



Contents lists available at ScienceDirect

Earth System Governance

journal homepage: www.journals.elsevier.com/earth-system-governance

Research article

Planetary justice: A research framework

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ARTICLE INFO

Article history:

Received 5 December 2019

Received in revised form

9 April 2020

Accepted 15 April 2020

Available online 26 June 2020

Keywords:

Planetary justice

Global institutions

Earth system governance

Future Earth

Agenda 2030

ABSTRACT

We develop a conceptual framework to empirically analyse conceptualizations of 'justice' in the context of profound transformations of the earth system. Equity and justice have become central issues in public discourses, political documents and research agendas. However, what justice implies in practice is often elusive. The conceptual framework that we advance seeks to bring structure, clarity, simplicity and comparability among different interpretations of justice in global change research. It reduces the wealth of five broad normative approaches to systematic, parsimonious answers on three key concerns any analyst of justice is facing: the subjects of justice and their relationship; the metrics and principles of justice; and the mechanisms on the basis of which justice is pursued. Our framework is designed for use in empirical analysis. We illustrate its usability by investigating two recent policy documents: the 2030 Agenda for Sustainable Development and the founding documents of the 'Future Earth' research platform.

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1. Introduction

We observe the beginning of a 'justice turn' in political discourses on global environmental change and earth system transformation. After many years of neoliberal dominance, international political documents of recent years abound with references to equity, equality, and justice. For example, the 2030 Agenda for Sustainable Development, agreed upon in 2015 by the United Nations General Assembly, makes repeated references that 'no one will be left behind' and that all human beings can fulfil their potential in dignity and 'equality' in a healthy environment. One of the 17 Sustainable Development Goals that are an integral part of this Agenda explicitly stipulates that governments should 'reduce inequality within and among countries' and sets a number of targets to achieve this goal (Goal 10). While the process of goal-setting is not entirely new in global governance, an intergovernmental agreement on working towards less inequality within and among countries is in this form unprecedented.

Major global change research programmes have followed suit and seem to also veer towards an understanding that justice is central to their scientific efforts. The founding documents of the global research platform 'Future Earth', for example, claim to

advance a research agenda that leads towards a 'sustainable and equitable world' (Future Earth 2014)—even though it fails to conceptualize or operationalize this notion of an 'equitable world' in any meaningful way. The Intergovernmental Panel on Climate Change, which had ignored justice issues for most of its first two decades of operation, now devoted a full chapter on 'equity' in its most recent report (IPCC, 2014). Indicative of this new trend in academia is a recent debate in *Global Environmental Change* between renowned International Relations scholar Robert O. Keohane, who had suggested in a keynote speech in 2016 that equity would not be an object for research but rather an issue for political conviction, and 18 social scientists who forcefully argued the opposite (Keohane, 2016; Klinsky et al., 2017).

Admittedly, this new emphasis on justice in global change research is not entirely new. Already over a decade ago, Adger et al. (2005) argued in an editorial to *Global Environmental Change* that a 'more explicit concern with equity and justice will be important in furthering the study of global environmental change'. Also the Earth System Governance Project, as a major global research programme focussing on environmental and sustainability governance, sought to encourage research on equity and justice in prioritizing analytical questions of 'access and allocation' in their 2009 science plan (Biermann et al., 2009) and 'justice and allocation' in the 2018 science plan (Burch et al., 2019). At the local level, in particular, environmental justice has been an area of intense study for long, for example regarding ecosystem services (e.g., McDermott, 2013; McDermott et al., 2013), adaptation to climate

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change (Adger et al., 2006; Pavaola, 2005; Thomas and Twyman, 2005), or forest carbon projects (Brown and Corbera, 2003; Suiseeya and Caplow, 2013) (see discussions in Bullard, 2005; Schlosberg, 2007; Mohai, Pellow and Roberts, 2009; Agyeman et al., 2016). Even in a global perspective, within some philosophical traditions such as cosmopolitanism, global justice has been discussed for many years (see our discussion below). In short, references to equity and justice have become more frequent in central policy documents, declarations, and science programmes.

And yet, we argue here that conceptually, global change research is still ill-prepared for this new emphasis on justice in our community. For too long, as argued by Klinsky et al. (2017), questions of misallocation, perceived inequalities and injustices have been marginalized by a mainstream discourse in Northern science communities that relegated justice considerations to purely personal, normative convictions, notwithstanding a strong but small community of justice scholars especially at local governance scales. Concerning research on planetary transformation, global change and governance, justice has been a relative fringe issue for long, and broader conceptual frameworks are missing.¹

This situation in the global change research community is problematic; yet it is likely, we are convinced, to change very soon. What is needed now is a richer debate on the conceptual foundations of what justice research on global sustainability and environmental change could mean. This is especially the case if we want to turn from a normative debate on planetary justice ('what is just?') towards an *empirical debate* on what conceptualizations of justice different actors in global environmental politics actually support. However, to be useful in empirical research—notably in a comparative perspective—any conceptual framework on planetary justice must fulfil, we argue, four basic requirements:

- (1) *First, for a conceptual framework to be useable in empirical research it must not seek to argue for any particular notion of justice but rather help distinguish different conceptualizations of justice in political discourses, programmes, and outcomes.* There is little prospect for any universal agreement on what equity and justice will concretely imply in complex situations of global change and earth system transformation. What is needed, instead, is a research framework that allows for identifying conflicting positions, clarifying inconsistencies, and moving forward towards a debate on 'planetary justice' as a legitimate, strong empirical research programme. The conceptual framework that we advance shall hence enable interdisciplinary debate and research while accepting, and operationalizing, differences in views and values on justice and equity. We do not advance any particular definition or operationalization of justice or equity. Instead, we develop a conceptual framework that draws on the variety of philosophical and ethical scholarship in this area, and operationalize this for the empirical purposes of global change research.
- (2) *Second, a conceptual framework on planetary justice needs to be both comprehensive and consistent in catching broad variation in real-world justice discourses.* All conceptualizations of justice that are empirically relevant ought to be captured by a conceptual framework to make it useful in empirical analysis. For that reason, we include in our framework for example the libertarian tradition, which is often invisible in the activist

environmentalist community but prominent in documents and policies from other influential actors such as conservative parties or industry associations. In addition, a planetary justice research framework cannot be issue-specific, unlike some of the detailed inductive frameworks developed for instance on climate justice (e.g., Klinsky and Dowlatabadi, 2009).

- (3) *Third, in order to be empirically useable, a conceptual framework of planetary justice needs to be parsimonious.* Given thousands of years of philosophical debate in this field, this is no easy feat. The conceptual framework that we advance, therefore, draws on merely five broad philosophical traditions that we reduced to their basic opposing positions regarding three core concerns, leading us to a set of merely five key propositions for each philosophical tradition. By no means do we try to cover the entire field of political philosophy and justice.
- (4) *Fourth, a conceptual framework for planetary justice needs a clear focus on the planetary scale of assessment, informed by an ambition to contribute to global change research (including integrated assessment models).* We hence focus on concerns at planetary level, and disregard (parts of) the burgeoning scholarship in the narrower field of environmental justice (e.g. Bloomfield, 2014; Bulkeley et al., 2013; Carmin and Agyeman, 2011; Dobson, 1998; Ehresman and Okereke, 2015; Gardiner, 2011; Ikeme, 2003; Schlosberg, 2004; Stevis, 2000).

To signal this planetary scale of both the problem and the framework that we advance, we use in the following the term *planetary justice*. Competing terms do not capture our ambition as neatly as planetary justice does. *Environmental justice* has generated a strong community of scholars and stands for a rich research tradition; yet terminologically, it brings problematic connotations of a nature-human or person-environment dichotomy that does not capture the integrated character of socio-ecological transformations that stands at the centre of the current Anthropocene debate (Biermann, 2020). *International justice* is a political concept that refers in essence to relations of peoples and countries. *Global justice* comes closest to what we refer here as planetary justice. Yet also here, the terminological weight lies on global society and social systems, and on obligations of justice that people owe to other people (at global scale), less so on the intertwined nature of the earth system in the Anthropocene where social and ecological systems have become inseparable and where obligations are owed to nonhuman entities as well. Planetary scale, planetary society-nature integration and non-binary system thinking stands behind our idea of a justice framework; and it is hence *planetary justice*, as a term, that we are using as key concept for this framework.

