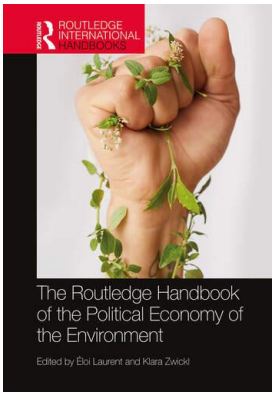

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Promoting justice in global climate policies

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PROMOTING JUSTICE IN GLOBAL CLIMATE POLICIES

Michel Bourban

Introduction

Philosophy and political economy play a crucial role in the climate change discourse. Normative and empirical perspectives overlap because climate change is structured by radical inequalities. One of the most striking characteristics of climate change is that people and populations most vulnerable to climate impacts, due to geographic location and socio-economic situation, have contributed least to global greenhouse gas (GHG) emissions. The 57 small island developing states (SIDS) are responsible for less than 0.003% of total GHG emissions, but they are among the most vulnerable to climate impacts (de Águeda Corneloup and Mol 2014: 282). The 48 least developed countries (LDCs) have only contributed 0.34% of cumulative emissions of CO_2, but people there are five times more likely to die from climate-related disasters than people in other countries (Ciplet, Roberts, and Khan 2015: 7). The US and EU, on the other hand, are *each* responsible for about 25% of cumulative fossil fuel CO_2 emissions since 1751 (Hansen and Sato 2016: 6–7). The richest (high and upper-middle income) countries in the world account for 86% of CO_2 emissions but only half of the global population (Ritchie and Roser 2019). On a per capita basis, global carbon inequalities are even more pronounced. While the richest 10% of the world's population are responsible for around 50% of global emissions, the poorest 50% (around 3.5 billion people), most of whom live in countries most vulnerable to climate change, are responsible for only around 10% of global emissions (Oxfam 2015).

This spatial inequality is compounded by a temporal one. While past and present generations have contributed substantially to exhausting the global carbon budget, future generations will suffer severe and probably catastrophic climate impacts. Present generations play a dominant role in this radically unequal situation. More than half of cumulative anthropogenic CO_2 emissions between 1750 and 2010 have occurred since 1970, with larger increases toward the end of this period. GHG emissions grew on average by 1.3% per year from 1970 to 2000, and by 2.2% per year from 2000 to 2010 (IPCC 2014: 6). After a three-year period in which emissions remained largely steady, global fossil CO_2 emissions rose by approximately 1.6% in 2017 and 2.7% in 2018 (Le Quéré et al. 2018). Climate change is therefore characterized by a strong spatial and temporal dispersion of causes and effects, which makes it a social-ecological challenge representative of the entry into the era of environmental inequalities (Gardiner 2011: 19–48; Laurent 2011: 102–111; Guivarch and Taconet this volume).

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The Intergovernmental Panel on Climate Change (IPCC) warns that for a 66% probability of limiting global warming to 1.5°C, humanity has a remaining carbon budget of no more than 420 $GtCO_2$ (Allen et al. 2018: 12). At current emission rates (42 $GtCO_2$ per year), this budget is expected to be exhausted in about 10 years. This situation is urgent and raises serious ethical issues, especially in terms of equity, as the IPCC highlights in its report on Global Warming of 1.5°C:

> Ethical considerations, and the principle of equity in particular, are central to this report, recognizing that many of the impacts of warming up to and beyond 1.5°C, and some potential impacts of mitigation actions required to limit warming to 1.5°C, fall disproportionately on the poor and vulnerable (*high confidence*). Equity has procedural and distributive dimensions and requires fairness in burden sharing both between generations and between and within nations.
>
> (Allen et al. 2018: 51; original emphasis)

The fact that these lines have been written by climate scientists shows how crucial normative research on climate change is. In fact, due to the great inequalities that structure the climate problem, neither natural scientists nor political actors can avoid using normative notions, such as "equity", "responsibility", and "capacity". The international climate regime, which is at the intersection of politics and science, at the crossroads between Conference of the Parties (COPs) and IPCC reports, frequently mentions ethical considerations, starting with the United Nations Framework Convention on Climate Change (UNFCCC 1992). One of the original roles of climate ethics has been to investigate the normative issues raised by scientific, political, and economic discussions on climate change (Gardiner et al. 2010). As Henry Shue (1992: 381) stressed in one of the first papers written in this field, climate negotiations are "a process constrained all along by some considerations of justice", because questions of climate justice are "unavoidable".

