of endowments which it produces, since their trading – as well as the ethical connotations *per se* analyzed in the following sub-section (*infra*, 3.2) – is generally believed to be an efficient and effective approach to climate negotiations. On this broader and dynamic view, this criterion would in fact produce substantial money transfers from developed to developing countries generated by the purchase of allowances by rich GHG emitters from poorer players.

The crux of my argument is that, when joint account is taken of the initial allocation of endowments envisaged by the criterion of differentiated equality and their subsequent exchange, the resulting financial flows can be considered a form of compensation paid by the North for its overuse of atmospheric absorptive capacity to the South. And compensation is a form of acknowledgement of the equal right to a common (Baer 2002; Helm 2003). Thus, the answer to the question on the fairness of interdependence in exploitation of the atmospheric common, when the criterion of differentiated equality is adopted and subsequent exchanges of endowments are allowed, is, I submit, positive, provided that that the financial transfers from the North to the South are recognized as compensation for the overuse of the atmosphere's absorptive capacity.

3.2 Exchange of endowments: Utilitarian theory of justices

In what follows I shall analyze the ethical implications of the exchange of existing carbon endowments from a *per se* or 'stand-alone' perspective (i.e., irrespectively of their initial allocation), for this article intends to provide independent principles of justice and criteria of equity for every domain of justice specified.

There is widespread evidence that the negotiation of carbon endowments among countries would benefit all participating countries, making more stringent emissions cutbacks possible in the future (Bohm 2000). This is because the marginal costs of emissions abatement differ greatly among countries, with the consequence that the search for efficiency requires a redistribution of emission rights that equalizes different marginal costs (Helm and Simonis 2000, p. 7). In the vocabulary of economics, the outcomes of such an efficient redistribution are Pareto-optimal social states, in the sense that there are no other social states that would make someone better off without simultaneously making someone else worse-off.

Pareto optimality is the core of the new welfare economics. This maintains that choices (according to act utilitarianism) have value only in terms of their consequences on social welfare (Konow 2003, p. 1200), which therefore depends solely on individual utility.²⁹ Utilitarianism since Jeremy Bentham and John Stuart Mill, David Hume and Adam Smith considers the only axiom for morality to be the 'principle of utility' (or the 'greatest happiness principle') which states that societies must pursue the greatest happiness for the greatest number. Utilitarianism is a consequentialist doctrine insofar as it has the rightness of conduct depend solely on the goodness of outcomes. The Pareto principle replaces the strong cardinality and comparability assumptions of utilitarianism by endorsing the much weaker value judgment mentioned above. Unfortunately, however, Pareto-optimality ignores justice issues. In fact, states can be Pareto-optimal and still be highly unjust: "If

²⁹ Amartya Sen (1979) calls this approach 'welfarism'.

preventing the burning of Rome would have made emperor Nero feel worse off, then letting him burn Rome would have been Pareto-optimal. In short a society or an economy can be Pareto-optimal and still be perfectly disgusting” (Sen 1970, p. 22). Hence the Pareto principle in itself necessarily entails the defence of the *status quo* (Schokkaert 1992, p. 69). Nor is the Kaldor-Hicks compensation principle sufficient to have it include justice issues.

Therefore, although the Pareto principle is necessary for maximizing the wealth to be (justly) redistributed, it must be supported by some criterion of distributive justice. I acknowledge that a number of potentially just final Pareto-efficient redistributions of endowments could be achieved through market mechanisms, irrespectively of the hypothetical initial allocation. This, however, holds only in a first-best world, with lump sum redistribution. But negotiations of endowments do not take place on perfectly competitive markets, nor does there exist any international body in possession of lump sum redistributive instruments. Abandoning the theoretical first-best heaven and considering the trading of endowments *per se*, I believe that the envy-freeness criterion is a way to choose between different Pareto-optima and identify allocations that are at once efficient and equitable: “To a significant extent, envy-freeness has become the first and foremost ‘distributive companion’ of the aggregative requirements of Pareto efficiency in the literature of normative economics” (Arnsperger 1994, p. 155). The absence of the envy criterion is the foundation of the quintessential economic TJ known as the theory of fairness (or of equity) (Varian 1974; Schokkaert 1992, p. 74). In its simplest form, an allocation is envy-free if no agent prefers the bundle of commodities of another (Varian 1974, 1976; Schokkaert 1992). On this view, individuals envy the other’s consumption bundle, not the other’s utility, so that this criterion does not involve interpersonal comparison of utility and does not provide a complete ordering of social states. It thus avoids the Arrow impossibility theorem without an enlargement of the informational basis (Schokkaert 1992, pp. 74–75).

