International Climate Change Law

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Introduction

It is now beyond doubt that climate change is real, it is already happening, and human beings are largely responsible for it.[1] Humanity has acquired 'geological force' in the 'Anthropocene',[2] and is pushing up against planetary boundaries.[3] Since the beginning of the industrial revolution, when people began burning fossil fuels, atmospheric concentrations of carbon dioxide (CO_2)—the principal greenhouse gas (GHG)—have risen from about 280 parts per million (ppm) to more than 400 ppm, higher than at any time in the last 800,000 years.[4] Although many uncertainties remain, the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)[5] concluded that:

- The warming of the climate system is 'unequivocal'.[6] According to the latest data from the United Kingdom's Met Office, global average temperature is now almost 1° C higher than pre-industrial levels.[7]

[1] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2014: Synthesis Report* (2014) Summary for Policymakers (SPM), 4–5.

[2] The term 'Anthropocene' was coined by Eugene Stoermer in the 1980s and popularized by the Nobel Prize-winning chemist, Paul Crutzen, beginning around 2000. See Will Steffen *et al.*, 'The Anthropocene: Conceptual and Historical Perspectives', *Philosophical Transactions of the Royal Society*, 369/1938 (2011): 842.

[3] Johan Rockström *et al.*, 'Planetary Boundaries: Exploring the Safe Operating Space for Humanity', *Ecology and Society*, 14/2 (2009): 32.

[4] IPCC, *Climate Change 2014: Synthesis Report* (n 1) SPM, 4. According to the latest data from the Scripps Institution of Oceanography, which has been directly measuring atmospheric concentrations of CO_2 at its Mauna Loa Observatory in Hawaii since the late 1950s, CO_2 concentrations were 406 ppm as of 22 January 2017. Scripps Institution of Oceanography, 'The Keeling Curve' <https://scripps.ucsd.edu/programs/keelingcurve/> accessed 22 January 2017.

[5] 'The Intergovernmental Panel on Climate Change (IPCC) is the international body for assessing the science related to climate change. The IPCC was set up in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) to provide policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation.' IPCC, 'IPCC Factsheet: What is the IPCC?' <http://www.ipcc.ch/news_and_events/docs/factsheets/FS_what_ipcc.pdf> accessed 20 January 2017.

[6] IPCC, *Climate Change 2014: Synthesis Report* (n 1) SPM, 2.

[7] United Kingdom Met Office, 'Global Climate in Context as the World Approaches 1° C Above Pre-Industrial for the First Time' (9 November 2015) <http://www.metoffice.gov.uk/research/news/2015/global-average-temperature-2015> accessed 20 January 2017.

- It is 'extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century'.[8]
- '[M]any of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased.'[9]
- These changes 'have caused impacts on natural and human systems on all continents and across all oceans'.[10]
- 'Continued emission of greenhouse gases will cause further warming…, increasing the likelihood of severe, pervasive and irreversible impacts….'[11]

This book provides an overview of the international legal response to this global threat.

I. CLIMATE CHANGE AS AN INTRACTABLE POLICY CHALLENGE

Climate change poses a complex, polycentric, and seemingly intractable policy challenge—a challenge some have characterized as 'super wicked'.[12] United Nations Secretary General Ban Ki-moon characterized it as the 'defining issue of our age'.[13] Certainly, it is one of the most difficult policy problems ever faced.

Several factors combine to make climate change an 'issue from hell'.[14] It is planetary in scope and—due to its long-term and potentially irreversible consequences—intergenerational in its impacts. It is caused by a wide range of production and consumption processes. Its causes and effects are global, and require complex collective action. It can be managed only if all states, or at least the major GHG emitters, cooperate in undertaking potentially costly, large-scale shifts in their economic and energy systems. Yet, because most of the benefits of climate change mitigation

[8] IPCC, *Climate Change 2013: The Physical Science Basis* (Cambridge University Press, 2013) SPM, 17.

[9] Ibid, SPM, 4. [10] IPCC, *Climate Change 2014: Synthesis Report* (n 1) SPM, 6.

[11] Ibid, SPM, 8; IPCC, *Climate Change 2014: Mitigation of Climate Change* (Cambridge University Press, 2014) SPM, 8 (noting that without additional GHG mitigation efforts, global mean surface temperature is set to increase by 2100 from 3.7° C to 4.8° C above pre-industrial levels).