This chapter assesses climate policies from a climate justice perspective, with a particular interest in international negotiations. The first section explains how the relationship between the philosophy and the economics of climate change evolved from opposition to complementarity. The rest of the chapter explores promising institutional reform proposals made possible by this recent overlap between the two fields. From a climate justice perspective, states have three main kinds of duty: mitigating GHG emissions, helping vulnerable populations to adapt to climate impacts, and compensating the victims of climate impacts that have not been avoided (Bourban 2018: 94–100). The second section focuses on mitigation policies and explains how carbon pricing schemes could contribute to a just energy transition. The third section moves on to adaptation policies and focuses on the prioritization criteria that could contribute to a just allocation of adaptation finance. This last section also deals with questions of compensatory justice raised by the topic of adaptation finance.[1]

The philosophy and the economics of climate change

In a seminal contribution to climate ethics, Dale Jamieson (1992: 144–146) writes that since climate impacts are so broad, diverse, and uncertain, "conventional economic analysis is practically useless", and "[t]he tools of economic evaluation are not up to the task". This is due, in large part, to the influence of cost-benefit analyses (CBA) on the economics of climate change. Stephen Gardiner (2004: 571) stresses that influential CBA undertaken by statistician Bjørn Lomborg and economist William Nordhaus are indeed "extremely controversial", especially as they set sharp limits on intergenerational concerns by underestimating the costs imposed on

future people by climate change. The social discount rates used to calculate future costs (4%–6% for Lomborg, 3%–6% for Nordhaus) make even the most catastrophic costs disappear after a few decades in economic models, which has serious consequences from an intergenerational ethics perspective. Likewise, many costs to nonhumans and all noneconomic costs to humans cannot be integrated into economic models, leading to a massive underestimation of the human and ecological damage of climate change.[2]

In its initial stages, in the 1990s and early 2000s, climate ethics therefore mainly developed as a critical reaction to economic analyses of climate change, leading to a clash between the two disciplines. The first generation of climate ethicists, led by Jamieson and Gardiner, stood largely in opposition to the first generation of climate change economists, led by Nordhaus. However, with the rise of the second wave of debates between philosophers and economists working on climate change since the end of the 2000s, things have evolved in both fields, and more interdisciplinary approaches have emerged. There are two main reasons for this.

First, more and more economists are questioning the relevance of CBA of climate change; they have also started to address normative issues, such as questions of intergenerational ethics. Simon Dietz et al. (2018: 456) explain, "CBA of climate change requires a series of methodological choices to be made, some of which have an ethical or otherwise philosophical character, where economics can provide limited guidance." More generally, Simon Dietz, Cameron Hepburn, and Nicholas Stern (2008: 366) highlight, "by its very nature climate change demands that a number of ethical perspectives be considered, of which standard welfare economics is just one." Second, philosophers have also made efforts to integrate the results of economic analyses into their research. Jamieson (2014: 143, 37) is more nuanced today and believes that although "economic analysis of climate change rests on normative assumptions that it does not have the resources to justify", the "economic model, thinking, and considerations are important and helpful".

Interdisciplinary projects are a good indication of the mutually enriching discussions on climate policies taking place today between philosophers and economists. Simon Caney and Cameron Hepburn (2011) have jointly published a paper on the ethical dimensions of market mechanisms in response to normative and empirical objections to carbon markets. More recently, Ravi Kanbur and Henry Shue (2019: 2, 14) have edited a volume integrating economics and philosophy in order to strengthen the "overlap and mutual enforcement between the economic and philosophical discourses on climate justice" and to call for more "interplay and interaction" between the two disciplines. According to them, "a major issue on which a joint effort by economists and philosophers is necessary and possible [is] the sustainability of the Paris Agreement" (Kanbur and Shue 2019: 14).

Just mitigation policies

The Paris Agreement

The Paris Agreement was adopted in 2015 at COP21 and came into force in 2016. It is the most recent – and perhaps, the major – outcome of the international climate regime. It is a long-term framework agreement, with a periodic review of what has been promised and realized, which has moved from the top-down approach of the Kyoto Protocol to a bottom-up architecture in which countries propose voluntary mitigation targets. The idea of this pledge-and-review approach is no longer to set absolute targets in a legally binding international treaty; it is to let each state decide the content of its nationally determined contribution (NDC) in an agreement based on the promises of the different countries. The Paris Agreement has the legal status of an international treaty, which implies that it creates legal obligations for all countries

that have ratified it; however, many parts of this agreement are not binding, such as the level of ambition of NDCs or respecting their content (Bodansky 2016).

This evolving structure can be explained by the fact that the geopolitics of climate change can be conceived as a geopolitics of energy led by a trio of fossil fuel providers and consumers that renders any ambitious and binding international mitigation policy difficult: China, which owns the world's largest reserves of coal and consumes nearly half of world production on its own; Russia, which uses gas for half of its primary energy and exports it massively; and the US, the largest consumer of oil in the world and a major producer of shale gas (Aykut and Dahan 2015: 430–433). To complete the picture, one should add the alliance between the major oil-exporting countries, the Gulf Cooperation Council (GCC), headed by Saudi Arabia, which, together with the US Congress, has played a decisive role in constantly slowing or blocking progress in international cooperation. This geopolitical balance of power helps us understand why the goal of climate negotiations is not so much a legally binding climate treaty as an agreement made up of voluntary national contributions.[3]

At the same time, international negotiations are necessary to face the global collective action problem of climate change. Cooperation between states is needed to mitigate global emissions, to help vulnerable countries adapt to climate impacts, and, if possible, to compensate for harm resulting from climate impacts. Only international negotiations can bring together representatives of the world's countries around a process mutually accepted by all in order to face a problem that concerns humanity as a whole.

