Climate Change and Society: Approaches and Responses 🆓

Abstract and Keywords

Climate change presents perhaps the most profound challenge ever to have confronted human social, political, and economic systems. The stakes are massive, the risks and uncertainties severe, the economics controversial, the science besieged, the politics bitter and complicated, the psychology puzzling, the impacts devastating, the interactions with other environmental and non-environmental issues running in many directions. This article summarizes the entire work which brings together a representation of the best scholars on climate change and society. It introduces the key topics, themes, layers, and issues related to climate change. It concludes with a discussion of the structure of the book. It begins with the science that first identified climate change as a problem, and how it is received by and in society and government.

Keywords: climate change, environmental issues, non-environmental issues, human system, climate justice

CLIMATE change presents perhaps the most profound challenge ever to have confronted human social, political, and economic systems. The stakes are massive, the risks and uncertainties severe, the economics controversial, the science besieged, the politics bitter and complicated, the psychology puzzling, the impacts devastating, the interactions with other environmental and non-environmental issues running in many directions. The social problem-solving mechanisms we currently possess were not designed, and have not evolved, to cope with anything like an interlinked set of problems of this severity, scale, and complexity. There are no precedents. So far, we have failed to address the challenge adequately. Problems will continue to manifest themselves—both as we try to prevent and as we try to adapt to the consequences of climate change—so human systems will have to learn how better to respond. One of the central social, political, and economic questions of the century is: how then do we act?

In this Handbook we have brought together a representation of the best scholars on climate change and society. We identified the key approaches and selected authors to represent and engage with their literatures in a manner that would be informative and inter-

esting to scholars in other areas and to newcomers as well. We have encouraged authors to make linkages between approaches and to other chapters. We hope the Handbook will contribute to the integration of understanding needed to tackle so systemic and complex a problem as the relationship between climate change and society. At the same time, the Handbook is by no means a synthesis, nor does it provide a unified diagnosis of what is wrong (and right) with contemporary human systems, an integrated and coherent program for research, or a singular blueprint for collective action. While we have views of our own on such questions, some of which will come through in this introductory chapter, there is no unified line followed by our authors as they address the complex relationship between people, societies, and the natural world. Most (not all) agree on the magnitude and (p. 4) severity of the problems. But there are substantial differences when it comes to identifying what matters, what is wrong, what is right, how it got to be that way, who is responsible, and, not least, what should be done.

Commissioning, reading, and editing these contributions has left us acutely aware of the limitations of human knowledge—and the major constraints on intelligent human action—when it comes to complex social-ecological systems. Climate change is, as Steffen explains in his opening chapter, a truly diabolical problem. It is additionally devilish in the mismatch between human capacities to act and the scale, scope, and immediacy of collective action seemingly demanded. Nevertheless we have to start somewhere, and we have aspired in this Handbook to commission and compile the best available set of intellectual resources for the multiple tasks ahead. Given the complexity of what we face, no single volume can offer commentary on absolutely everything that is needed. Yet we have aspired to a measure of comprehensiveness in addressing the range of ways climate change plays out in the social realm.

Our main task is, then, to lay out the various ways that climate change affects society, and what society might do in response. The authors represent a variety of disciplinary understandings and intellectual frameworks that can be brought to bear. In this chapter we introduce the key topics, themes, layers, and issues, before concluding with a discussion of our chosen structure. We begin with the science that first identified climate change as a problem, and how it is received by and in society and government.

1 Science and Society

While the effects of climate change—floods, drought, heat stress, species loss, and ecological change—can be experienced very directly, their conceptualization as connected phenomena with common causes is due to climate science, which therefore plays a very basic part when it comes to climate change and society. Natural scientists (such as Steffen in his chapter) tell us that there is now consensus in the climate science community about the reality of climate change, and near consensus on its severity and the broad range of attendant harms and risks. But that consensus does not of course mean the science is then accepted as the basis for policy. Climate science does not provide certain future projections of risks and damages. The projections are entangled in assumptions

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about how human systems respond over time—as well as natural ones. Climate is an outcome of a complex geo-atmospheric-ecological system, and complex systems always have a capacity to surprise by behaving in unanticipated ways. Climate change, furthermore, is only one of a range of interacting phenomena of global environmental change caused or affected by human activity. We may indeed be entering the unknown territory of an 'anthropocene' era where people drive truly major changes in global systems. Thus while the broad sweep of history shows climate change being taken ever more seriously as an issue within the scientific community and eventually far beyond (see Weart's chapter), we are dealing with complex processes with uncertain outcomes rather than simple facts, and the public and politicians have difficulty seeing the drivers to collective action in any simple way. The agendas of climate science are now affected by larger social and political processes (see the (p. 5) chapter by von Storch et al.). Thus scientific findings and their action implications must seek validation not just within the scientific community itself, but also within the larger society, and different political systems have different means for validation (see Jasanoff's chapter).