[12] Richard Lazarus, 'Super Wicked Problems and Climate Change: Restraining the Present to Liberate the Future', *Cornell Law Review*, 94/5 (2009): 1153; see generally Horst W.J. Rittel and Marvin M. Webber, 'Dilemmas in a General Theory of Planning', *Policy Science* 4/2 (1973): 155, 160 (introducing the concept of 'wicked' problems); Kelly Levin *et al.*, 'Playing it Forward: Path Dependency, Progressive Incrementalism, and the "Super Wicked" Problem of Global Climate Change' (7 July 2007) (paper prepared for delivery to the International Studies Association Convention Chicago, 28 February–3 March 2007) <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.464.5287&rep=rep1&type=pdf> accessed 20 January 2017.

[13] UN Secretary General Ban Ki-moon, 'Opening Remarks at 2014 Climate Summit' (23 September 2014) <http://www.un.org/apps/news/infocus/sgspeeches/statments_full.asp?statID=2355#.Vv21uBKANBc> accessed 20 January 2017.

[14] Al Gore, *The Future: Six Drivers of Global Change* (New York: Random House, 2013) 314.

do not accrue to the country taking action, but are instead shared by the international community as a whole, individual countries have little incentive to act on their own. Significant investments to reduce GHG emissions will be in a country's individual self-interest only if they are reciprocated by other states—only if a country's actions are part of a bargain involving significant action by other countries to address climate change.[15]

For a variety of reasons, however, it has proven extremely difficult to secure international agreement. Part of the explanation is familiar: international law generally has difficulty solving collective action problems because it lacks strong tools to secure participation and compliance and thus provides only a measure of assurance to states that, if they act, others will reciprocate.[16] But several particular features of the climate change problem exacerbate this general problem:

- First, climate change implicates virtually every aspect of a state's domestic policies—energy, agriculture, transportation, urban planning, and so forth—with potentially enormous economic stakes. As a result, in many countries it is enmeshed in the vicissitudes of domestic politics. In the United States (US), for example, climate change has become a highly partisan issue, with a majority of one of the two main political parties openly questioning the science of climate change, making legislative action all but impossible and limiting the kinds of international agreements the US can join.[17] And, in Australia, a government fell over the 'carbon tax'.[18]
- Second, because of the climate system's inertia, climate change requires people to act now to address a long-term and, in some cases, uncertain threat.[19] According to the IPCC, delaying concerted mitigation action beyond 2030 'will substantially increase the challenges' associated with meeting the target adopted in the Paris Agreement of limiting temperature increase to well below 2° C.[20] There is an even less chance of reaching a 1.5° C aspirational goal

[15] IPCC, *Climate Change 2014: Mitigation of Climate Change* (n 11) 5.

[16] See generally Scott Barrett, *Environment and Statecraft: The Strategy of Environmental Treaty-Making* (Oxford University Press, 2003).

[17] Kiley Kroh, Kristen Ellingboe, and Tiffany Germain, 'The Anti-Science Climate Denier Caucus: 114th Congress Edition' *ThinkProgress* (8 January 2015) <https://thinkprogress.org/the-anti-science-climate-denier-caucus-114th-congress-edition-c76c3f8bfedd#.71brt4r1r> accessed 27 October 2016.

[18] In September 2013, the Liberal Party defeated the Labour Party in general elections, after the Liberal Party leader, Tony Abbott, declared the election a 'referendum' on Australia's carbon tax. Christopher Rootes, 'A Referendum on the Carbon Tax? The 2013 Australian Election, the Greens, and the Environment', *Environmental Politics,* 23/1 (2014): 166. The following year, the Abbott government repealed the carbon tax.

[19] Levin *et al.*, Playing It Forward (n 12); See IPCC, *Climate Change 2014: Synthesis Report* (n 1); see for popular reportage of the IPCC Report, Sam Friell, 'UN: Time is Running Out for Climate Change Action', *Time* (13 April 2014) <http://time.com/60769/global-warming-ipcc-carbon-emissions/> accessed 27 October 2016.

[20] The IPCC notes that if concerted mitigation action is delayed, keeping to the temperature limit 'will require substantially higher rates of emissions reductions from 2030 to 2050; a much more rapid scale-up of low-carbon energy over this period; a larger reliance on [carbon dioxide removal] in the long term; and higher transitional and long-term economic impacts'. IPCC, *Climate Change*

without a considerable increase in mitigation ambition in the 2020 to 2030 period.[21] But there is comparatively little appetite in many countries to take costly action now to avert seemingly remote harms in the future. Short-term election cycles compel governments to prioritize immediate concerns such as poverty eradication, energy access, affordable transportation, and economic development over seemingly long-term problems such as climate change.