Distributing the costs of mitigation

Ethical considerations, especially in terms of justice or fairness, can have a real and observable influence on climate negotiations. They play a crucial role in the creation, maintenance, and evolution of influential international norms. While other factors such as economic and political interests also matter, the role of ethics in the formation, alteration, and application of norms should not be underestimated (Pickering 2010).

Climate justice is a field of normative political theory composed of two related major branches: burden-sharing justice, which focuses mainly on the allocation of the costs of climate policies (mitigation, adaptation, compensation), and harm-avoidance justice, which aims at ensuring that the most vulnerable to climate impacts are protected (both by maintaining global warming below a certain threshold and by helping them adapt to unavoidable climate impacts) and that climate policies do not result in further harming the global poor.[4] The justification and institutionalization of principles of justice play a major role in this field, from both the distributive perspective (the polluter pays, ability to pay, and beneficiary-pays principles) and the harm-avoidance perspective (the harm principle).

While climate justice scholars have developed their own theories (for instance, cosmopolitan, utilitarian, or Rawlsian), it is interesting to note that considerations of justice are raised both by climate scientists, as we saw earlier with the IPCC, and by climate negotiators and other policymakers. Climate change has been framed as a problem of distributive justice since the start of international climate negotiations, about three decades ago. The parties to the UNFCCC have indeed agreed that their core objective would be to "protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities" (UNFCCC 1992: art. 3.1). This norm of common but differentiated responsibilities and respective capabilities (CBDR-RC) plays a major role in all the main outcomes of climate negotiations, including in the Paris Agreement, which states that NDCs should be set according to this principle (UNFCCC 2015: art. 4.3).

The interpretation of the norm of CBDR-RC has been the object of endless political and academic debates. There has been substantial philosophical debate on distributive principles of climate justice.[5] One possible way to understand this debate is to see it as an attempt to clarify the normative implications of CBDR-RC. While the polluter pays principle explains why some states are more responsible than others (because they have emitted and are still emitting the most), the ability to pay and the beneficiary pays principles explain why some are more capable than others (because they have higher financial and technological ability and because they have benefited more from past emitting activities). But how can such principles be operationalized?

Here, climate justice scholars must rely on the research of social and political scientists to explain how to measure or operationalize the abstract principles they support. This operationalization process allows clear identification of which countries are meeting the expectations of climate justice and which are not. Sivan Kartha et al. (2009) and Paul Baer (2013) have developed a highly relevant instrument to this end: the "greenhouse development rights (GDR) framework". This is a formula for global burden-sharing based on an index composed of a responsibility indicator (cumulative national emissions since 1990) and a capacity indicator (per capita annual income above a development threshold of $8,500). This responsibility–capacity index determines the percentage of total global obligation for each country by giving each indicator the same weight: in 2010, the US held 29.4% of global obligation, the EU 26%, Japan 7.6%, Russia 5.8%, China 5.1%, Brazil 2.8%, and India and South Africa 0.9% each. In total, high-income countries held 73.7% of global obligation and LDCs 0.3%, with the remaining 26% being held by new emitting countries, such as BASIC countries (Brazil, South Africa, India, and China).[6]

Recognizing that their choice of indicators is debatable according to the different countries' interpretation of responsibility and capacity, some authors of the GDR have developed a second index, the "climate equity reference framework" (CERF), which proposes a "climate equity reference calculator" to assign each country and region its fair share of mitigation efforts (Holz, Kartha, and Athanasiou 2018). In contrast to the GDR, the CERF includes an "equity range" or an "equity band" that allows more or less demanding effort-sharing parameters to be chosen, giving countries enough flexibility to calculate their level of global obligation.[7] Among high-capacity and high-responsibility countries, such as the US, EU members, and Japan, "NDCs fall far short of the fair-share contributions as bounded by the equity band" (Holz, Kartha, and Athanasiou 2018: 127). This means, whatever the choice of parameters, these countries fail to assume their global responsibilities. The US pledged only 16%–24% of its fair-share contributions, the EU 21%–23%, and Japan about 10%. In addition, fair shares of the global effort to mitigate emissions are higher than plausible domestic reductions in these countries. This means that, to fulfill their mitigation efforts, they must contribute, through climate finance, to mitigation opportunities in other countries where mitigation potential exceeds domestic obligations.[8]

The major (and perhaps unsurprising) finding is that, if we take the norm of CBDR-RC seriously, most developed countries' pledges are largely insufficient so far and, therefore, unfair. This remains true even if we choose undemanding indicators of responsibility and capacity. Hence, more ambitious climate policies are urgently needed. But how can fairer mitigation policies be reached?