As far as the trading of GHG emission rights is concerned, Pareto-efficiency and envy-freeness require compensation payments (Helm 2003) that favour the division of a common resource like the atmosphere. Specifically, the Pareto principle suggests that subsequent redistributions allocate emission rights where the marginal cost of abatement is lower (generally in the countries of the South) until marginal abatement costs are equalized across emitters.³⁰ At the same time, envy-freeness requires that Southern countries be compensated³¹ by countries with lower initial cutbacks (typically those in the North, where marginal abatement cost is higher) for their proportionally larger share of emission cutbacks. This is in order to prevent any party from preferring the resulting allocations of endowments and compensation payments of the others, with the proviso that the new efficient allocations give every party at least the utility implied by the original one, and no more utility than that achievable if there were only one party.³²

In the practical terms of international climate policy this entails – as envisaged on other bases by the consideration of the initial allocation of endowments backed by the principle

³⁰ In fact (Criqui et al. 1999; IPCC 2001c), in the North the marginal return on controlling GHG cutbacks has dramatically decreased, while its costs have substantially increased. The developed countries are now on the steepest segment of the curve of GHG abatement marginal costs.

³¹ By ‘compensation’ is meant the use of a private resource like money to make compensatory payments in order to attain a just division of a common resource (the atmosphere).

³² These are sometimes known as ‘separated criteria’: respectively, the criterion of individual rationality, and of standing alone (Helm 2003). I prefer to regard them as precautionary bounds, respectively, the lowest and the highest, for the distributions envisaged by Pareto-efficiency and envy-freeness.

Table 3 Domains, theories of justice (TJ) and criteria of equity in adaptation

Domains of justice	Theory of justice	Criteria of equity
Funding of adaptation activities	Rawls' TJ I and II principles	Differentiated historical responsibility (historical responsibility taking into account undeserved inequalities)
Allocation of adaptation resources	Sen's TJ capability approach	Lack of human security (in the space of basic capabilities)

of differentiated equality when subsequent exchange is allowed (*supra* 3.1) – that there must be a quite substantial trade in endowments between industrialized countries with higher marginal abatement costs and developing countries with lower ones (Eyckmans and Schokkaert 2003, p. 9). Hence, giving to the South a greater share of emission rights is efficient in a *per se* perspective, but if this state is justified by Pareto-efficiency, in order for it to be envy-free, and thus just, it requires monetary compensation whereby no party prefers the emission rights and compensation payments of the others. Moreover, this desired Pareto-efficient, envy-free distribution should maintain each party's utility between the original level of the initial state (lowest bound) and the one-party-gains-all level (highest bound) (Helm 2003). In order to achieve this just final allocation, the parties that must undertake the majority of GHG cutbacks for efficiency reasons (developing countries) should therefore be fully compensated by parties where marginal abatement costs are inefficiently high (developed countries). Only this solution can in principle be both Pareto-efficient and envy-free. It can also ensure that neither party (neither the South nor the North) is worse off than in the original situation or better off than in the hypothetical one-party-gains-all situation.

4 Justice and equity in adaptation

As far as adaptation to climate impacts is concerned, the theories of distributive justice and the consequent conceptions of equity set out in Table 3 may provide the basis for an international debate.

From an operational point of view, also the adaptation sphere of distributive justice can be split into two domains: the funding of adaptation activities and the allocation of resources. The former aspect concerns the division among countries of the costs of adaptation programs and projects, and of residual damages compensation. The second issue concerns the allocation of the resources available for adaptation strategies among short-term activities such as disaster preparedness, long-term ones such as institutional, regulatory and anticipatory measures, and residual damages compensation. It is worth pointing out that these two domains of justice are ethically independent. In fact, from a normative perspective, the equity criterion ('differentiated historical responsibility') that determines the funding of adaptation strategies does not have major implications for the equity criterion ('lack of human security') that backs the allocation of raised funds and *vice versa*.³³ What ultimately counts is the ethical soundness *per se* of the two proposed schemes.

³³ For the sake of simplicity, I do not consider here the fact that in practical terms the fairness of the funding scheme may actually influence the amount of raised funds.