But even getting to the point of taking science seriously can be difficult. The Intergovernmental Panel on Climate Change (IPCC) famously uses language seeped in uncertainty to qualify its predictions (likely, very likely, virtually certain, etc.), and there are a few dissenting scientists who claim there is little evidence of major and imminent climate change. As Dunlap and McCright discuss in their chapter, a thoroughly organized campaign has successfully used such scientific uncertainty to create political uncertainty, with those who fund the case against the reality of climate change having a massive stake in the fossil fuel economy. Skepticism is in some countries joined to a right-wing ideology such that, because climate change requires coordinated collective action of the kind that is anathema in this ideology, climate change should not exist. More insidiously, skepticism may also give the impression that it is empowering ordinary people to be able to question the assertions of a scientific elite. Any lapses in the practice and content of this science (of the sort alleged but unproven in the stolen e-mails from the University of East Anglia in 2009, and the admission of a mistaken claim about the rate of melting of Himalayan glaciers in an IPCC report) are seized upon by these ideologists to discredit climate science in its totality. The media, looking for 'balance' amid controversy, gives as much airtime to skeptics as it does to climate scientists and others who point to the reality and scale of change (Boykoff and Boykoff 2004). Science moves to the center of political controversy, and scientists respond in varied ways (Schneider 2009).

Unsurprisingly, scientists feel harassed by the attacks of organized skeptics and denialists. To the extent scientists respond with further insistence on the consensus within the scientific community about the veracity of their claims, the more they play into their critics' hands. The net result is that science enters a spiral of politicization. Scientists themselves in many cases cannot avoid becoming political actors, as they fight for the credibility of what they do in the larger public arena. Not surprisingly, they can and do make many false steps in this arena, and much can be done to improve the communication of science to the public (see Moser and Dilling in this volume). They are also faced with the quandary over whether to admit to uncertainties in the range of their own findings—and

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so leave themselves open to critics who discredit the scientists' lack of confidence—or to claim certainty greater than that actually warranted by these findings. Admission of a degree of uncertainty is the norm among colleagues, but fodder for skeptics. One thing we do know is that simply insisting on the rightful authority of science as the guide to action has failed. But the natural sciences are not the only politicized disciplines.

2 From Science to Economics

What do scientific findings mean in human terms? An answer is given by economics, which can attach cost estimates to the current impacts and projections of future impacts of climate change. One such set of estimates is provided in the chapter by Mendelsohn, who comes up (p. 6) with relatively low estimates, with costs concentrated among the rural poor in developing countries. Economists such as Nicholas Stern in his famous 2006 report to the government of the United Kingdom come up with much higher estimates. A lot turns on seemingly technical factors such as the rate of discount used to calculate a present value for future costs. Depending on the discount rate chosen, we can end up with massive differences in the size of the present value of future costs, and so radically different implications for climate policy. The choice of discount rate turns out to be a major ethical issue, not just a technical economic matter (see the chapters by Howarth and R. Norgaard). Further contestation arises once we move beyond the confines of standard economic analysis to contemplate other ethical issues (Dietz's chapter), pertaining (for example) to basic human needs, and the distribution of burdens and benefits of action and inaction across rich and poor, within and across national boundaries, as well as between generations. Sagoff argues in his chapter that the asymmetry of burdens and benefits across generations means that economic thinking should not be at the core of climate policy analysis.

Once we get past controversies over cost estimates and distributions, economics also provides a powerful set of analytics for thinking about the choice of policy instruments to achieve the desired level of mitigation (expressed in terms of targets and timetables for total greenhouse gas emissions). The consensus among economists—at least those steeped in the neoclassical paradigm that dominates the discipline—is that market-based instruments are the most efficient, and in particular emissions trading or cap-and-trade (see the chapter by Harrison et al.). Governments have begun to experiment with such schemes, established for some time in connection with non-greenhouse pollutants such as sulfur dioxide in the United States, more recently extended to greenhouse gases and CO_2 in particular, especially in the European Union (see the chapter by Jordan et al.). Emissions trading requires that some authority sets a cap on total emissions, then issues permits for quantities that add up to that cap. These permits can then be traded, such that companies for which reducing pollution is expensive can buy permits from those for which reductions are cheaper. The economic theory is very clear, but the politics and policy making is much murkier. Even before we get to monitoring and compliance, polluters with sufficient political power will demand exemptions and/or free permits for themselves. So when emissions trading schemes are proposed or introduced, it is common to

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find whole economic sectors exempted (for example, agriculture in Australia), or established dirty industries (for example, coal-burning electricity generators) favored at the expense of more efficient but less established competitors (see Spash's chapter).