A just energy transition

Reinforcing the pledge-and-review approach that has dominated climate negotiations for a decade with a price-signal approach is a promising way forward. The logic of promises and verifications currently guiding international negotiations is both insufficient (because most NDCs are

currently unfair) and ineffective (because global GHG emissions keep rising). To remedy these two major weaknesses, a price-signal approach could be integrated into the climate regime in order to incentivize producers and consumers to reduce their emissions. This might contribute to closing the gap between current emission levels and a trajectory that would avoid dangerous anthropogenic interference with the climate system.

The goal of the Paris Agreement is to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels" and to pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels" (UNFCCC 2015: art. 2.1). Even if all countries were to fulfil their current NDCs, temperature increases would still reach (at least[9]) between 2.6°C and 3.1°C by 2100 (Rogelj et al. 2016). To give NDCs the necessary boost they need to keep global warming "well below 2°C", new promises by high-emitting countries are not enough: if no problem of collective action has so far been solved by the voluntary actions of different countries, a problem as profoundly global and intergenerational as climate change will probably not be an exception (Stiglitz 2015). A new framework to guide mitigation policies is therefore needed. A carbon pricing regime, which aims to attribute a price rationale to countries' pledges, can help facilitate the transition from intentions to action and put an end to the waiting game of high-emitting countries (Gollier and Tirole 2015). In other words, "[t]he current weaknesses of the existing climate negotiation framework could be remedied in large part by introducing into climate negotiations the goal to develop a robust carbon pricing system" (Laurent 2020b: 105).

To meet the demands of climate justice, a carbon pricing regime has to integrate both burden-sharing considerations (how can GHG emissions be fairly priced?) and harm-avoidance considerations (how can the regressive effects of carbon price policies be avoided?). I propose here a roadmap for a just energy transition in four main steps.[10]

The first step is to rapidly and radically reduce government subsidies for fossil fuels. Global subsidies for fossil fuels reached the mind-boggling amount of $4.9 trillion in 2013 and $5.3 trillion in 2015 (6.5% of global GDP for both years) (Coady et al. 2017). The first reason why these subsidies must be reduced directly and rapidly is that they are stimulating the overexploitation of the energy sources at the root of the climate problem and air pollution. Eliminating such subsidies would have reduced global emissions by 21% and fossil fuel air pollution deaths by 55% in 2013 (Coady et al. 2017). The second reason is that such subsidies make carbon pricing meaningless: putting a price on carbon emissions while massively subsidizing fossil fuels would be contradictory.

This leads to the second step: putting an increasing price on GHG emissions. This would allow coordination between the parties to the UNFCCC's efforts to achieve their mitigation targets and gradually increase their ambition to reduce the gap between NDCs and the objective of the Paris Agreement. Implementing a price signal is precisely the objective of cap-and-trade systems and the carbon tax. These two market mechanisms provide an incentive to reduce emissions by including the cost of environmental externalities in the cost of energy use. Raising the price of energy-intensive products and services encourages producers and consumers to change their behavior and to use low-emitting sources of energy.

Although the two instruments have the same objective and very similar effects, they differ in how they operate. Cap-and-trade systems primarily concern large industries, such as electricity, aluminum, and steel production, and ensure, through their cap, that a specific emission reduction target is achieved. The tax can cover emissions from other sectors, such as housing, transport, and agriculture, but does not guarantee a specific mitigation goal. What is important is that these two mechanisms are largely complementary (Criqui, Faraco, and Grandjean 2009: 179). For emissions from large industrial companies, it is desirable to maintain and develop

carbon markets with strengthened rules governing them; for diffuse emissions not covered by these markets, carbon taxes allow all households and companies not subject to the carbon market to adjust to an increasing carbon price. It is therefore preferable to set up a system where the two instruments coexist in hybrid schemes (Hepburn 2009).

Since the carbon price should be set according to the principle of CBDR-RC, it is not identical for all countries. The idea is to define a price trajectory according to the share of global responsibility of different countries as set by the CERF's equity calculator, not a single, global price. Many carbon pricing policies are already implemented, with a total of 57 initiatives in 2019. However, only 20% of global GHG emissions are currently covered by a carbon price policy and less than 5% are priced at a level consistent with reaching the goal of the Paris Agreement (WB 2019). The triple objective of complementing the current pledge-and-review approach with a price-signal approach is (1) to allow coordination between existing carbon pricing policies, (2) to extend them to countries that are not yet participating, and (3) to set carbon prices that are consistent with the goal of keeping global warming well below 2°C.