A non-normative, parsimonious, consistent, and coherent conceptual framework on planetary justice can help in several research challenges.

First, such a research framework can inform integrated assessment modellers and foresight analysts when constructing narratives and storylines for the next generation of global assessment models, drawing on world views and justice perceptions that are based on sound, widely found theoretical systems, not on ad hoc assumptions.

Secondly, the framework can inform social scientists in systematically analysing political processes, institutions, policy documents, programmes and positions with a view to the assessment of the normative views present in such processes or documents, allowing to clearly demarcate different views, identify inconsistencies, and elucidate overlaps and agreements. Systematic comparisons across policy discourses, communities, regions and

¹ See also the review of the former editors of *Global Environmental Politics*, complaining about the lack of attention to 'issues like inequality, injustice, and imperialism' in this MIT-Press mainstream journal (see Dauvergne and Clapp, 2016, p. 8).

over time might help, in particular, to advance understanding of different perceptions and positions, as well as assist in shaping common ground among actors, which eventually can advance global governance more generally. As such, a sound conceptual framework can help develop an *empirical-analytical research community on planetary justice* that goes beyond philosophical theorizing, globalist activism or the anti-normative concerns expressed by many (often Northern) scientists.

Third, such a conceptual framework can be useful for researchers in the community, including the Future Earth network or the IPCC, in an effort to more systematically reflect on the normative foundations of such major networks, and guide global research and assessment programming.

In short, the research framework that we advance will allow social scientists to engage in a meaningful and practical manner in concrete, comparative research efforts that study how the deep philosophical positions around justice have found their reflections in actual political discourses, programmes and policy positions in global sustainability governance.

The remainder of this article is organized as follows. Section 2 lays out five broad philosophical traditions that form the basis of the Planetary Justice research framework that we advance. Section 3 develops propositions from these five traditions for three key concerns that are central in any debate on planetary justice: (1) what are the subjects of justice, (2) what should be seen as just, and (3) what mechanisms should be supported to achieve justice. This leads us to sets of merely five remaining basic propositions for each theoretical tradition that can be used in empirical analysis or integrated assessments to distinguish and compare different conceptualizations of planetary justice. Section 4 offers two empirical illustrations, and section 5 concludes.

2. Theoretical approaches towards justice

We now lay out five different theoretical approaches to analyse justice. But to start with, what is justice?

Given our approach of contrasting major ethical theories in order to operationalize them for the purpose of global change research, it becomes impossible to start off with one unifying definition of what justice actually means. This depends—as is the main thrust of our framework—on the theoretical predisposition that one chooses. Similarly, it is impossible to analytically distinguish without any ambiguity between related concepts such as equity or fairness. These terms are differently defined in different theories, and even in plain English, seem to be indistinguishable in daily use. Equity, for example is defined as ‘the quality of being fair and impartial’ (Oxford dictionary), ‘the quality of being impartial, fairness’ (Collins dictionary), or ‘the situation in which everyone is treated fairly and equally’ (Cambridge dictionary). ‘Fairness’ is in plain English rather similar to equity; the Collins dictionary for example gives ‘fairness’ as the meaning of ‘equality’. Similarly, the Oxford dictionary defines fairness as ‘the impartial and just treatment or behaviour without favouritism or discrimination’, which is more or less identical to its definition of equality. Justice, in turn, is understood as ‘the quality of being fair and reasonable’ (Oxford dictionary), as ‘fairness in the way people are dealt with’ (Cambridge dictionary), or as ‘the principle of fairness that like cases should be treated alike’ (Collins dictionary). We use in our analysis the notion of ‘justice’, which is more generally seen—e.g., by the Merriam Webster dictionary—as ‘the maintenance or administration of what is just especially by the impartial adjustment of conflicting claims or the assignment of merited rewards or punishments’.

The research framework that we advance reduces the wealth of philosophical traditions of five broad intellectual approaches that

are of special relevance to the core ethical contestations in global change research. These five traditions are liberal egalitarianism, cosmopolitanism, the capabilities approach, libertarianism, and what we describe as ‘critical perspectives’. We elaborate on these five traditions here briefly. In section 3, we analyse these traditions in more detail in three dimensions that stand at the core of the Planetary Justice framework that we propose.

- (1) First, we distinguish *liberal egalitarianism*, a philosophical position that seeks to combine the values of equality, personal freedom and personal responsibility (Cappelen and Tungodden, 2006). An influential contemporary form of liberal egalitarianism focusses on how social institutions in a so-called ‘liberal society’ ‘distribute rights and duties and determine the advantages of social cooperation’ (Rawls, 1971, p. 7). A key concept is the basic structure of societies as this contains social positions in which people are arbitrarily born into and which can be deeply unequal. Justice is determined here by how institutions assign fundamental rights and duties as well as economic opportunities in society in order to correct for the arbitrariness of one’s life expectations due to factors beyond their control. This line of thinking is broadly defined by the work of John Rawls and his followers (e.g. for empirical applications see Clements, 2015; Vanderheiden, 2008).
- (2) Secondly, we include *cosmopolitan theories*, all of which argue for some degree of (global) community among all human beings regardless of their social and political affiliation. Cosmopolitans can be broadly distinguished in relational and non-relational² approaches (Armstrong, 2012). Relational cosmopolitan theories extend the basic tenets of liberal egalitarianism to the global level. They pay particular attention to the terms of social interaction that affect all its participants who are not to be confined by the boundaries of a nation state, as in liberal egalitarianism, but are instead conceived of as a global society (Pogge, 1989, p. 22). In this view, global interactions and institutions such as financial and trade regimes create global interdependencies and generate benefits and burdens worldwide. Such cosmopolitan approaches to justice, then, aim to specify what constitutes a *globally fair distribution of benefits and burdens* in the context of a globalized world. Key writers in this prolific debate—that often also addresses global environmental concerns—are Charles Beitz, Simon Caney, Darrel Moellendorf and Thomas Pogge.
- (3) A third conceptualization of justice that we include is the *capabilities approach*, a normative framework that evaluates institutions according to their impact on effective opportunities—that is, the capabilities—that people have to lead a valuable and dignified life. In contrast to Rawlsian liberal egalitarianism the focus here is not on means (e.g. income) but on ends (e.g. human dignity). The reason is that people differ in their ability to convert means into valuable opportunities to live the kind of life that they have reason to live. For example, a disabled individual cannot use their capability of free mobility in a society that does not cater for special needs, even if such society distributes income in an egalitarian manner. The capabilities approach then pays attention

² Non-relational cosmopolitan theories emphasize that humans are entitled to justice by virtue of being humans rather than because they are related with each other through global institutions (see e.g. Gillian Brock). As this position is also shared by the capabilities approach delineated below, we refrain from elaborating it further here.

to the interpersonal differences among people and emphasizes the multiple dimensions of human life. Central authors in this tradition are Martha Nussbaum and Amartya Sen.