These real-world politics notwithstanding, market discourse is increasingly pervasive and powerful. It informs many discussions of national policy instruments, and extends to global policy and emissions trading across national boundaries. The discourse affects the content of global governance arrangements, which can even be privatized as carbon traders seek to escape international governmental authority (see Paterson's chapter). Market logic extends too to offsets, whereby polluters can compensate for their greenhouse gas emissions by paying somebody else, for example, to plant trees that will absorb an equal quantity of emissions. What actually happens at ground level in countries where there is weak monitoring capacity is another matter entirely. Unlike conventional markets where one party of the transaction can complain, or at least never transact with the other party again, both parties in offset transactions have every incentive to give misleading information to the public on the real number of trees planted and their actual effectiveness in (p. 7) offsetting climate impacts. Again, complexity rules. But whatever their consequences for mitigation, new kinds of climate markets present many opportunities for traders to become wealthy, becoming a constituency pushing for further marketization (see Spash's chapter).

National governments are embedded in market economies that constrain what they can do, and the social realm is often limited by economistic frames and discourse. However, markets are not necessarily just a source of constraint. Markets are made up of producers and consumers who might themselves change their behavior in ways that reduce emissions. The most important producers here are large corporations. Why might they change their ways? In part, if they thought the world was moving in a low-carbon direction (whether by choice or necessity), positioning themselves to take advantage of this shift might be profitable. Of course this positioning would need to be more than the kind of rhetoric that enabled (for example) BP to market itself as 'Beyond Petroleum'—at least until an oil spill in the Gulf of Mexico in 2010 exposed a range of problems in its public relations approach (in addition to its safety practices). While there may be money to be made in producing goods for a low-greenhouse gas economy, the problem is that currently there is much more money to be made in climate-unfriendly activities. Corporate responses to the challenge of climate change have been highly variable (see Pulver's chapter), and there is little reason to suppose a significant number of corporations will play a leadership role if governments do not. The only corporations that do have a clear financial incentive to take the risks of climate change very seriously are insurance companies. This is especially true of the big reinsurance companies with potentially high exposure to damages caused by extreme weather events. The high hopes once vested in insurance companies by some analysts (Tucker 1997) on this score seem so far to have produced little in the way of comprehensive action.

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A decarbonizing economy would of course have to involve changes in patterns of consumption, whether induced by government policy and price increases, or chosen by consumers through changing mores. Such basic individual and broad cultural changes that affect consumption have been promoted by a variety of social movements, religious actors, and celebrities. Many environmental organizations focus on consumer behavior— from the individual level up to the decarbonization and transition of towns and regions— both as a source of direct change and as a clear economic and political statement. The 'green governmentality' identified by Lipschutz and McKendry in their chapter would help mold citizens of a new ecological order, whose consumption demands could look quite different from those characteristic of industrial society. However, as Szasz points out in his chapter, consumption choices are limited by the social-economic structure, which conditions the range of easy options that individual consumers have. Luke also insists we understand the dangers of such forms of such behavioral control, even if it does look green. At any rate, changing consumer habits are no substitute for coordinated collective action.

3 The Public Realm, and its Problems

In a world where the legitimacy of public policies and other collective actions rests in large measure on the democratic credentials of the processes of their production, it matters a great deal what publics think, and what actions they consequently support, or are willing to (p. 8) undertake themselves. Initially, many climate scientists, policy makers, and activists thought that the key here was simply getting publics to understand the facts by providing information (the point behind Al Gore's 2006 documentary film *An Inconvenient Truth*, for example). Yet as Moser and Dilling point out in their chapter, just providing information normally has little impact on behavior. And trying to instill fear in publics about possible impacts often turns out to be counter-productive, as people switch off. Most people get their information via the media, but as already noted there are structural features of mainstream media (the reporting only of controversy, which requires two opposing sides) that are problematic when it comes to communicating climate change. Face-to-face dialogue might work much better in terms of prompting people to think through the issues seriously; but that is extraordinarily hard to organize on any scale involving more than a handful of people. Thus there remain many failures in public cognition of the complex phenomena attending climate change (see Jamieson's chapter). Public opinion polls often show that people do care, and do want something to be done (see Nisbet's chapter); but there is no necessary urgency. In practice, many issues of more immediate concern (and which impose far fewer burdens of cognition) trump climate change when it comes to (for example) voting behavior.