The amount levied on GHG emissions by the tax and the auctioning of emission rights is recovered by public authorities, which creates significant revenue. The existing incentive structure can only be effectively transformed if alternative energy sources are available and affordable for individuals and companies that decide to change their source of energy due to the rising price of oil, coal, and gas. States can play a decisive role by investing massively in the research, development, and deployment of renewable energies such as solar, hydro, and wind power. This is the third major step. This investment can be mainly funded by the money raised through tax and auctioning of emission rights, but also by subsidies that are no longer invested in fossil fuels. If the $5.3 trillion per year currently used to subsidize fossil energy were invested instead in renewable energies, a rapid energy transition would become possible.

According to the IPCC (2011: 20), renewable energies could cover up to 43% of global energy demand by 2030 and up to 77% by 2050, provided the right policy decisions are taken. Wind, water, and sun could cover 80% of energy demand by 2030 and 100% of this demand by 2050 in 139 countries (Jacobson et al. 2017). Subsidizing the transition from fossil fuels to renewables would also lead to significant co-benefits, such as the creation of 24.3 million net long-term, full-time jobs, the avoidance of millions of annual air pollution deaths, and increased worldwide access to energy (Jacobson et al. 2017).

As the IPCC stresses, however, "some potential impacts of mitigation actions" can also "fall disproportionately on the poor and vulnerable" (Allen et al. 2018: 51). Carbon markets and carbon taxes can have a regressive effect: any increase in the cost of fossil fuels affects low-income individuals and households, who spend a larger proportion of their budget on energy expenditure. Since livelihood and health depend largely on access to affordable energy sources, the energy transition could contribute to maintaining and even worsening energy poverty, thereby widening environmental inequalities.

To avoid this potential clash between climate justice and social justice, compensatory measures ought to be implemented as a fourth step. For instance, governments could set incentives to improve energy efficiency in poor households: low-energy infrastructures would cost them less, and large savings on their energy budgets would be possible due to their very low level of consumption. Similarly, public transportation would need to get more subsidies to extend networks, improve efficiency, and reduce prices (or make it free), since increasing the cost of hydrocarbons has a significant impact on the travel of the working and middle classes. Another mechanism would be to redistribute part of the revenue collected through abolishing fossil fuel subsidies and through the carbon market and tax in the form of an energy dividend to offset the increased cost of energy.[11]

What about countries where such measures cannot be implemented? As part of their responsibility to mitigate global emissions, developed countries should help developing countries secure access to low-emitting sources of energy. States like Bangladesh, India, and many African countries all have very favorable geographical provisions for the deployment of alternative energy sources, especially solar energy. If these countries were to succeed in exploiting this gigantic source of energy, through both clean technology transfer and climate finance, the challenge would be largely met.

The renewable energy market is now a profitable option for multiple investors and industrialists.[12] In many parts of the world, wind and solar energy are now competitive with fossil fuels in terms of cost. These market opportunities show that the costs of the energy transition are declining, while the direct benefits associated with reducing GHG emissions are becoming more apparent (Moellendorf 2015: 83). The collective structure of the climate problem, according to which it is collectively rational for states, corporations, and individuals to cooperate to reduce global emissions but individually irrational to do so, is therefore partially eroding. This gives us reason to hope that dangerous climate change can still be avoided without jeopardizing the fight against global poverty.

Just adaptation policies

The adaptation finance gap

The design of adaptation policies would also benefit from the overlap between philosophy and political economy. Adaptation is today at the top of the UNFCCC's agenda because of the visible increase in climate-related disasters such as droughts, floods, heat waves, and hurricanes and because of the rising awareness that current and future mitigation measures will not be sufficient to avoid dangerous climate impacts (Ciplet, Roberts, and Khan 2013: 52).

Developed countries have committed to help developing countries mitigate and adapt through monetary transfers and technical assistance. By providing "fast-start" finance pledges approaching $30 billion between 2010 and 2012 and "medium-term" finance pledges scaling up to $100 billion a year by 2020, the 2009 Copenhagen COP generated strong political momentum in climate finance (UNFCCC 2009: para. 8). The Paris Agreement adds that parties to the UNFCCC "shall set a new collective quantified goal from a floor of USD 100 billion per year, taking into account the needs and priorities of developing countries" (UNFCCC 2015: para. 54), meaning that the parties have to agree on a more ambitious goal before 2025.

The major problem is that there is insufficient funding for the number of adaptation projects. There is a persistent and growing "adaptation finance gap" between funds needed and those promised and delivered, for two main reasons. First, pledged amounts of climate finance are much lower than estimates of adaptation costs in developing countries. The costs of adaptation in developing countries could reach up to $300 billion a year by 2030, and between $500 billion and $1 trillion a year by 2050, even if global temperatures remain below 2°C (Puig et al. 2016: 6; Oxfam 2018: 6). Although this wide range of estimates shows that there are significant uncertainties involved in putting a precise cost on adaptation, it is fairly certain that tens and probably hundreds of billions of dollars will be needed every year to deal with climate impacts in the coming decades (Betzold and Weiler 2018: 8–9). Second, OECD countries have not respected their financial commitments, having for instance only provided about $2.35 billion in 2012 for genuine adaptation projects, even though they claimed that $10.1 billion was adaptation-related (Weikmans et al. 2017: 466).