The ethical issues of adaptation have been little considered at either the theoretical or practical level, but they are very likely to play a key role in the framing of future climate commitments (Paavola and Adger 2002; Ringius and Frederiksen 2002). In fact, the greater vulnerability of the South and the North's much larger share of past and current GHG emissions (Gardiner 2004, p. 579) make the financing of adaptation activities and the allocation of resources the main causes of disagreement between the developed and developing countries (Shukla 1999). Once again, therefore, these issues should be set in a sound ethical framework and brought to centre stage in an endeavour to foster fair and effective climate negotiations.

4.1 Financing of adaptation activities: Rawls' theory of justice as fairness

Who should pay for activities undertaken in order to prevent, avoid or reduce the negative impacts of climate change? Historical principles of justice (Gardiner 2004, p. 579) demand that those who have caused the problem should be held responsible: "Those societies whose activities have damaged the atmosphere ought, according to the first principle of equity,³⁴ to bear sufficiently unequal burdens henceforth to correct the inequality they have imposed" (Shue 1999, p. 534). In order to quantify the responsibilities of countries for the amount of GHG remaining in the atmosphere, they should be held accountable for their cumulative past emissions. I accordingly assume that responsibility based on historical accountability is a sound basis on which to proceed. This enables the past emissions by polluters and their contributions to GHG concentration in the atmosphere to be directly correlated with climate change and variability. The atmosphere, with its capacity to absorb man-made emissions and to lessen climate change and its effects, is a common resource, and the rights to it pertain to all actual and potential human beings in the world. All individuals should therefore be guaranteed just access to atmospheric absorptive services. In order for this right to use to be just to all parties, past emissions must be taken into account so that equality of opportunity is assured to everybody, irrespective of where and when they happen, happened or will happen to live (Neumayer 2000). Otherwise, ignoring historical accountability would be to act in favour of people who lived in the past in heavy-emitter rich countries, and to discriminate against those now living in low-emitter developing countries, as well as against future generations.

Nonetheless, the share of the absorptive capacity of the atmosphere consumed (given by the level of cumulative emissions) depends on various circumstances, such as climatic conditions, or the availability of sinks and renewables. In general, it depends on conditions that do not derive from the will of the emitting parties. I therefore maintain that this circumstance should be grounded on a robust theory of justice with a 'tendency to equality' (Rawls 1971, p. 100), or as Cullen (1992) puts it, one which can ensure simultaneously substantial differences in equality, such as the RTJF. In short, I consider this domain of justice in adaptation from the same ethical perspective as the first domain of justice in mitigation (the initial allocation of endowments, *supra* 3.1), albeit I refer in this case to a different basic need, namely atmospheric absorptive capacity.³⁵ Although the two domains

³⁴ Shue's principle of equity is broader than the traditional ecological 'polluter pays principle' because the latter is exclusively forward-looking (Shue 1999, p. 534).

³⁵ Instead, one of the first domains of justice in mitigation is energy requirements, that is, the availability of energy services (*supra*, 3.1).

originate from different ethical claims – respectively, to equality and to historical responsibility – on the one hand they both treat equals equally, as required by principle I of RTJF, and on the other leave room for the wide discrepancies that characterize countries facing diverse climatic conditions, as asserted by principle II of RTJF, by taking undeserved inequalities into account. In this domain too, in fact, the unbalanced distribution of climatic traits hampers countries from achieving real equalities of opportunity in accessing the atmosphere's absorptive capacity. Hence, grounding the funding of adaptation activities on (principles I and II of) RTJF requires an equity criterion which encompasses all the elements and determines the use of atmospheric absorptive capacity. This I call the criterion of 'differentiated historical responsibility'. It suggests that, according to the Rawlsian egalitarian principle, the yardstick must be responsibility based on historical accountability, whereas the difference principle requires consideration of undeserved inequalities that have actually influenced cumulative GHG emissions and contributed to their cumulative amount.

In policy terms, the financing of adaptation activities could be quite straightforward. It should envision, I submit, the creation of a global fund financing adaptation to climate change similar in its aim to the Adaptation Fund whose mechanisms for disbursement have been agreed at the Seventh Conference of the Parties (COP 7), or, more realistically, the co-funding of the Adaptation Fund itself. This fund would in principle be financed (or co-financed) by countries according to the criterion of differentiated historical responsibility: each party, in fact, rivals the others in its use of the atmosphere's absorptive capacity, for the atmosphere is a common resource, with a finite capacity and characterized by difficulty of exclusion. The amount of each single contribution to this fund would therefore be calculated in proportion to cumulative emissions, net of undeserved inequalities, such as those deriving from dissimilar heating and cooling needs, differing availabilities of sinks and renewables.