Interlinked psychological, social, cultural, and political-economic processes can lead even those who in the abstract accept the need for action to in practice come to believe that they personally—or even the society in which they live—have no need to do anything that will impose any major disruptions on their own lives (see the chapter by K. Norgaard). Information, scientific or otherwise, is often processed through the lens of existing beliefs

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formulated in areas of life remote from climate science. Those beliefs can be very powerful, for better or for worse. Religious beliefs are particularly important in this respect (see Kearns's chapter). Sometimes religious beliefs line up on the side of ideological skepticism of the kind we have already noted; but sometimes these beliefs can join with the need for action (as in the 'creation care' movement among US evangelical Christians).

Publics should not however be understood as simply *mass* publics, which are problematic when it comes to mastering complex issues simply by virtue of their mass nature. A public can also be a *concerned* public organized around an issue; Nisbet in his chapter estimates the concerned 'issue public' on climate change to constitute around 15 percent of Americans—quite high in comparison to other political issues. Publics of this sort can be found at many levels: local, national, transnational, and global. They are organized in many different ways, ranging from community groups to the translocal solidarity identified by Routledge in his chapter to global networks of activists depicted by Lipschutz and McKendry in their chapter. They also demand a range of behavioral and policy changes, from a radical transition to a post-carbon lifestyle to basic democratic demands for more public participation in decision making. Concerned publics almost by definition are geared for action in the way mass publics most of the time are not. But the extent of their influence in the face of structural political forces and powerful recalcitrant actors remains highly uncertain. Publics are often vocal and visible—for example, at meetings of the Conference of the Parties (COPs) of the United Nations Framework Convention on Climate Change (UNFCCC), or at local city council meetings, but that does not mean they are decisive. And yet, in the face of the intransigence of many governments, such nongovernmental publics continue to provide ideas, energy, and pressure necessary to respond to climate change.

(p. 9) 4 Justice and Vulnerability

Increasingly, concerned publics advance a discourse of climate justice. The political philosopher John Rawls (1971) once famously proclaimed that justice should be the first virtue of social institutions. Itself disputable, that ideal remains a distant aspiration when it comes to climate change. Considerations of justice have often been marginalized in favor of economic efficiency and aggregate welfare in public policies and intergovernmental negotiations. Yet climate justice does inform policy debates and positions taken in negotiations, as well as political activism.

The debate around climate justice has revived an argument within justice theory about the adequacy of proposing principles for ideal situations of the kind Rawls himself proposed. The alternative task for theory involves addressing major pressing and concrete social and political problems, concerning human rights, poverty, and now the changing climate. Increasingly, justice frameworks are being used in the development of climate policy strategies.

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The fact is that existing vulnerabilities will be exacerbated by climate change. The costs of climate change and the unintended effects of some policy responses to it will not be evenly distributed, and we need, at the outset, some way to measure the vulnerabilities to be experienced in such an unequal way (see Polsky and Eakin's chapter). Many of the direct costs of climate change itself will, as Mendelsohn points out in his chapter, be felt by the poor in developing countries. Those costs are sufficiently severe to undermine human security in terms of rights and basic needs (see Barnett's chapter). Climate change can have many substantial direct impacts on human health, and many secondary impacts if health problems undermine the adaptive capacity of social systems (see Hanna's chapter). Many indigenous communities, already living on the margins, are particularly vulnerable (see Figueroa's chapter). Many initiatives done for the sake of global mitigation—such as biofuels and offsets—have negative impacts on the well-being of the rural poor in developing countries by taking land away from food production. These people are of course those with the least political power in global politics in general, and when it comes to climate change in particular. They may have justice on their side, but that alone will not give them an effective voice.

Environmental ethicists and climate justice theorists have examined the moral challenges that attend climate change, and what ought to be done in response. Beyond the science, the economic arguments, the policy differences, and the actions and frames of the various actors in the climate change drama, lies a normative dimension of the crisis. Emerging norms of justice may play a number of roles in regulating the relationships of the whole range of human actors as they confront climate change. As Gardiner in his chapter summarizes, questions of justice concern the procedures around which decisions are made, the unfairness of the distribution of existing vulnerabilities to climate change and the fair distribution of benefits and burdens in the present and near future (see also Baer's chapter), the extent and nature of our obligations to both those within and outside our own country (international or cosmopolitan justice), responsibility to future generations (or intergenerational justice—see Howarth's chapter), and even the potential injustice done to nature itself.