- (4) A fourth position is *libertarianism*, a normative perspective that affirms the rights of individuals to liberty, ownership and free exchange. Libertarianism views existing wealth distribution as legitimate as long as such wealth has been gained by lawful activities. Redistributions of wealth through governmental action are, in this perspective, unjust. The function of government needs to be restricted to the protection of life, liberty and property and to the enforcement of contracts. This perspective has been most forcefully laid out by Robert Nozick (1974), who developed a libertarian theory of justice in response to the work of John Rawls and other liberal egalitarians (see also Sukhdev et al., 2014). In Nozick's view, it is not the outcome per se that matters—for example, whether individuals receive goods in accordance with a certain principle such as need—but rather the process. If the process of acquiring wealth has been lawful and just, the final distribution of wealth is also just and merits protection by the state. Redistribution of wealth is hence only possible with the consent of the wealthy (as opposed to forced redistribution by taxation or social levies), since 'the state may not use its coercive apparatus for the purpose of getting some citizens to aid others' (Nozick, 1974, p. ix). While there have been—especially in the 19th and early 20th century—also left-leaning (anarchist, socialist, egoist, anarcho-syndicalist, etc.) strands in the libertarian tradition, today it is mainly seen as a philosophy on the right of the political spectrum. We draw here, apart from the work of Nozick, mainly on related political programmes of modern libertarian parties (such as the US-based Libertarian Party that won over 3% of the national vote in the 2016 presidential election) and think-tanks, such as the Cato Institute.
- (5) A fifth intellectual tradition, which we label here as *critical perspectives*, question the *structural conditions* that create injustice. This tradition has some roots in Marxism (e.g. Horkheimer, 1972; Horkheimer and Adorno, 1972), but encompasses also a diverse set of other approaches that seek human emancipation from structural injustices, in particular feminism. Critical perspectives pay specific attention to the role of political agency of those suffering injustices in how to address them. A key representative of critical perspectives that we draw on is Nancy Fraser. Her work is particularly concerned with questions of (structural) misrecognition due to social status and identity, misrepresentation of political voice, and maldistribution of economic benefits and burdens (Fraser, 2000, 2005, 2008, 2009). Apart from Fraser, we draw more broadly on critical political theory (Newell, 2005; Young, 1990) and emancipatory social movement scholars (Shiva, 1997, 2000).

In delineating these five traditions, we had to make choices: not all intellectual traditions could be included. We focus here, as a starting point, on mainstream Western philosophical traditions, and we leave out at this stage non-European traditions such as Hinduism, Confucianism or indigenous beliefs in Pachamama. We also cannot cover in this article intellectual traditions that go beyond interpersonal justice and would include justice obligations towards non-human animals or future generations. The reason for this exclusion is mainly practical: Our planetary justice framework is informed by a need to assess existing political documents, scientific debates or integrated assessment models in global change research and debate. In a mainstream political document it is less likely to encounter references to Confucian philosophy or

Pachamama. However, we see incorporation of such intellectual traditions as important next steps in the planetary justice research framework that we propose here, and we view our framework well positioned to include in a subsequent phase also justice theories from non-Western traditions or obligations towards non-human animals or future generations.

3. A conceptual framework to assess planetary justice

We now advance a conceptual framework that allows operationalizing justice in a way that does not presuppose a normative stand of the analyst. In other words, analysts can refer to different notions of justice in a conceptually clearly defined manner in reference to the five major theories of justice, without bringing in their own, necessarily personal normative position. The framework that we suggest consists of three core concerns, each of which is differently addressed by the five theories of justice that we base our analysis on. Bringing them together, this framework allows to clearly elicit the normative position—especially in a comparative perspective—of any programme, institution, scenario-building process or integrated global change assessment. Table 1 offers a more practical guide towards that direction by listing five core statements about planetary justice and checking their applicability in the light of the five justice theories examined here.

3.1. Subjects of planetary justice

First, any position, text or discourse that addresses planetary justice in global change research needs to specify, implicitly or explicitly, the sort of entities included within a system of justice and to define the subjects of justice. With a view to planetary justice, one key difference among the five theories of justice is their conceptualization of the normative relations among people.

Liberal egalitarianism, for one, defines subjects of justice on the basis of *membership as shared nationality and citizenship*. In this conceptualization, borders hence matter. This is because the basic structure of society is defined based on a self-contained national community in which individuals of that community are free, rational, and 'reasonable' citizens who want to live in cooperation with one another, in a territorially defined society where egalitarian principles of justice apply. Globally, however, international justice is served by a system of multiple 'just societies', which (ideally) all have the characteristics of 'liberal' and 'decent' peoples. This is because global injustices are not perceived to lie in the structure of the international political economy but in the deficient internal constitution of 'burdened societies' (Rawls, 1999).

Cosmopolitanism, instead, defines subjects on the basis of *global interdependence*. Borders, hence, are meaningless from an ethical perspective. As noted earlier, cosmopolitans acknowledge that there are transboundary interactions and multiple structures globally which in turn mark a variety of subjects. What connects these subjects as units of moral concern is the extent to which they are *affected* by any given structure. Subjects defined that way can be individuals, groups or even states, all being interdependent (Beitz, 1979). Importantly, subjects in global society, in this perspective, are all equally related by moral obligations of support and care, making international cooperation and redistribution a fundamental tenet of cosmopolitanism.

The capabilities approach, on its part, defines the subjects of justice on the basis of *individual personhood*, understood as common distinguishing features of humanity. In this understanding, what distinguishes subjects is their individual capacity for care, love, compassion, altruism, reciprocity and dignity even though this capacity may often not be expressed. Although the capabilities approach is mostly concerned with the individual, its atomistic

Table 1
Core propositions of the planetary justice research framework.

Core justice statements	Liberal egalitarianism	Cosmopolitanism	Capabilities	Libertarianism	Critical perspectives
<i>National borders are irrelevant for assessing justice</i>	No	yes	yes	yes	yes
<i>The rich have moral obligations towards the poorest people of the planet</i>	only within their own society	yes	yes	only voluntarily (philanthropy)	yes
<i>For assessing justice, personal moral and religious convictions:</i>	do not matter	do not matter	are important	do not matter	are important
<i>Justice is best served:</i>	when the least advantaged members of society benefit most from national policies and institutions	when all individuals worldwide can satisfy basic human needs necessary for human survival	when all individuals can live a life 'worth living', based on a number of basic requirements that fit their capabilities	by securing freedom of choice for all unfettered by governmental intervention	when oppressive structures are broken down so that all individuals are recognized and able to participate as equals in public life
<i>The preferred mechanism to achieve justice would be:</i>	national welfare state within a system of 'just societies'	global redistributive governance supported by strong public institutions	globally decentralized support systems to advance the dignity of individuals	global free markets	national and global destruction of oppressive institutionalized structures of subjugation

anthropology is ontological rather than methodological (Robeyns, 2005). This makes it compatible with research investigating the capabilities of groups or communities (Schlosberg and Carruthers, 2010).

Conversely, libertarianism defines subjects on the basis of *individual freedom and ownership*, with no inherent links to a particular society or 'nation'. National borders are unimportant as evidenced by the strong focus of libertarians on global free trade and the breakdown of barriers to free enterprise. However, as opposed to cosmopolitan theories, libertarians are fiercely opposed to any build-up of global institutions and international organizations, and reject transnational transfers of funds for instance through traditional development aid. Thus, people are seen as being united across borders but under the principles of a global free market society, not a global solidaric society as in cosmopolitanism.

Critical perspectives, finally, do not focus on differences of borders but on differences according to *subjection* to particular (global) structures, and hence subjugation based on either gender or class that runs across nations in terms of transnational class and gender conflicts (Fraser, 2000, 2008, 2009). Subjection is understood broadly not in terms of national citizenship or state jurisdiction but as being subject to the coercive power of non-state and trans-state forms of domination related to class or gender (Fraser, 2008).

Core Propositions 1–3: In sum, any text, discourse or statement can be analysed as to the conceptualization of normative relations among people, notably: (1) the importance of national borders and nations vis-à-vis a global society of people; (2) the emphasis on personal obligations vis-à-vis others; and (3) the emphasis of moral versus rational arguments (see Table 1).

3.2. Metrics and principles of planetary justice

Second, texts or statements in global change discourse can be analysed as to the metrics and principles that they use, implicitly or explicitly, to define justice and what they view as (globally) 'just' in the first place. Again, the five broad theoretical traditions offer different propositions on this question.