It is therefore not surprising that, just as in the case of mitigation policies, adaptation finance policies so far have proved insufficient and mostly unfair. In a recent evaluation of climate finance through a climate justice lens, Mizan Khan et al. (2020: 265) conclude, "Ambiguity in key areas of climate finance governance related to distributive, procedural, recognition, and compensatory forms of justice still plague the UNFCCC regime." From a climate justice perspective, adaptation finance is a redistribution of wealth premised on, or at least partially justified by, prior or ongoing injustices that ought to be compensated (Duus-Otterström 2016: 659; Baatz 2018: 74). Developed countries have a duty of compensatory justice to contribute their fair share to adaptation efforts in developing countries, based on the principle of CBDR-RC. The persistent and growing adaptation finance gap shows that existing efforts should be substantially scaled up to match the demands of climate justice.

Sharing the costs of adaptation equitably

The adaptation finance gap implies that funding for adaptation projects is scarce. To ensure that funding is allocated to those who need it the most, prioritization criteria are necessary. Following the categories of recipient need, recipient merit, and donor interest influential in the development aid literature, Weiler, Klöck, and Dornan (2018) found that physical vulnerability, good governance, and economic interests were major prioritization criteria in the distribution of bilateral adaptation finance between 2010 and 2015.

Vulnerability is the most-discussed criterion in prioritizing the allocation of adaptation finance, in both academic and political circles. Scholars agree that adaptation finance ought to benefit those who are most vulnerable to climate change (Ciplet, Roberts, and Khan 2013: 60), and all major UNFCCC agreements reflect this consensus (Klein and Möhner 2011: 16–17). The current allocation of adaptation finance seems to take into account this crucial criterion, but three issues need to be stressed.

First, many studies on the distribution of adaptation finance do not find that the most vulnerable countries have received adequate amounts of money (Khan et al. 2020). And even if the countries that are physically vulnerable to climate change, that is, more exposed and sensitive to climate risks, did receive more adaptation money, this would still disregard crucial vulnerability factors. Vulnerability is also influenced by social factors, such as levels of inequality, marginalization, and social injustice, which determine people's adaptive capacity (IPCC 2014: 21), and by political factors, such as government effectiveness, levels of democracy, and levels of corruption (Mikulewicz 2018). An allocation of adaptation finance based on physical vulnerability may therefore not prioritize the most vulnerable, all things considered.

Second, despite broad agreement in scientific literature and political discussions that adaptation finance is owed as a priority to those who are the most vulnerable to climate change, Jonathan Pickering (2012: 5) stresses that this agreement "masks two important areas of disagreement, namely how vulnerability should be conceived and measured, and whether (and which) other principles could also inform prioritization".

We therefore come back here to the crucial question of the operationalization of principles of distributive justice. How should vulnerability be measured? Several studies have developed complex aggregate global vulnerability indices. For example, the World Risk Index (UNU-EHS 2019) uses several indicators for each of the main factor of physical and social vulnerability: exposure, susceptibility, coping capacities, and adaptive capacities. There are, however, major problems with aggregate indices of global vulnerability: the rankings of countries diverge greatly between different indices (Mathy and Blanchard 2016: 757), there is no agreed way to compare countries' vulnerability (Klein and Möhner 2011: 16), and "all attempts to allocate adaptation

funding based on aggregate national-level indices of vulnerability to climate change have been deeply unsatisfying" (Füssel, Hallegatte, and Reder 2012: 323). Data aggregation requires many empirical and normative assumptions, some of which are controversial. As long as no agreed methodology exists, aggregating many heterodox factors that influence vulnerability into a single number will "not reveal more but rather disguise[s] what is known" (Hinkel 2011: 205).

This raises the other question mentioned by Pickering: which additional criteria should then inform prioritization? This points toward a multi-criteria approach to fairly allocate adaptation finance, and to the third issue related to the current allocation of adaptation finance: trade-offs might arise between different criteria.