(p. 10) The discourse of climate justice increasingly pervades questions of global governance of climate change. For example, the concept of international justice takes nations as its basic unit of ethical considerability—and as such, national governments can deploy this discourse when it suits their interests to do so. So developing countries can point to the history of fossil fuel use on which developed countries built their economies, such that fairness demands that it is the developing countries that should shoulder the burden of mitigation. The response on the part of the wealthy countries is that for most of this history, their governments had no awareness that what they were doing could change the climate, and so ought not to be held uniquely responsible for future mitigation. This kind of response can be augmented by reference to the huge numbers of rich consumers in China, India, and Brazil who can have their own profligate lifestyles protected so long as justice is conceptualized in inter*national* terms—'hiding behind the poor'. Effective global action on mitigation could benefit from taking a more cosmopolitan approach to justice, one in which people rather than nations are the subjects of moral considerability and re-

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sponsibility (see discussions in chapters by Harris, Baer, and Gardiner). Here, obligations of justice surpass those owed only to those in our own country. Given global climate change, such nationalist limits begin to look irrelevant—as our individual actions affect people outside our own nations, our obligations exceed those borders as well. In this light, rich consumers in China have a global climate responsibility equal to that of rich consumers in the United States. Pragmatically, as Harris points out, if it introduced measures to restrict the emissions of its own rich, China would then have more credibility in international negotiations when it asked the US cut its emissions. This is just one example of how ethical considerations could have real practical importance. The larger point is that while the discourse of climate justice can be put in the service of those most vulnerable to the effects of climate change, it can also facilitate resolution of collective problems.

5 Governments

Negotiating a context defined by concerned publics, experts, lobbyists, and structural limits on what they can do, governments can choose to act on climate issues. Some of them already do. Dealing with major climate change issues has however never been a part of the core priorities of any government. Of course environmental policy has been a staple of government activity (especially in developed countries) since the 1960s. But it remains the case that the environment is not core business in the same way that the economy is. Governments acted swiftly and with the expenditure of vast sums of money in response to global financial crisis in 2008–9. They have never shown anything like this urgency or willingness to spend on any environmental issue. The difference is easily explained: the first concern of any government in a market economy is always to maintain the conditions for economic growth, which normally also means maintaining the confidence of markets in the government's own operations (Lindblom 1982). The second concern of most governments in developed countries has been to operate and finance a welfare state (see Gough and Meadowcroft's chapter), which itself is predicated upon continued economic growth. The core security imperative of government—protection against external threats—has (p. 11) receded with the increasing rarity of war between states, but remains important. Failure on one of these core priorities has the potential for swift catastrophe for any government, be it in terms of fiscal crisis and punishment by voters at the polls, or (in the case of security) erosion or even loss of sovereignty. Failure when it comes to climate change, where the risks, burdens, and benefits are distributed in complex fashion across space and time, does not yet mean anything at all comparable in the immediacy of its consequences for government.

While none of them performs adequately, some national governments do perform better when it comes to climate policy than others, though this variation is not easily explained (see Christoff and Eckersley's chapter). Historically the 'coordinated market economies' of northern Europe, accompanied by political systems that work on the basis of consensus rather than majority rule, have on most indicators done better when it comes to environmental performance in general than their more liberal counterparts in the Anglo-American countries, and that is reflected in climate policies. The surprising development here

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is that the UK has shown signs of trying to break the mold. In stark contrast to its counterparts in the United States and Australia, the leadership of the Conservative Party in the UK has decided to try to appeal to green voters. In the face of the failure—or in the US in the 2000s the blatant refusal—of national governments to substantively address the issue, subnational governments (US states such as California, regions, cities, and localities) have in many cases adopted policies to reduce emissions of greenhouse gases (see the chapter by Bulkeley). However, while insisting on the importance of subnational action, even its most ardent enthusiasts would not see it as a substitute for effective national (and international) policy action. The multi-leveled generation of the problem, and the sting of its impacts, demand multi-level governance (see Farber's chapter).

To date, very few national governments look at all like decarbonizing their economy, or redesigning energy systems to reverse growth in energy consumption (see the chapters by Diesendorf and Christoff/Eckersley). While countries like the UK, Iceland, Denmark, Spain, and Portugal have taken significant steps to increase conservation and the generation of carbon-free energy, they are still below 30 percent clean energy generation, and economic downturn may impede future progress. China deserves watching closely in these terms, because of the size and growth of its proportion of global emissions, its vulnerability to the effects of climate change, and uncertainty about the kind of political-economic development trajectory that it could take in future. Despite its seeming refusal to countenance any infringement on its sovereignty of the sort that agreeing as part of a global process to cut its emissions would connote, China could decide to make substantial unilateral cuts (see Schreurs's chapter). Chinese policy for the moment remains dominated by the economic growth imperative, but some of those exasperated by the kind of stalemate so common in liberal democratic states think that Chinese style authoritarianism might be capable of more decisive action. However, actually implementing such decisions amid complex circumstances may prove beyond the capacity of authoritarianism,

In the context of the UNFCCC, the G77 group of countries claimed a voice for the developing world in general (see Kartha's chapter). However, when it came to the Copenhagen Accord, China dropped the G77 for which it had been a spokesman in favor of a G2 deal with the United States. The governments that compose the G77 generally stress their right to very conventional forms of economic growth that may themselves do little for their rural poor. So state-based action does not exhaust the possibilities for the most vulnerable, (p. 12) which might also include (for example) building translocal solidarities as described in Routledge's chapter, or mobilizing collectively to resist damaging outside initiatives.