To start with, in the liberal egalitarian tradition rational individuals would agree to the maximum possible liberty and equality but would accept inequality in the distribution of wealth if this benefits the least advantaged members of society (Rawls, 1971,

p. 302-303). All social and economic inequalities would need to be attached to offices and positions open to all under conditions of fair equality of opportunity and be to the greatest benefit of the least-advantaged members of society (the 'difference principle'). All social primary goods—liberty and opportunity, income and wealth, and the bases for self-respect—are to be distributed equally unless an unequal distribution of any or all of these goods is to the advantage of the least favored' (Rawls, 1971, p. 303).

Much of cosmopolitan scholarship concurs with Rawls' position but extends liberal egalitarianism to the planetary level, arguing for a *global difference principle* (Caney, 2001, 2005; Moellendorf, 2002). This would require 'that persons (of equal ability and motivation) have equal opportunities to attain an equal number of positions of a commensurate standard of living' (Caney, 2001, p. 120). Moellendorf (2002), for instance, suggests that if randomly selected people would have no knowledge about the talents and abilities of others, they would favour a distribution that ensures that all global inequalities are to the benefit of the least advantaged. Beitz uses the example of natural resources as a morally arbitrary endowment that individuals in the original position have no knowledge of. In that case, too, individuals would choose a global difference principle that would assure resource-poor societies that they would not be prevented from realizing economic conditions in support of just social institutions and the protection of human rights (Beitz, 1979, p. 141-142).

Other cosmopolitan scholars, however, seek a different route and favour a *needs-based minimum floor principle*. Brock (2009), for instance, asks us to imagine what principles would derive if individuals were randomly selected to attend a global conference in which they were to decide what would be a fair framework for interactions among the world's inhabitants. The delegates knew nothing about their allegiances or situation but that decisions would be binding. Brock argues that delegates would choose a minimum set of protections and entitlements they can expect to tolerate: that everyone should enjoy some equal basic liberties, and that everyone should be protected from real or probable risks or harms (Brock, 2009, p. 50). Accordingly, she derives four indicators of global justice: all are enabled to meet their basic needs; people's basic liberties are protected; there are fair terms of cooperation in global institutions; and (global) social and political arrangements are in place that support these goals (Brock, 2009, p. 119).

The capabilities approach, on its part, rejects the contractarian views of liberal egalitarianism and cosmopolitanism.³ It contests that the justification of principles of justice lies in the fairness of the procedure that derives such principles. Instead, inspired by the Aristotelian conception of a 'good life', the capabilities approach would argue that planetary justice is about *enabling all people to live a rich life by fully developing their individual capabilities and virtues*. The purpose of planetary justice would not be to establish a society of mutual advantage (as with Rawls) but a society in which everyone can make the best use of their own capabilities and reason in favour of the common good. Capabilities are seen as sets of combinations of functionings and express the real possibilities of choices that people have (Anderson, 1999; Holland, 2008, 2012; Renouard, 2011; Schlosberg, 2012). The concept of 'functioning' 'reflects the various things a person may value doing or being' (Sen, 1999, p. 75) and represents 'various components or aspects of how a person lives' (Gasper, 2002, p. 4). A person's ability to realize their desired functionings depends on their capabilities and entitlements. Capability is understood as a kind of freedom: specifically, the substantive freedom to achieve alternative combinations of functionings (Sen, 1999). The capabilities are then in essence a number of basic requirements that each person would require to describe a society as 'just'. According to Sen, people themselves must have the opportunity and freedom, in a democratic deliberative process, to determine the capabilities needed for their functioning. Other theorists suggest concrete list of capabilities that would be vital for a decent human life. Nussbaum for instance suggests as basic capabilities life, bodily health, bodily integrity, senses, imagination and thought, emotions, practical reason, affiliation, other species, play, and control over one's environment. Others suggested access to healthcare, skills and education, access to credit, and environmental and social protection to be part of the capabilities list (Sandbrook, 2005), or mental well-being, empowerment, political freedom, social relations, community well-being, work conditions, leisure conditions, political security, economic security, and environmental conditions (Ranis et al., 2006).

Libertarians, on their part, support a fundamentally different route. For them, justice is served when civil liberties are protected, markets function as main exchange mechanism, and the role of government is minimized (Nozick, 1974). In this view, *any redistributive justice is unjustified*, and must not be based on coercive means such as taxation. The US-based [Libertarian Party \(2016\)](#), possibly one of the more extreme modern expressions of this intellectual tradition, calls for 'repeal of the income tax, the abolishment of the Internal Revenue Service and all federal programmes and services not required under the U.S. Constitution'. Even though there are some libertarians who advocate a guaranteed basic income as an alternative to the modern welfare state (Crider, 2016), such views seem to be rather at the fringes of the mainstream discourse, which largely agitates against strong public institutions that could coerce citizens to share their income or wealth. The [Libertarian Party \(2016\)](#), for instance, simply states that the 'proper and most effective source of help for the poor is the voluntary efforts of private groups and individuals'.

As for critical perspectives, finally, justice requires *participatory parity* in the economic, cultural and political dimensions of life. Economically, critical perspectives target maldistribution as a result of the class structure of society (Newell, 2005). They note that economic structures, property rights regimes and labour markets

deprive some actors of the resources necessary for their full participation in society. Culturally, misrecognition results from institutionalized hierarchies of cultural value that deny certain people their requisite standing in terms of identities (including marginalization of groups of actors such as women or religious and ethnic minorities, see Fraser 2000, 2005; Desjardin 2006; Shiva 2000; Young 1990)—and on the basis of social status, that is, social subordination by being prevented from participating as peer in social life (Fraser, 2000). In this context, misrecognition is seen as the result of 'institutionalized patterns of cultural value that constitute one as comparatively unworthy of respect or esteem' (Fraser, 2000, p. 113–114). Politically, misrepresentation accounts for 'ordinary political injustices' arising within particular political communities on the basis of skewed decision rules which compromise the political voice of some members and impair their ability to participate as peers in social interaction (Fraser, 2009, p. 6). Misrepresentation contains the element of substantive exclusion of those otherwise formally included in a particular political community as well as that of the inability to contest their exclusion. Further, misrepresentation is associated with misframing, for instance when transnational injustices are framed as issues of national concern, thereby excluding particular actors as subjects of justice.

Core Proposition 4: In sum, any text, discourse or statement can be categorized following their (implicit or explicit) definition of what 'just' would imply, emphasizing either: the factual differences between people and the resulting need to advance the interests of the poorest, either (1) nationally (liberal egalitarianism) or (2) globally (cosmopolitanism); (3) the fulfilment of a list of basic requirements for individuals as defined by them or by general standards (capability approach); (4) the outcome of free (market) exchange processes among individuals that defines justice and just possession (libertarianism); or (5) the gradual breakdown of transnational structures of subjugation by class or gender (critical perspectives).

3.3. Mechanisms of advancing planetary justice

To grant subjects of planetary justice what is considered their just position or share, mechanisms of justice become politically central in determining how planetary justice is delivered and who is considered responsible for addressing injustices. We review mechanisms that have been strongly associated with different justice theories, while acknowledging that some nuance is lost when translating complex philosophical principles to a limited set of (global) political and economic mechanisms.

Liberal egalitarianism is often associated with the creation of a *national welfare state*, as a social system in which the government is responsible for the economic and social welfare of its citizens and enacts policies to provide access to health care, education, minimum wage, and support to the unemployed and disadvantaged. Rawls himself, however, defends the more demanding mechanism of property-owning democracy, 'the widespread ownership of assets and human capital ... against a background of fair equality of opportunity' (Rawls, 2001, p. 139). In this context, the state should enable, according to Rawls, all its citizens to be able to manage their own affairs instead of only aiding those who lose out because of accident or misfortune. Translating this proposition to contemporary societies, some scholars argue in favour of a strong taxation system designed to prevent the 'large-scale private concentrations of capital from coming to have a dominant role in economic and political life' (O'Neill and Williamson, 2012, p. 5). However, from a planetary perspective, the core distinction between a nation-based welfare state and a community of nations stays central in Rawlsian thought.