Avoiding trade-offs

Among the three prioritization criteria mentioned earlier, a possible trade-off could arise between vulnerability and good governance. Many vulnerable people in LDCs and SIDS are governed by authoritarian, rights-violating regimes. If "better governed" countries receive higher amounts of adaptation finance, then vulnerable individuals who live in "poorly governed" countries, and who greatly need adaptation assistance, receive less or no funding. This trade-off seems already to be happening to some extent in the current practice of bilateral adaptation finance:

> Donors seem concerned with aid effectiveness and tend to give more adaptation aid to better governed countries which are (seen as) better able to use resources in an efficient and effective manner, even if these countries are also better able to cope with climate change and hence are less vulnerable.
>
> (Betzold and Weiler 2018: 166)

This trade-off between vulnerability and good governance raises the following question: how can we increase the likelihood of highly vulnerable individuals who live in poorly governed states and who ought to be protected benefiting from adaptation finance?

Göran Duus-Otterström (2016: 668) rightly points out,

> vulnerable individuals should not be penalized for living under nondemocratic and ill-functioning governments, and so if poor domestic institutions stand in the way of their protection, it would seem that the right conclusion is not to withhold finance, but to try to sidestep the national government in various ways.

But how can this be done? A relevant option would be to help populations living in authoritarian regimes to claim their basic social and political rights by helping them gain control over the design and implementation of adaptation projects supported by climate finance. There are different and complementary ways to achieve this goal, for instance by supporting local, regional, or national resistance in authoritarian regimes from the outside (Caney 2015) or by implementing new trade policies that reduce corruption in authoritarian states with rich natural resources (Wenar 2016).

A third measure would be to reduce corruption by supporting ongoing democratization processes in vulnerable societies. This would directly address the political factors of vulnerability. Democratization processes can play a key role in reducing high levels of corruption and reducing vulnerability by limiting the misappropriation of adaptation finance. There is a consensus in the adaptation literature that local adaptation governance should be democratized

in order to prioritize the predicament of the poor and the marginalized (Mikulewicz 2018: 26). Thus, to avoid the trade-off between vulnerability and good governance, adaptation finance should, in part, support the development of democratic institutions in authoritarian countries with populations highly vulnerable to climate change.

Democratizing the local decision-making process within vulnerable countries with high levels of corruption would achieve a more equal distribution of power within the community, and therefore a more equitable use of adaptation finance. From this perspective, the good governance criterion and the vulnerability criterion support each other: democratization is a basis for tackling the political nature of vulnerability. One possible way to support democratization processes in poorly governed countries is to help civil society with financial support to local NGOs dealing with climate impacts in their community.

In many SIDS, for instance, NGOs provide key community-level development and adaptation services but are often heavily underfunded: "Frequently, the few paid staff in an organization end up spending most of their time chasing grants just to keep a handful of core staff on the payroll and end up with little time for program work" (Johnson 2015: 68). In the context of the Marshall Islands, Giff Johnson (2015: 69) suggests implementing specific funding for core NGO staff that would ensure existing NGOs can provide their community services and won't spend most of their time looking for new grants or simply disappear. Silja Klepp comes to a similar conclusion in the case of Kiribati (Klepp 2013: 316; Klepp and Chavez-Rodriguez 2018: 3–4). In this context, joint efforts by civil society and government officials have led to remittances from migration programs and increased financial support for adaptation projects, but most of the available resources are used for external consultants who are not familiar with the context and the needs of the population, and local knowledge and circumstances are often neglected in the implementation of adaptation projects. These examples show the need for more financial support to civil society, especially NGOs employing or working closely with the local population, to ensure that vulnerable people living in poorly governed countries get the financial assistance they are entitled to and take part in the design and implementation of adaptation projects whose *raison d'être* is to protect them.

How do we measure the progresses made by vulnerable countries in their democratization process and how do we avoid similar problems to those mentioned previously regarding the operationalization of the vulnerability criterion? The Varieties of Democracy (V-Dem) Indicators seem to represent a promising reply to this question (Lührmann, Mechkova, et al. 2018; Lührmann, Dahlum, et al. 2018). On the one hand, the V-Dem project allows to measure key core elements of democracy by relying on 450 indicators and indices, such as the egalitarian principle (via the V-Dem Egalitarian Component Index) and the participatory principle (via the V-Dem Participatory Component Index). On the other hand, strong correlations within and between indices show that there are good grounds for the robustness of the data. While notions such as equality and participation are not easy to measure, they are less heterogeneous than the ones of physical, social, and political vulnerability. The point here is not to turn indices measuring democracy into a distributive formula but rather to consider the information they provide in decision-making regarding the distribution of adaptation finance, together with the information provided by other criteria, such as vulnerability, effectiveness, and sustainability.[13]

Conclusion

There are two main topics on which political economy and philosophy overlap in discourses on climate change: first, in discussions on principles of distributive justice, such as the norm of CBDR-RC in mitigation policies and the criteria of vulnerability and good governance in

adaptation policies. While philosophers are more focused on justifying the responsibility and capacity of countries based on the polluter pays, ability to pay, and beneficiary pays principles, political economists have developed useful indices to operationalize these principles and compare the different levels of responsibility and capacity between regions and countries. Both tasks are essential and complementary, and fulfilling them together could lead to an "ex datis philosophy", a philosophy that strongly draws on empirical data.