What could induce national governments to do better? Aside from international agreements (of which more shortly), there is some scope for reframing climate issues in ways that would make effective national government action more likely. That reframing might involve recognition of the security dimension of climate change. Climate change can, as Gilman et al. point out in their chapter, threaten the security of populations and vital systems, even in some cases threaten the sovereign integrity of states (if for example there are catastrophes on their borders). Conceptualizing energy security as energy indepen-

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dence may also be helpful, as it would mean freedom from reliance on unstable and/or authoritarian foreign countries. Security could also refer to the basic security of human needs, as argued by Barnett in his chapter. The 'securitization' of climate issues also has its critics, such as Doyle and Chaturvedi, who in their chapter criticize the concept of 'climate refugees' for its construction of vulnerable people as security threats. A security framing does mean emphasizing threat and so fear, in a way that Moser and Dilling in their chapter have identified as problematic in moving public opinion. And as a comprehensive frame for climate issues, it probably makes most sense for the United States—a global superpower with security interests in all parts of the world that could therefore be affected by impacts of climate change that are only locally catastrophic. Yet such a frame failed to help the US develop a climate policy, despite being invoked (if weakly) by the Obama administration both before COP-15 in 2009, and after the BP oil spill in the Gulf of Mexico in 2010.

Another possible reframing might involve more widespread adoption of a discourse of ecological modernization, which puts economic growth and environmental protection in a mutually reinforcing, positive-sum relationship—rather than their traditional zero-sum conflict. In this light, mitigation might actually be an economically profitable option. This particular reframing has been adopted most extensively in the coordinated market economies of northern Europe (and Japan), and as Hajer and Versteeg point out in their chapter, can now also be found very prominently in international negotiations on climate change. But as they also note, there can be a large gap between discourse structuration and discourse institutionalization, where the discourse adopted actually conditions the content of public policies. A more radical reframing would see national governments adopting resilience rather than economic growth as their core priority (see the chapter by Adger et al.); but that is a more distant prospect, as it would involve a wholly new imperative, rather than modification of existing imperatives.

Despite the reframings that have occurred, they have not yet led to the broad type of action necessary to avoid large-scale climate change and deal with its growing impacts.

6 Global Action (and Inaction)

Neither coordinated collective action nor discursive reframings can stop at the national level. Climate change involves a complex global set of both causal practices and felt impacts, and as such requires coherent global action—or, at a minimum, coordination across some critical mass of global players. Without such coordination, there is substantial (p. 13) incentive for every player to seek to impose the burdens of mitigation on others, while seeking to take as free a ride as possible on their efforts. Enough players doing this will of course result in little in the way of effective action. Such is the status quo.

The United Nations Framework Convention on Climate Change was established in 1992 to organize negotiations that eventually involved just about all the world's states. In 1997 the Kyoto protocol seemed to commit many of the World's developed countries—the 'Annex One' states—to reductions in the absolute level of greenhouse gases that they emit-

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ted by 5.2 percent overall by 2012, in relation to a baseline of 1990. But Kyoto failed to deliver much in the way of actual reductions. The world's largest emitter, the United States, did not ratify the agreement, which imposed no obligations at all on developing countries. So at the time of writing, the world's two largest economies and largest emitters, the USA and China, are not covered by Kyoto. These are also two of the states that cling most tightly to a notion of sovereignty that cannot be diminished by global governance. Even those states that did ratify the Protocol generally fell far short of the commitments they had registered. After Kyoto the UNFCCC process made its torturous way forward, with expectations centered on the 15th Conference of the Parties (COP-15) in Copenhagen in 2009, when representatives of 190 states gathered. What happened at the eleventh hour in Copenhagen was that G190 was supplanted by G2. China and the United States, two of the most problematic participants in the prior negotiations and when it comes to the very idea of global governance in general, produced a Copenhagen Accord with no binding targets for anyone and no enforcement mechanism for the weak targets that were proclaimed. While most countries agreed to take note of the Accord, few did so with any enthusiasm, or with any intention to do anything much in consequence.