³ Even though Nussbaum (2006) flirts with contractualism as developed by Thomas Scanlon (2000), an ethical approach that derives political principles about what we 'owe to each other' because we care and not because of rational self-interest calculations (as in Rawls).

As cosmopolitans extend liberal egalitarianism from the nationally defined 'just societies' to the global level, their basic mechanism for advancing global justice becomes *global redistribution* to support the needs of the poorest within and among countries. Cosmopolitans have therefore developed a vast array of concrete proposals, such as the development of global taxation and accounting policies, for instance the imposition of a Global Resources Dividend as a tax on the use of natural resources, which would be based on the premise that states do not enjoy full property rights over resources on their territory but must share parts of the value and benefits of these resources with global society (Pogge, 2001, p. 66). The payment of such a dividend is based on the assumption that the global poor have a stake in all limited natural resources on the planet. Pogge argues that a dividend of 1% of the global product would be enough to eradicate severe forms of poverty. Related proposals often supported by cosmopolitans include a global carbon tax on the use of energy sources that emit carbon dioxide (proposed in Cooper, 1998) or a tax on global financial transactions (proposed in Tobin, 1974). These proposals are not without criticism from similar political positions, with scholars warning, for instance, that the establishment of a global taxation system within the current power structures could be abused by the most powerful states. Accordingly, cosmopolitans also argue for the restriction of taxation havens, creation of an independent international taxation organization, the openness of global financial transactions, and the establishment of transparency and accountability mechanisms of the global financial regimes (Brock, 2009).

Also representatives of the capabilities approach argue that governments and public policies are needed to improve the quality of life for all people as defined by their capabilities. The nation state has here a central moral role because democratic states are seen as primary loci to secure freedom and self-determination (Nussbaum, 2000, 2011). Due to their attention to a range of human capabilities, institutions such as schools and cultural and religious institutions feature prominently in this approach. At the international level, an institutionalized—though limited—expression of the capabilities approach is the human development index of the United Nations, a composite of life expectancy, level of education and per capita income, which measures the 'human development' as opposed to purely economic development measured in indicators such as gross domestic product. While the main attention of representatives of the capabilities approach is at the domestic situation within countries, they also acknowledge that because many people live beneath their capabilities thresholds, richer nations must help poorer nations in meeting their capabilities (Nussbaum, 2011). To achieve that, the capabilities approach, and Nussbaum in particular, rejects philanthropy because these mechanisms overlook the role of institutions in generating injustices (Nussbaum, 2011). Instead, it advocates an institutional solution that is thin and decentralized—here largely in opposition to the state-based welfare state of liberal egalitarians or the global redistributive institutions that cosmopolitans would prefer. Specifically, the capabilities approach envisages institutional structures that ought to be loose, reflexive and adaptable to changing global conditions, for example in the form of networks of international treaties that impose certain norms on nation states, with an emphasis on the responsibility of corporations and civil society to foster capabilities in the regions they operate in. Sen (2001) also emphasizes the importance of democracy in the form of political participation, dialogue and public interaction as the only mechanism that can help assessing the demands of justice on the basis of public reasoning.

This fundamentally differs from modern libertarianism, which forcefully *rejects a strong role of governments*, and in particular *any redistributive policies enacted by governments based on taxation*.

Global redistributive funding mechanisms would here place a disproportionate claim on the lawfully acquired wealth of people in richer countries by transferring this wealth to government-run programmes in developing countries. Such funding mechanisms thus run against the core tenets of libertarian philosophy. Instead, free markets unfettered by governmental oversight and control are seen as the core mechanisms to advance just societies. Especially the today dominant North American libertarian views support a generally critical position to international cooperation, veering towards a more isolationist view of foreign policy. All this results in a position towards planetary justice that seeks to limit any global institutionalized redistributive mechanism, bringing libertarians in fundamental opposition to cosmopolitan thinkers. An exception to the general anti-internationalist stand are those global institutions that support the core values of libertarianism, such as the regimes under the World Trade Organization, the World Intellectual Property Organization, and others.

For critical perspectives, finally, planetary injustice is overcome by *dismantling institutionalized obstacles* that prevent some people from participating as peers in social life. In order to achieve that critical perspectives reject the view that strong states and hegemonic elites are always the ones to determine the subjects and substance of justice, and that the subjects and substance of justice can be determined by 'normal' social science on the basis of undisputable 'facts' provided by 'justice technocrats' (Fraser 2008, p. 27)—as could be seen in proponents of liberal egalitarianism or cosmopolitanism, even though they would phrase their stand differently. Rather, critical perspectives argue that questions about justice invite contestation and conflict. To validate and legitimate contestation, the mechanisms for addressing injustices need to be dialogical. Yet, dialogue is not considered enough, as dialogue alone cannot result in binding resolutions. For this reason, critical perspectives advise to avoid relying on populist approaches that only emphasize dialogue with civil society. Indeed, they underline that civil society deliberations often lack representativeness (see also S nit et al., 2016); and civil society itself lacks the ability to adopt binding decisions. Accordingly, critical perspectives envision a constant dialogue between a formal institutional track with the ability for binding decisions, and a civil society track. New democratic institutions that can fulfil the role of the formal institutional track are hence necessary, in this view, because none of the present global institutions meets the democratic standards of participatory parity that critical perspectives hold central.

Core Proposition 5: In sum, any text, discourse or statement can be analysed with a view to the preferred mechanisms that are emphasized to achieve planetary justice, either (1) advancing the national welfare state (liberal egalitarianism); (2) creating strong global institutions that include meaningful global redistributive mechanisms and increasingly limit national choice and sovereignty (cosmopolitanism); (3) supporting human development that cherishes the capabilities of individuals and their dignity without centralized, 'elite-driven' (global) institutions (capability approach); (4) enabling globally a free exchange of citizens without much interference by governments or public policies (libertarianism); or (5) dismantling oppressive institutions and nurturing dialogical processes between democratic centres of decision-making and global civil society (critical approaches).

4. Empirical application

We now apply our planetary justice research framework to concrete documents and governance processes, testing the usefulness of our concept to map existing discourses and identifying incoherence. We study in detail two prominent examples of current sustainability politics: the 2030 Agenda for Sustainable

Development, agreed upon by the UN General Assembly in September 2015 as the main directional policy document at the international level; and the founding documents of the 'Future Earth' programme, a major international research platform aiming to provide knowledge and support for sustainable transformations for the globe.

4.1. The conceptualization of justice in the 2030 Agenda for Sustainable Development

The 2030 Agenda for Sustainable Development (United Nations, 2015) with its attached 17 'Sustainable Development Goals' and 169 more concrete targets has been hailed as a 'universal, integrated and transformative vision for a better world'.⁴ The words of justice, equality and inequality are very frequently mentioned in this Agenda: that is, seven, eighteen and six times respectively. Yet how is justice conceptualized in this possibly most important recent political document agreed upon in the UN system?

As for the subjects of justice, the 2030 Agenda for Sustainable Development broadly adopts a universal approach, arguing that 'all need to be able to fulfil their potential in dignity and equality and in a healthy environment' (p. 2) and 'no one will be left behind' (p. 2). Two categories of people attract special attention in the Agenda: first, people in 'the most vulnerable countries and, in particular, African countries, least developed countries, landlocked developing countries and small island developing States' as well as 'countries in situations of conflict and post-conflict countries' (p. 7); second, people 'who are vulnerable and must be empowered' (p. 7). Overall, the Agenda focuses on the 'needs of the poorest and most vulnerable' (p. 3) and underlines the crucial importance of 'interlinkages and integrated nature' of the Sustainable Development Goals to serve these subjects. Broadly speaking, the 2030 Agenda for Sustainable Development seems to *veer towards a conceptualization of justice that appears to be most closely related to concepts of cosmopolitanism*.