Second, the two disciplines also complement each other on the crucial task of finding institutional reforms to make the international climate regime more just and more effective. They can both provide crucial resources to reduce the mitigation gap and the adaptation finance gap. Climate justice, as an interdisciplinary field, is interested in both identifying climate injustices and finding ways to reduce such injustices. The institutional reforms explored earlier, complementing the pledge-and-review approach with a price-signal approach and supporting democratization processes in poorly governed vulnerable countries, raise both empirical and normative challenges. These challenges sketch an agenda for future interdisciplinary research on climate change from a climate justice perspective.[14]

Notes

1 On the related subfield of loss and damage ethics, see Wallimann-Helmer et al. (2019).
2 The influence of CBA in the economics of climate change is clearly illustrated by William Nordhaus being awarded the Nobel Prize in Economic Sciences in 2018 for his integrated assessment models (IAMs), which rely extensively on CBA. According to his "dynamic integrated climate-economy" (DICE) model, an optimal climate policy would result in global warming of about 3.5°C by 2100 (Nordhaus 2018: 348). Ironically, the Nobel announcement was made on the same day as the release of the IPCC report emphasizing the crucial importance of keeping global warming below 1.5°C (IPCC 2018). For critical reactions by political economists to the attribution of this prize to Nordhaus, see Gareth (2018) and Laurent (2020b: 133–134). For a recent criticism of Nordhaus's approach, which integrates both effectiveness and equity concerns, see Boyce (2018).
3 The failure of the 2009 Copenhagen Summit to produce a long-expected new climate treaty to replace the Kyoto Protocol also played an important role in this evolution of the architecture of the international climate regime. The Cancun Agreements, which incorporated most of the outcome of the Copenhagen conference, achieved almost unanimity in 2010. The new bottom-up structure was then solidified at successive meetings in Durban, Doha, Warsaw, and, finally, Lima, where the common framework and guidelines for the 2015 negotiations were set by the "Lima Call to Action". For more details on the Paris Agreement from a climate justice perspective, see Bourban (2017) and Light (2017).
4 This is an adaptation of a distinction first introduced by Caney (2014).
5 For the major contributions to burden-sharing climate justice, see Caney (2010), Page (2011), and Shue (2015).
6 For alternative indices combining other indicators and leading (in general) to complementary results, see Dellink et al. (2009), Müller, Höhne, and Ellermann (2009), and Laurent (2020b: 106–10). For instance, in his model of fair allocation of the carbon budget, Éloi Laurent proposes to rely on per capita emissions rather than national emissions and to include levels of human development (according to the Human Development Index) and projected population increase. His index is complementary to the GDR framework in the sense that he also finds high-income countries, especially the US, Canada, Germany, and Japan, as the most responsible for bearing the burden of mitigation policies.
7 For a politically feasible proposal to include the CERF equity calculator into the climate regime, see Bourban (forthcoming).
8 Here again, other indices lead to similar results. For instance, Laurent (2020b: 108) finds that the US, Canada, Germany, and Japan owe respectively 17, 9, 2, and 1 billion(s) of tons of CO_2 to other countries, a "negative carbon budget" they have to pay "by investing in carbon sinks or by transferring technology and/or financing to accelerate emission reductions in carbon positive carbon budget countries".
9 "At least", because if we take into account possible tipping points in the climate system, crossing the planetary threshold of 2°C could lead the entire earth system into a "hothouse earth" pathway, even if

GHG emissions are subsequently reduced (Steffen et al. 2018). In this scenario of cascade of positive feedbacks, global temperature would raise much higher than 3.1°C.

10 I draw here on Bourban (2018: 283–295). Note that the idea of a "just transition" was promoted in the early 1990s by US labor leader Tony Mazzocchi to resolve the conflict between jobs and the environment. It has found an important echo recently, in both the academic and the political world, as part of the "Green New Deal" promoted by the UN-DESA (2009), and then supported in early 2019 by politician and activist Alexandria Ocasio-Cortez (as well as economists Joseph Stiglitz and Paul Krugman), and then by the European Commission at the end of 2019. For a critical examination of the concepts framing the "European Green Deal", including the one of "just transition", see Laurent (2020a); for a development of normative considerations of the original UN-DESA strategy, see Shue (2013).

11 For instance, British Columbia has designed a highly progressive carbon tax in which about 40% of revenue is reimbursed to households through income tax cuts and lump-sum payments (Beck et al. 2015).

12 Global investment in renewable energy capacity reached $272.9 billion in 2018, which was the fifth successive year in which renewables capacity investment exceeded $250 billion. From 2010 to 2019, a total of $2.6 trillion was invested in renewable capacity (UNEP 2019).

13 For more information on the democracy criterion and its relationship with other prioritization criteria, see Baatz and Bourban (2019).

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