4.2 Allocating adaptation resources: Sen's capability approach

The allocation of adaptation resources raises subtle challenges. Intuitively, the most appealing benchmark for the allocation of funds seems to be the notion of vulnerability as spelled out by the Intergovernmental Panel on Climate Change (IPCC). According to the IPCC, vulnerability "is the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change" (IPCC 2001b, p. 6). In this view vulnerability represents the net impacts of climate change and is therefore seen as an 'end point' (O'Brien et al. 2004; Kelly and Adger 2000). Regrettably, this notion of 'biophysical vulnerability' (Brooks 2003) alone cannot give any information on the ability of the parties to implement proper adaptive strategies. Therefore, any analysis based solely on biophysical vulnerability cannot, in my opinion, be a conclusive referent for the allocation of adaptation resources. Rather, it is useful to turn to the 'starting point' (O'Brien et al. 2004; Kelly and Adger 2000) notion of 'social vulnerability' (Adger 1999; Adger and Kelly 1999; Kelly and Adger 2000; Brooks 2003, Brooks et al. 2005) defined as a state of well-being pertaining directly to individuals and social groups, whose causes are related to social, institutional, and economic factors, as well as to climate impacts. Here, therefore, the focus is on prior damages and not on future stresses, as excellently synthesized by the image of the 'wounded soldier' (Kelly and Adger 2000, p. 328).

In the light of these premises it is once again necessary to turn to justice principles and equity criteria to define the basis for a more just, and possibly more agreed, allocation scheme for adaptation funds that includes considerations on the ability of countries to use adaptation resources effectively, i.e., on social vulnerability.

Amartya Sen's capability approach (SCA) seems promising. I refer to the SCA as primarily a method for making comparisons of well-being³⁶ which provide an ethically sound basis for the allocation of adaptation resources, and to the ability to turn them into actions. This approach requires "a broader informational base, focusing particularly on people's capability to choose the life they have reason to value" (Sen 1999, p. 63), to highlight the social and economic factors which give people the opportunity to do and to be what they consider valuable.

Thus, the SCA concentrates directly on the substantive freedoms of individuals. Sen suggests that well-being should be considered in terms of functionings and capabilities. Functionings relate to what a person may value doing or being: they are the living conditions achieved by an individual and represent a set of interrelated activities and states ('doings' and 'beings') that shape his/her life. Capabilities concern the ability of an individual to achieve different combinations of functionings and define the freedom to choose the life s/he prefers. These two categories are complementary but nevertheless distinct:

A functioning is an achievement, whereas a capability is the ability to achieve. Functionings are, in a sense, more directly related to living conditions, since they are different aspects of living conditions. Capabilities, in contrast, are notions of freedom, in the positive sense: what real opportunities you have regarding the life you may lead (Sen 1987, p. 36).

Nonetheless, in order to use the SCA as a justice reference in the climate debate, I introduce a major simplification. I refer to the chosen vector of functionings as the proper space for measuring climate harms.³⁷

In short, the SCA can be viewed as offering an evaluative space of justice, and as challenging the resourcist and welfarist approaches. It concentrates instead on the individual and social ability to convert resources into valuable capabilities and eventually to achieved functionings. Therefore, the distinctive feature of Sen's theory is its focus on 'midfare' (Cohen 1993, p. 18), a state of the subject (of justice) lying midway between the resources it generates and the utilities thereof, i.e., something between primary goods and utility.

This approach is particularly useful in allocating adaptation resources because the essence of any effective adaptive response is not solely the availability of goods and services, or analysis of the outcomes of adaptation actions according to the yardstick of personal utility; rather, it is the possibility of gaining effective protection against climate impacts from adaptation resources, as demanded by the notion of social vulnerability. This evaluative space, the 'midfare', is the *locus* where, in my opinion, the allocation of adaptation resources can be most fruitfully read. By contrast, as regards the financing of adaptation to climate impacts, no ability is required to consume the atmosphere, so that the focus is entirely on the just availability of the primary service 'atmospheric capacity'. Yet concentration on mere resources, be they primary goods or otherwise, suffers from the 'fetishist handicap' (Sen 1979, p. 218) in the allocation of adaptation resources, because it

³⁶ Indeed, for Sen it has a far wider significance: it is first of all conceptual framework which with to highlight the drawbacks of other approaches to identifying and defining well-being and human development. Since Sen's concern seems to be mainly with this foundational level, he has never provided a formula for the conduct of welfare and development measurements and comparisons.