As for the metrics and principles of justice and for the identification of what justice actually is, the Agenda focusses on the need for 'universal respect for human rights and human dignity, the rule of law, justice, equality and non-discrimination', and reiterates commitment to the United Nations system, the related treaties and agreements, such as the Universal Declaration of Human Rights. The Agenda's core attention, however, lies on 'eradicating poverty in all forms and dimensions, including extreme poverty', as this is seen as 'the greatest global challenge and an indispensable requirement for sustainable development' (p. 2). All people 'must enjoy a basic standard of living' (p. 7). In this context the Agenda refers to seeking to build 'strong economic foundations' because 'sustained, inclusive and sustainable growth is essential for prosperity', which in turn can only be achieved 'if wealth is shared and income inequality is addressed' (p. 15). Again, the 2030 Agenda seems to support a cosmopolitan view of justice that construes a global society that needs to support its poorest members who live in abject poverty.

However, there is no strong distributive language in the text. Rather, justice seems to be based on a 'needs-based minimum floor principle' version of cosmopolitanism with thresholds to be met and less on a 'global difference principle' approach. Indeed, more concretely the Agenda calls to 'eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day' (Goal 1.1) and 'reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions' by 2030 (Goal

1.2). Similar language is adopted for other goals, such as 'double the agricultural productivity and incomes of small-scale food producers' (Goal 2.3), and 'half the number of global deaths and injuries' (Goal 3.6). When it comes to global distribution, the language is significantly softened, relying now on terms such as 'encourage official development assistance and financial flows, including foreign direct investments, to States where the need is greatest' (Goal 10. b). This, in turn, also carries implications for the mechanisms to deliver justice.

Concerning these mechanisms of advancing justice, Goal 17 sets down the means of implementation of the Agenda. Overall, implementation is to be achieved through a 'revitalized Global Partnership for Sustainable Development' (pp. 3 and 26), which is supported by the policies and actions outlined at the 3rd International Conference on Financing for Development, held in Addis Ababa in July 2015. Although the needs of the poor and the vulnerable are highlighted repeatedly, these are not to be served by strong distributive cosmopolitan measures such as global tax and accounting measures, a global resources dividend or restrictions of taxation havens. Rather the emphasis is on investment, technology transfer, cooperation in capacity building, openness of the international trade system, policy coherence and partnerships. Further, although the Agenda calls for monitoring and accountability mechanisms, these pertain to capacity building and not to the transparency and accountability of global financial transactions, for instance, as underlined by many cosmopolitan scholars as fundamental to reducing global poverty and inequality. Thus, when it comes to concrete mechanisms that could support justice, the Agenda seems to combine a liberal egalitarian view of interactions among 'just societies' that is based on mutual cooperation, with libertarian tenets that prioritize free trade to advance a 'just' allocation of goods based on capitalist market systems.

In sum, we find that the 2030 Agenda for Sustainable Development presents a conflicting mix of normative approaches towards justice. There is a strong cosmopolitan rhetoric when it comes to the subjects of justice, with an overwhelming emphasis on the global poor, yet this is combined with political mechanisms that draw on liberal egalitarianism and libertarianism in its focus on cooperation among states combined with free trade. Politically, this can be interpreted as a *rhetorical compromise* between the interests of poorer developing countries that would not have accepted any declaration without at least rhetorical references to global redistribution and essentially a cosmopolitan understanding of global justice, and the interests of industrialized countries in the North that adhere politically more to a nation-based, in many cases also 'soft-libertarian' approach to questions of global collaboration. It remains to be seen, in the implementation of the Agenda for Sustainable Development, whether the strong cosmopolitan thrust of the agenda will eventually result in a realignment of global policies to support that vision.

4.2. The conceptualization of justice in the Future Earth research alliance

As a second example, we now study the conceptualization of justice in 'Future Earth', a global research platform that was founded around 2014 as successor to a range of earlier global change research programmes. Today, Future Earth is the largest network of global change scientists worldwide, with involvement of officially over 50,000 researchers through association and endorsement of other research projects along with a variety of national chapters, science-policy interactions and outreach activities. Its overall vision is 'for people to thrive in a sustainable and equitable world' (Future Earth, 2014). However, it is striking that in the major programmatic documents published so far, terms like justice, fairness, or equity

⁴ <http://www.un.org/sustainabledevelopment/secretary-general/>.

are not taken up. The 'equitable world' that Future Earth wants people to thrive in, is not defined. Equally, the platform seeks to 'encourage sustainable consumption and production patterns that are equitable' but does not inform about what equity would mean in this context. Instead, the answer to this is to be found in 'understanding the social and environmental impacts of consumption of all resources, opportunities for decoupling resource use from growth in well-being, and options for sustainable development pathways and related changes in human behavior' (Future Earth, 2014).

The more comprehensive 'Initial Design' of Future Earth, published in 2013, does not mention terms such as justice or fairness even once, except for very general claims that the platform 'will add value with research that shows how global environmental changes ... link to and underpin development, how development efforts can in turn add to global environmental problems, and how global environmental change relates to issues of human security, gender equity, indigenous cultures and justice' (Future Earth, 2013, p. 35); and that 'Future Earth will answer fundamental questions about how and why the global environment is changing, ... what are the implications for human development and the diversity of life on earth, and what the opportunities are to ... create transformations to prosperous and equitable futures' (Future Earth, 2013, p. 28). There are few references also to 'equitable' and 'equity', but these rather in relation to data access, data management and the generation of new research ideas (Future Earth, 2013, pp. 92 and 68), hence here focussing broadly on concerns raised by developing countries about an inherent Northern bias in global research communities. Some research questions that are being suggested include references to equity, for example in the investigation of 'the patterns, trade-offs and options for equitable and sustainable use of resources and land' and of how 'socially and environmentally effective, efficient and equitable ... alternative approaches for conceiving, measuring and implementing development projects and initiatives' can be (Future Earth, 2013, p. 34).

In sum, it appears that while Future Earth claims to strive for an 'equitable world', this claim is not specified as to its implications. The planning process for Future Earth did not result in any conceptualization of justice; it does not problematize questions of justice as a subject of research; and it does not provide or support a conceptual framework that could guide comparative research on justice at local, national and global levels. Ethical literature is not being cited or otherwise referred to. Thus, despite its grandiose claim about its central mission to advance towards 'equitable world', the core planning documents of Future Earth remain silent when it comes to any concrete conceptualization of justice.

Is there, then, any *implicit* conceptualization of justice that could be assessed along the lines of the Planetary Justice research framework that we advance here? Even though Future Earth seems to explicitly focus on change and 'transformations' in societies, it is rather difficult to pinpoint any ethical or political direction. With a view to libertarian views, it is striking that the 100-pages long Initial Design mentions 'markets' only once and here more in passing in relation to the increase of water supplies (Future Earth, 2013, p. 35). On the other hand, Future Earth (2013, p. 24) sees governments as being 'responsible for managing and balancing the short and long-term well-being of their citizens, business, environments and resources', and the agency of governments and the need for institutional transformation seems to be emphasized frequently, even though often linked to an equal focus on other 'stakeholders', including business, which is generally listed *before* civil society. While there is no clear position as to the relevance of global cooperation and institutions, the overall direction of the documents is clearly influenced by the United Nations political processes, and seems to be supportive of global programmes and

actions, hence pointing more towards a cosmopolitan understanding of societal processes and responsibilities, even though the stunning lack of any reference to global justice stands in opposition to fundamental values and views held by cosmopolitans.