This Handbook goes to press in the shadow of the disappointing outcome of COP-15. Our authors disagree about the best response to this kind of disappointment, and the very weak international climate regime that it leaves in place. Biermann suggests a number of ways to strengthen the regime, including the establishment of a World Environment Organization on a par with the World Trade Organization, a strengthening (rather than abandonment) of the UNFCCC itself, and a stronger institutionalized role for civil society organizations (many of which push for stronger action on the international stage). Young suggests institutionalization of fairness principles of a sort that would induce more serious participation from China and key developing countries. Harris suggests that a cosmopolitan interpretation of fairness might be a circuit-breaker in international negotiations because it would enable China to demonstrate that it sought to impose burdens of mitigation on its own wealthy citizens. China would then have more credibility when it demanded that developed nations commit to more effective emissions reductions. Young also suggests more attention to intersections with other regimes (such as that for international trade) in a way that would induce more mitigation, and perhaps an enhanced role for effective minilateralism—negotiation among a small number of key parties. While at first glance this looks exclusive, that could be ameliorated to the degree representatives of those likely to suffer most from climate change are also at the table. Baber and Bartlett suggest that a common law approach to the establishment of international environmental norms may be just as productive as negotiation of international treaties—though the time scale on which any such bottom-up approach could work makes that insufficient in and of itself.

While these and other ideas for its improvement are being canvassed, Paterson in his chapter points out that what is happening in practice is that the international climate (p. 14) regime is being marketized. Whether in the context of internationally agreed targets and timetables or outside such agreements, emissions trading and offsets grow in prominence, to the point they are poised to dominate global climate governance. This

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may well continue whether or not such use of markets is ultimately effective in containing climate change.

Analysis of the global climate regime might focus on particular deficiencies and proposals for reform, but it is also worth taking a step back to consider the whole idea of a comprehensive, inclusive, negotiated, global approach to climate change mitigation. Perhaps that is asking more than the international system is capable of delivering. Comprehensive self-transformation of the basic parameters of the international system has only ever been negotiated in the wake of total war: the Treaty of Westphalia in 1648, the Congress of Vienna in 1815, the Versailles settlement in 1919, Bretton Woods in 1945. The first three of these concerned only security; the fourth added economics. While comparisons are sometimes made between climate change and war (e.g. Lovelock 2010), there is no total war-like catastrophe to spur global action; and even if there were, there is no obvious mechanism to ensure that mitigation would be at the top of the agenda.

Perhaps we need to think in very different terms about the coordination of a global response. Such terms would recognize the inherent complexity of multi-level governance in the global system, and the multiple points of leverage. It would involve attending to the roles that stakeholder communities, shared norms, evolving discourses, local practices, and regional agreements, could play—while not necessarily renouncing global negotiation in its entirety. This sort of thinking has barely begun (but see Bäckstrand's chapter). The problem is that the pace at which the mechanisms it identifies could change and take effect in positive fashion may be too slow to match the pace at which climate change is arriving. In addition, governance mechanisms need to be anticipatory rather than reactive when it comes to future change. Governments are not used to acting in this kind of way; nor do more diffuse governance mechanisms necessarily compensate.

7 Organization of this Handbook

The complexity of the issues of climate change and society means that an element of arbitrariness is inescapable when breaking down the whole into component areas of scholarship, and then ordering those areas. The interconnections are many and strong. There are few independent subsystems of scholarship with significant findings that stand on their own. Responding effectively to the challenges of climate change will require coordination of efforts across different ways of looking at the problems. Understanding all the social dimensions of climate change requires us to embrace these complexities and interrelationships. Nevertheless, publishing the contributions between covers requires putting them in a linear order. We have chosen to do as follows.

Part II, 'The Challenge and its History,' lays out the key challenges climate change presents, and how matters got to be that way. Complexity means that a range of perspectives and discourses can be brought to bear (in both the history of climate change and the rest of this Handbook). The climb up the scientific agenda took place over a century. The climb up the political agenda was slow, but eventually reached a point where climate (p. 15) change became the archetypical environmental problem. These ascents have been

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accompanied by changing conceptualizations of climate and the way it plays into social, political, and economic discourses that condition the responses of actors and institutions. The impact of those discourses now itself merits critical scrutiny.

Natural science is obviously central when it comes to understanding climate change and responding to it, but the relationship of the science to society and public opinion as addressed in Part III, 'Science, Society, and Public Opinion,' proves problematic. The natural sciences themselves need to understand the complex relationship between 'pure' science and the way that scientific agendas interact with society at large. Knowledge claims are processed in politically variable ways. In the face of organized skepticism, conventional ways of communicating science to the public have come unstuck. We know what does not work when it comes to communicating climate change; we know much less about what does work.