³⁷ Sen himself suggests that at a practical level the most appropriate focus of attention should not always be the measurement of capabilities: "Some capabilities are harder to measure than others and attempts to putting them on a 'metric' may sometimes hide more than they reveal" (Sen 1999, p. 81).

is not concerned with what these goods ‘do to human beings’ (Sen 1979, p. 218). In other words, the difference between the SCA and the RTJF – which at first glance seem similar, especially in their focus on the least well-off – lies in the different informational base on which they rely (the ‘focal personal features,’ Sen 1990, p. 112). Those of the SCA are substantive freedoms, while those of the RTJF are primary goods and services. According to Sen, the ability to convert these primary goods into freedoms varies for individual, social, institutional reasons. Consequently, equality of primary goods may produce marked inequalities in the level of enjoyed freedoms. Moreover, the beneficiaries of adaptation resources are mostly the developing countries, by and large characterized by lower social and institutional abilities to turn primary goods (resources) into freedoms, i.e., into valuable beings and doings. Primary goods are therefore only ‘means’ to achieve freedoms, which are the real ‘ends’ of development. It is for this reason that I prefer to root the allocation of funds in the notion of capabilities (ends), rather than in the notion related to goods and services (means). Turning adaptation resources into a proper adaptive strategy requires a great deal of possibilities and abilities, and the SCA is the framework that explicitly includes these aspects.

The Senian notion of well-being concerns the enlargement of individuals’ substantive freedoms: capabilities. In general, adaptation resources should thus be allocated with regard to the level of some suitably selected capabilities (in practical terms, achieved functioning, *supra* note 37): the lower the overall level of these capabilities, the more adaptation funds are due.

The criterion of equity springing from the framework of social justice put forward by the SCA – which in my opinion is more appropriate in the climate debate – is based on the concept of human security. This criterion I call ‘lack of human security’. Specifically, the lower the degree of human security, the greater the access to adaptation resources should be.

The primary feature of human security is its focus on individuals rather than on nation states. This is also its main difference from the traditional concept of security, which on the contrary is based on the use of force to prevent threats to autonomy and territorial integrity. Although this perspective first arose in the 1960s as a response to growing dissatisfaction with the traditional paradigms of security and development, it imposed itself in a structured way only in the early 1990s through the efforts of the United Nations Development Program (UNDP). The 1994 UNDP Report on Human Security stressed the essential properties of the notion of human security: the centrality of people, universality, the interdependency of its components, its preventive sight. Nonetheless, the boundaries of the concept of human security are still vague and somewhat controversial (King and Murray 2001, p. 591; Paris 2001, p. 88). I abide with the notion of human security put forward by Alkire, who views it as the protection and promotion of a limited number of aspects of human well-being which constitute its ‘vital core’ (Alkire 2002, p. 2). In other words, this notion of human security is defined by a set of basic capabilities (achievable functionings, in practice) more parsimonious than that defined by the broader concept of human development. In fact, the latter concerns the expansion of all people’s substantive freedoms, all their capabilities, while the former is less ambitious and aims to provide a vital subset of basic capabilities. Hence, it seems preferable to ground the participation of all countries in a possible adaptation fund on a ranking based on human security which encompasses the ability to convert resources into valuable doings and beings, rather than on one that refers only to the basis of goods and services.

In practical terms, the definition of human security as put forward by King and Murray (2001) can prove a useful reference because it points up a set of domains of well-being, the relevant practical indicators, and the threshold value of generalized poverty. According to

King and Murray, human security is “the number of years of future life spent outside a state of ‘generalized poverty’”; and “[g]eneralized poverty occurs when an individual falls below the threshold of any key domain of well-being” (King and Murray 2001, p. 585). In my opinion, the usefulness of this definition in the debate on adaptation to climate impacts lies in its acknowledgment that human security depends closely on poverty, defined as deprivation of basic capabilities (income, health, education, political freedom and democracy, according to King and Murray): which is exactly what the notion of social vulnerability requires. My fundamental point is that the weaker a country is in these domains of well-being, the less are its institutional and social possibilities and capacities to turn adaptation resources into effective adaptation actions. Hence, weaker countries should be given privileged access to the funds. This access, though proportional to the population harmed, should nonetheless be inversely proportional to the human security index of the individual country, measured in King and Murray’s terms. In fact, the lower this index, the lower the ability to deal with climate-related damage and the greater should be the just share in a global adaptation fund.