In sum, we observe that while justice is an aspiration of both the 2030 Agenda for Sustainable Development and the Future Earth research alliance, the conceptualization of justice is in the former case confusing and in the latter case absent. This prompts us to question whether justice will be fostered and in what form. Inconsistent views and unclear propositions about justice may appear pluralistic and inclusive by minimizing normative contestation and conflict through simply evasion of key issues of justice. And yet, it is doubtful whether such agnostic or evasive strategy by the United Nations or the Future Earth programme will in the end help the science community to support a coherent response to the multiple global sustainability challenges that we are facing.

5. Conclusion

This article developed a research framework to advance our understanding of justice, equity and fairness at planetary scale in light of major different philosophical traditions. This framework can be used by social scientists, researchers of the global change community and modellers to clearly elicit the normative position—also in a comparative perspective—of any programme, institution, or scenario-building process addressing planetary concerns.

The framework builds on five broad intellectual traditions that are of special relevance to the core ethical contestations in the field of global environmental change. These five traditions are liberal egalitarianism, cosmopolitanism, the capabilities approach, libertarianism, and critical perspectives informed by Marxism and feminism, among others. The first two theories would argue about planetary justice on the basis of the hypothetical choices people would make in an original position of equality either at the national level (liberal egalitarianism) or at the global level (cosmopolitanism). The third theory argues that planetary justice involves cultivating human capabilities and reasoning about the common good. The fourth approach would submit that planetary justice is about freedom of choice in a globally free market unfettered by (inter)governmental intervention (libertarianism). The fifth argues that planetary justice is about human emancipation from the globally oppressive structures that constrain it. The framework consists more concretely of three core concerns, regarding the central subjects, principles and mechanisms of planetary justice, each of which is differently addressed by the five theories of justice that we base our analysis on.

We exemplified this framework by examining two prominent examples of current planetary sustainability politics: the 2030 Agenda for Sustainable Development, agreed upon by the UN General Assembly in September 2015 as the main directional policy document at the global level; and the founding documents of the Future Earth research platform, a major international research platform aiming to provide knowledge and support for sustainable transformations at planetary scale. We found that justice is incoherently conceptualized in these two cases, if at all. This is problematic: cosmopolitan aspirations cannot be satisfied with libertarian mechanisms; capabilities cannot be promoted by global distributive principles; and a critical agenda cannot be expressed simply by notions of individual well-being and human development.

By clarifying the normative positions behind major political and scientific programmes and broader visions for our future, the Planetary Justice research framework that we advance forces to think more carefully and clearly about what it is that we consider unjust, who is facing that injustice, and what is the right

mechanism to address it. This is, we argue, not only a much-needed scientific endeavour. It is also a promising step towards fostering a broader societal dialogue about the kinds of just societies we aspire to live in.

Declaration of competing interest

Both authors declare not to have any conflict of interest.

CRediT authorship contribution statement

Frank Biermann: Conceptualization, Formal analysis, Writing - original draft, Writing - review & editing. **Agni Kalfagianni:** Conceptualization, Formal analysis, Writing - original draft, Writing - review & editing.