Part IV turns to 'Social Impacts.' Economists have devoted a great deal of effort to estimating the present and likely future costs of climate change. Some economists (represented here by Mendelsohn) reach modest estimates. Much turns not just on technical matters such as choice of a discount rate, but also on what kind of economic paradigm ought to be applied. Even economists who reach relatively small estimates of total costs recognize that particular vulnerable populations such as the rural poor in developing countries and indigenous peoples living in ecosystems at the margins of industrial society may be hit hardest, be it in terms of health, livelihood, or culture. So costs need to be understood not only in economic terms, but also in broader social and cultural terms.

Many of the negative social impacts of climate change (and of adaptive responses to it) will be felt in the form of an undermining of the 'Security' of nations and peoples, and these issues are addressed in Part V. In one sense, it is a matter of the security of collectivities such as nations, populations, and the social and economic systems that support them. Security concerns therefore range from national security to basic human needs. The securitization of climate change and the very use of categories such as 'climate refugees' also have their critics.

Threats to human security are just one kind of social justice issue that arises in connection with climate change; a range of issues is covered in Part VI, 'Justice.' These issues include the distribution of benefits and burdens across nations and, perhaps more fundamentally, across people, but climate justice also entails issues of basic needs, procedures, corrective justice, and the nature of the obligation of those living in the present to future generations. Justice is in part a matter for philosophical analysis, but can also be used to challenge utilitarian economic analysis, influence international policy discourse, and rally social movements.

Such movements are just one kind of relevant public. The range of 'Publics and Movements' is addressed in Part VII. At an aggregate level public opinion exists in terms of percentages of people concerned about or willing to respond to climate change. Only the most engaged participate in movements, which can be organized locally, nationally, and globally, and in networks transcending these levels. The impact of movements in promot-

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ing cultural change may however be blunted by psychological and sociological denial mechanisms. Opinion and activism on climate change do not exist in isolation, but are also affected by factors such as economic interests and religious beliefs.

(p. 16) Responding more or—more often—less effectively to concerns raised by publics and movements, the actions of governments do of course matter a great deal, and are the subject of Part VIII, 'Government Responses.' Performance currently varies substantially across different countries. The case of China gets special treatment, because of the size and growth of its economy, its authoritarian response to climate issues, and its potentially massive international impact. In an era of multi-level governance, responsibility for action is going to be shared across different levels, subnational, regional, local, national, and international. The way states are currently organized to facilitate economic growth and, at least in most developed countries, provide social welfare constrains the possibilities for effective action on climate change, and the positions governments can adopt and targets to which they can commit in international negotiations. From the perspective of the governments of the Global South, without developed welfare states and without the history of growth that made them possible, matters look very different indeed.

The 'Policy Instruments' governments can deploy to meet their obligations are analyzed in Part IX. Market-based instruments, especially cap-and-trade, offsets, and carbon taxes, are especially prominent in the recommendations of economists, and in some cases the actions of governments. The most extensive experience with such instruments when it comes to climate change is in Europe, so that experience receives special attention. The redesign of energy systems is high on the list of possible policy initiatives.

'Producers and Consumers,' the subjects of Part X, can both respond to the policy instruments of government and take actions on their own initiative in the context of climate change. Our authors examine the role of corporations and consumers in both impeding and facilitating action against climate change.

Public and movements, national and subnational governments, producers and consumers all have roles to play in climate change mitigation and adaptation, but much still turns on what happens at the global level. Especially after the frustrations and failures evident in UN-based negotiations, rethinking 'Global Governance,' is central, and the topic of Part XI. Our authors look at the problematic history and performance of such governance, the lessons we might draw from existing global regimes, the moral foundations of alternative institutional arrangements, and the role of international law.

Finally, Part XII, 'Reconstruction,' contemplates the reworking of political, economic, and social arrangements as we adapt to the reality of coming climate change. The emphasis is on new forms of governance (especially at the global level), and more resilient social-ecological systems. After all of the challenges, opinions, impacts, actors, and responses, the task, of course, is to look forward to adaptation, transition, and rebuilding a society immersed in climate change.

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8 Conclusion

The broad scope of this Handbook encompasses a range of issues and approaches beyond the basic science of climate change, from the philosophical to the political, from the psychological to the sociological, from the historical to the geographical, from the economic to the legal. On how science is disseminated, on how we assign economic value, on how (p. 17) states negotiate and govern, on the meaning of justice, and on the experience of those affected by climate change, we see contested concepts, frames, meanings, and responses.

As we said at the outset, climate change presents perhaps the most profound and complex challenge to have confronted human social, political, and economic systems. It also presents one of the most profound challenges to the way we understand human responses. In this collection, we have tried to lay out the variety and complexity of the issues at the intersection of climate change and human society. Our goal has been to be as comprehensive as possible within the limits of space. We offer the reader a broad-ranging collection of ways to think about one of the most difficult issues we human beings have brought upon ourselves in our short life on the planet.

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