5 Concluding remarks

The Kyoto Protocol – though not ‘fatally flawed’ as some interested voices claim – is unfortunately far from being widely accepted by politicians around the world. The scientific community, too, has expressed perplexity: even many climatologists and social scientists point out that it is a fragile agreement, whose potential outcomes are limited. But the Kyoto Protocol is not the final stage of an international climate negotiating process. Rather, it can be seen as a first step, which can be strengthened and widened in the next commitment periods if it is grounded on different bases. These new more solid underpinnings reside, in my opinion, in principles of justice and criteria of equity. One of the main problems³⁸ with a binding global climate treaty like the Kyoto Protocol, in fact, is the tension between the goals of the developing and developed countries. Kyoto largely reflects the developed countries’ view³⁹ of climate change as essentially an environmental problem. Accordingly, the environmental effectiveness and the economic efficiency of mitigation efforts have been key factors in definition of the Protocol actions and instruments. The developing countries, by contrast, perceive climate change as primarily augmenting social vulnerability and affecting human security, and they would expect, besides mitigation actions, stronger adaptation and residual damages compensation initiatives.

Justice and equity can to some extent ease this conflict. A climate agreement, be it the evolution of the Kyoto Protocol for the next commitment periods or otherwise, based on sound principles of justice and built on fairly agreed criteria of equity would, I believe, eventually enable the parties involved to conceive a more coherent climate system grounded on common views and greater mutual trust.

In the sphere of international distributive justice, as far as the mitigation strategy is concerned, a just initial allocation of endowments should rely on the criterion of differentiated equality, which requires a rule that takes account of the actual consumption of

³⁸ Other major problems with the Kyoto Protocol are its complexity in terms of the parties involved, the institutional capacity required, and the rigidity of the commitments. Kyoto, in fact, is ambitious in every respect: it involves a large number of countries, has sophisticated implementation mechanisms, sets demanding targets and stringent timetables (Bodansky 2002).

³⁹ Paradoxically, it basically consists in the US approach to climate change.

energy services owing to the unequal climatic features that affect demand. In the practical terms of climate policy, although this criterion is self-sufficient on ethical grounds, it does not hold *per se*, for it would entail a shortage of emissions rights in developed countries that ought necessarily to be resolved through the North's purchase of endowments from the South. From this perspective, however, carbon trading has mainly an instrumental role, and the consequent North–South financial flows can, and indeed should, be seen as just compensations to poorer countries due to the industrialized countries' overuse of the scarce atmospheric capacity.

As for the subsequent exchange of endowments *per se*, the Pareto principle supported by the criterion of envy-freeness requires that parties which undertake the majority of GHG cutbacks (developing countries) should be fully compensated by parties whose marginal abatement costs are inefficiently high (developed countries). The exchange of endowments should therefore take place from the South to the North until a global allocation has been reached where costs for the last avoided unit of GHG, i.e., marginal abatement costs, are equal in all countries. On practical grounds, the dynamics of carbon trading are hence similar to those of the first domain of justice in mitigation. However, here the exchange of endowments has obviously a substantive role in which the rationale of compensation, absolutely different from the one implied by the criterion of differentiated equality, rests basically on efficiency reasons.

The criteria of differentiated historical responsibility and lack of human security may prove a useful basis for adaptation strategies. In regard to the just financing of adaptation activities, the criterion of differentiated historical responsibility requires a rule that takes account of the actual consumption of atmospheric capacity. Adaptation resources should be allocated to all eligible parties in proportion to the level of human security: the lower the overall level, the more adaptation funds are due.

Given international constraints, from a positive standpoint these objectives can be achieved by creating a global fund financing adaptation to climate change similar in its aim to the Adaptation Fund adopted by COP 7, or by its co-funding. In any case the contributions of each participant country should be proportional to cumulative emissions, net of undeserved inequalities, and the allocation of raised resources should benefit the harmed countries in inverse proportion to their levels of human security.

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