References

- Adger, W.N., Brown, K., Hulme, M., 2005. Redefining global environmental change. *Global Environ. Change: Human Pol. Dimen.* 15, 1–4.
- Adger, W.N., Paavola, J., Huq, S., Mace, M.J. (Eds.), 2006. *Fairness in Adaptation to Climate Change*. MIT Press, Cambridge, MA.
- Agyeman, J., Schlosberg, D., Craven, L., Matthews, C., 2016. Trends and directions in environmental justice: from inequity to everyday life, community, and just sustainabilities. *Annu. Rev. Environ. Resour.* 41, 321–340.
- Anderson, E.S., 1999. What is the point of equality? *Ethics* 109 (2), 287–337.
- Armstrong, C., 2012. *Global Distributive Justice*. Cambridge University Press, Cambridge, MA.
- Beitz, C., 1979. *Political Theory and International Relations*. Princeton University Press, New Jersey.
- Biermann, F., 2020. The future of 'environmental policy' in the Anthropocene. *Environmental Politics*. Submitted for publication.
- Biermann, F., Betsill, M.M., Gupta, J., Kanie, N., Lebel, L., Liverman, D., Schroeder, H., Siebenhüner, B., Conca, K., da Costa Ferreira, L., Desai, B., Tay, S., Zondervan, R., 2009. In: *Earth System Governance: People, Places and the Planet*. Science and Implementation Plan of the Earth System Governance Project.. The Earth System Governance Project, Bonn.
- Bloomfield, M.J., 2014. Shame campaigns and environmental justice: corporate shaming as activist strategy. *Environ. Polit.* 23 (2), 263–281.
- Brock, G., 2009. *Global Justice: A Cosmopolitan Account*. Oxford University Press, Oxford.
- Brown, K., Corbera, E., 2003. Exploring equity and sustainable development in the new carbon economy. *Clim. Pol.* 3 (1), 42–56.
- Bulkeley, H., Carmin, J., Castán Broto, V., Edwards, G.A.S., Fuller, S., 2013. Climate justice and global cities: mapping the emerging discourses. *Global Environ. Change* 23, 914–925.
- Bullard, R.D. (Ed.), 2005. *The Quest for Environmental Justice: Human Rights and the Politics of Pollution*. Sierra Club Books, San Francisco, CA.
- Burch, S., Gupta, A., Inoue, C.Y.A., Kalfagianni, A., Persson, Å., Gerlak, A.K., Ishii, A., Patterson, J., Pickering, J., Scobie, M., Van der Heijden, J., Vervoort, J., Adler, C., Bloomfield, M., Djalante, R., Dryzek, J., Galaz, V., Gordon, C., Harmon, R., Jinnah, S., Kim, R.E., Olsson, L., van Leeuwen, J., Ramasar, V., Wapner, P., Zondervan, R., 2019. New directions in earth system governance research. *Earth Sys. Gov.* 1.
- Caney, S., 2001. International distributive justice. *Polit. Stud.* 49 (5), 974–997.
- Caney, S., 2005. *Justice beyond Borders*. Oxford University Press, Oxford.
- Cappelen, A.W., Tungodden, B., 2006. A liberal egalitarian paradox. *Econ. Philos.* 22, 393–408.
- Carmin, J., Agyeman, J. (Eds.), 2011. *Environmental Inequalities beyond Borders: Local Perspectives on Global Injustices*. MIT Press, Cambridge, MA.
- Clements, P., 2015. Rawlsian ethics of climate justice. *Crit. Criminol.* 11 (23), 461–471.
- Cooper, R., 1998. *Toward a Real Global Warming Treaty: The case for a carbon Tax*. *Foreign Affairs*, pp. 66–79. Mar–April.
- Crider, P., 2016. *Libertarian Social Justice. Commentary on Libertarianism.org*, 13 September. <https://www.libertarianism.org/columns/libertarian-social-justice>. Last accessed on 9 April 2020.
- Dauvergne, P., Clapp, J., 2016. Researching global environmental politics in the 21st century. *Global Environ. Polit.* 16 (1), 1–12.
- DesJardin, J.R., 2006. *Environmental Ethics: An Introduction to Environmental Philosophy*, Fourth ed. Thomson Wadsworth, Belmont, CA.
- Dobson, A., 1998. *Justice and the Environment: Conceptions of Environmental Sustainability and Theories of Distributive Justice*. Oxford University Press, Oxford.
- Ehresman, T.G., Okereke, C., 2015. Environmental justice and conceptions of the green economy. *Int. Environ. Agreements: Polit. Law Econ.* 15 (1), 13–27.
- Fraser, N., 2000. Rethinking recognition. *N. Left Rev.* 3, 107–120.
- Fraser, N., 2005. Reframing justice in a globalizing world. *N. Left Rev.* 36, 69–88.
- Fraser, N., 2008. Abnormal justice. *Crit. Inq.* 34 (3), 393–422.
- Fraser, N., 2009. *Scales of Justice: Reimagining Political Space in a Globalizing World*. Columbia University Press, New York.
- Future Earth, 2013. *Future Earth Initial Design: Report of the Transition Team*. International Council for Science, Paris.
- Future Earth, 2014. *Future Earth 2025 Vision*. Future Earth Interim Secretariat, Paris. URL: https://futureearth.org/wp-content/uploads/2019/09/future-earth_10-year-vision_web.pdf. (Accessed 9 April 2020).
- Gardiner, S., 2011. *A Perfect Moral Storm: The Ethical Tragedy of Climate Change*. Oxford University Press, Oxford.
- Gaspar, D., 2002. Is Sen's capability approach an adequate basis for considering human development? *Rev. Polit. Econ.* 14 (4), 435–461.
- Holland, B., 2008. Justice and the environment in Nussbaum's 'capabilities approach': why sustainable ecological capacity is a meta-capability. *Polit. Res. Q.* 61 (2), 319–332.
- Holland, B., 2012. Environment as meta-capability: why a dignified human life requires a stable climate system. In: Thompson, A., Bendik-Keymer, J. (Eds.), *Ethical Adaptation to Climate Change: Human Virtues of the Future*. MIT Press, Cambridge, MA, pp. 145–164.
- Horkheimer, M., 1972. *Critical Theory*. Seabury Press, New York.
- Horkheimer, M., Adorno, T.W., 1972. *Dialectic of Enlightenment*. Seabury Press, New York.
- Ikeme, J., 2003. Equity, environmental justice and sustainability: incomplete approaches in climate change politics. *Global Environ. Change* 13, 195–206.
- IPCC, 2014. *Mitigation of Climate Change. Working Group III Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, New York.
- Keohane, R.O., 2016. *Keohane on climate: What price equity and justice*. *Climate Change News* (online). <http://www.climatechangenews.com/2016/09/06/keohane-on-climate-what-price-equity-and-justice/>. Last accessed 9 April 2020.
- Klinsky, S., Dowlatabadi, H., 2009. Conceptualizations of justice in climate policy. *Clim. Pol.* 9, 88–108.
- Klinsky, S., Roberts, J.T., Huq, S., Okereke, C., Newell, P., Dauvergne, P., O'Brien, K., Schroeder, H., Tschakert, P., Clapp, J., Keck, M., Biermann, F., Liverman, D., Gupta, J., Rahman, A., Messner, D., Pellow, D., Bauer, S., 2017. Why equity is fundamental in climate change policy research. *Global Environ. Change* 44, 170–173.
- Libertarian Party, 2016. *Platform 2016*. <https://www.lp.org/platform/>. Last access 9 April 2020.
- McDermott, C.L., 2013. Certification and equity: applying an 'equity framework' to compare certification schemes across product sectors and scales. *Environ. Sci. Pol.* 33, 428–437.
- McDermott, M., Mahanty, S., Schreckenberg, K., 2013. Examining equity: a multi-dimensional framework for assessing equity in payments for ecosystem services. *Environ. Sci. Pol.* 33, 416–427.
- Moellendorf, D., 2002. *Cosmopolitan Justice*. Westview Press, Colorado.
- Mohai, P., Pellow, D.N., Roberts, J.T., 2009. Environmental justice. *Annu. Rev. Environ. Resour.* 34, 405–430.
- Newell, P., 2005. Race, class and the global politics of environmental inequality. *Global Environ. Polit.* 5 (3), 70–94.
- Nozick, R., 1974. *Anarchy, State, and Utopia*. Basic Books, New York.
- Nussbaum, M.C., 2000. Aristotle politics and human capabilities: a response to Antony Arneson, Charlesworth and Mulgan. *Ethics* 111 (1), 102–128.
- Nussbaum, M.C., 2006. *Frontiers of Justice*. The Belknap Press of Harvard University Press, Cambridge, MA.
- Nussbaum, M.C., 2011. *Creating Capabilities: The Human Development Approach*. Harvard University Press, Boston.
- O'Neill, M., Williamson, T. (Eds.), 2012. *Property Owning Democracy: Rawls and beyond*. Wiley-Blackwell, Oxford.
- Pavoola, J., 2005. Seeking justice: international environmental governance and climate change. *Globalizations* 2 (3), 309–322.
- Pogge, T., 1989. *Realizing Rawls*. Cornell University Press, Ithaca, NY.
- Pogge, T., 2001. Priorities of Global Justice. *Metaphilosophy* 32 (1/2), 6–24.
- Ranis, G., Stewart, F., Samman, E., 2006. Human development: beyond the human development index. *J. Hum. Dev.* 7 (3), 323–358.
- Rawls, J., 1971. *A Theory Of Justice*. Oxford University Press, Oxford.
- Rawls, J., 1999. *The Law of Peoples*. Harvard University Press, Cambridge, MA.
- Rawls, J., 2001. *Justice as Fairness: A Restatement*. The Belknap Press of Harvard University Press, Cambridge, MA.
- Renouard, C., 2011. Corporate Social Responsibility, Utilitarianism and the Capabilities Approach. *Journal of Business Ethics* 98 (1), 85–97.
- Robeyns, I., 2005. The capability approach: a theoretical survey. *J. Hum. Dev.* 6 (1), 93–114.
- Sandbrook, R., 2005. Africa's great transformation. *J. Dev. Stud.* 41 (6), 1118–1125.
- Scanlon, T., 2000. *What We Owe to Each Other*. The Belknap Press of Harvard University Press, Cambridge, MA.
- Schlosberg, D., 2004. Reconceiving environmental justice: global movements and political theories. *Environ. Polit.* 13 (3), 517–540.
- Schlosberg, D., 2007. *Defining Environmental Justice: Theories, Movements, and Nature*. Oxford University Press, Oxford.
- Schlosberg, D., 2012. Climate justice and capabilities: a framework for adaptation policy. *Ethics Int. Aff.* 26 (4), 445–461.
- Schlosberg, D., Carruthers, D., 2010. Indigenous struggles, environmental justice, and community capabilities. *Global Environ. Polit.* 10 (4), 12–35.
- Sen, A.K., 1999. *Development as Freedom*. Knopf Press, New York.

- Sénit, C.-A., Kalfagianni, A., Biermann, F., 2016. Cyberdemocracy? Information and communication technologies in civil society consultations for sustainable development. *Global Gov.* 22 (4), 533–554.
- Shiva, V., 1997. *Biopiracy: The Plunder of Nature and Knowledge*. South End Press, Boston, MA.
- Shiva, V., 2000. *Stolen Harvest: The Hijacking of the Global Food Supply*. South End Press, Boston, MA.
- Stavis, D., 2000. Whose ecological justice? *Strategies. J. Theoy Cult. Pol.* 13 (1), 63–76.
- Suiseeya, K.M.R., Caplow, S., 2013. In pursuit of procedural justice: lessons from an analysis of 56 forest carbon designs. *Global Environ. Change* 23, 968–979.
- Sukhdev, P., Wittmer, H., Miller, D., 2014. The economics of ecosystems and biodiversity (TEEB): challenges and responses. In: Helm, D., Hepburn, C. (Eds.), *Nature in the Balance: the Economics of Biodiversity*. Oxford University Press, Oxford, UK.
- Thomas, D.S.G., Twyman, C., 2005. Equity and justice in climate change adaptation among natural-resource-dependent societies. *Global Environ. Change* 15, 115–124.
- Tobin, J., 1974. What is permanent endowment income? *Am. Econ. Rev.* 64 (2), 427–432.
- United Nations, 2015. *Transforming Our World: The 2030 Agenda for Sustainable Development*. UN Doc. A/RES/70/1. <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>. Last accessed 9 April 2020.
- Vanderheiden, S., 2008. *Atmospheric Justice: A Political Theory of Climate Change*. Oxford University Press, Oxford.
- Young, I.M., 1990. *Justice and the Politics of Difference*. Princeton University Press, Princeton, NJ.