- Finally, states have very different interests, priorities, capacities, and perspectives, making agreement even harder. There are vast disparities between states in wealth, GHG emissions profiles, and vulnerabilities. The countries primarily responsible for causing the climate change problem are not the ones that will be most adversely affected. Addressing the problem could produce losers as well as winners. And states have very different views as to what would constitute a fair outcome. Small island states, for instance, at the frontlines of climate change impacts, have a compelling reason to act. Yet since their GHG emissions are inconsequential, their actions will have little impact on the trajectory of warming. By contrast, the Organization of Petroleum Exporting Countries (OPEC), the members of which are economically dependent on fossil fuels and have high per capita GHG emissions, have compelling reasons—at least in the short term—for inaction. And, many large developing countries still have the burden of providing energy access to vast swathes of their population.[22]

Given these challenges, it is not surprising that international law has had only modest success to date in addressing climate change.

II. THREE PERSPECTIVES ON THE CLIMATE CHANGE PROBLEM

The climate change problem can be understood in many ways—as a scientific, technological, or even religious problem.[23] But three perspectives have dominated the international policy response to climate change. First, European countries have tended to see it as an environmental problem, reflected in their representation for many years at the UN climate negotiations by their environment ministries. Small

2014: Synthesis Report (n 1) SPM, 24. See Decision 1/CP.21, 'Adoption of the Paris Agreement' (29 January 2016) FCCC/CP/2015/10/Add.1, 2, Annex: Paris Agreement (Paris Agreement).

[21] Carl-Friedrich Schleussner *et al.*, 'Science and Policy Characteristics of the Paris Agreement Temperature Goal', *Nature Climate Change,* 6/9 (2016): 827.

[22] In India, for example, climate change is dwarfed on the political agenda by the need to provide electricity to 300 million people. See eg India's Intended Nationally Determined Contribution, Working Towards Climate Justice (1 October 2015) <http://www4.unfccc.int/submissions/INDC/Published%20Documents/India/1/INDIA%20INDC%20TO%20UNFCCC.pdf> accessed 20 January 2017 (which notes that India is home to 'around 24% of the global population without access to electricity (304 million)').

[23] Pope Francis, 'Encyclical Letter *Laudato Si'* of the Holy Father Francis on Care for Our Common Home' (Vatican Press, 2015) <http://w2.vatican.va/content/dam/francesco/pdf/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si_en.pdf> accesssed 20 January 2017.

island states have, not surprisingly, been even more environmentally minded, given the existential threat posed by climate change. In contrast, many non-European developed countries (in particular, the US) have tended, almost from the start, to see climate change through an economic lens, with economists playing a major role in formulating policies.[24] Meanwhile, many developing countries understand climate politics as part of a larger pattern of historical and economic injustices—a continuation of the 1970s debate about the 'new international economic order', which grew out of the decolonization movement.[25] In their view, developed countries not only bear the primary historical responsibility for combating climate change, but should also support developing countries in their efforts to do so.[26] Indeed, some developing countries even claim 'compensation' and argue that developed countries must discharge their 'ecological debt'.[27]

A. Climate change as an environmental problem

Perhaps the most obvious perspective on climate change is to see it as an environmental problem.[28] Viewed in this way, the goal of international climate policy is to prevent dangerous anthropogenic climate change by reducing net GHG emissions. Given the persistence of CO_2 in the atmosphere, the goal of preventing dangerous climate change will eventually require completely eliminating net emissions, as the 2015 Paris Agreement recognizes.[29] But how much we need to reduce emissions at any particular point in time is a function of three factors: first, the level of temperature increase deemed safe; second, the concentration levels necessary to prevent warming from exceeding that temperature limit; and third, the choice

[24] See Daniel Bodansky, 'Transatlantic Environmental Relations', in John Peterson and Mark Pollack (eds), *Europe, America, and Bush* (London: Routledge, 2003) 58 (contrasting EU and US approaches to climate change).

[25] On the New International Economic Order, see generally Jagdish N. Bhagwati (ed), *The New International Economic Order: The North-South Debate* (Cambridge: MIT Press, 1977).

[26] Statement by Ambassador Nozipho Mxakato-Diseko from South Africa on Behalf of the Group of 77 and China, at the Opening Plenary of the 12th Part of the 2nd Session of the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP 2-12), Paris, France (29 November 2015) <http://www4.unfccc.int/Submissions/Lists/OSPSubmissionUpload/219_137_130932914217320365-G77%20and%20China%20statement%20ADP2-12%2029%20Nov%202015.pdf> accessed 20 January 2017.

[27] Peter Neill, 'Ecological Debt and the Global Footprint Network' *The Huffington Post* (4 January 2015) <http://www.huffingtonpost.com/peter-neill/ecological-debt--the-glob_b_6101200.html> accessed 20 January 2017 (discussing the origins of the term 'ecological debt'); Plurinational State of Bolivia on Behalf of the Alianza Bolivariana Para Los Pueblos De Nuestra América—ALBA, UNFCCC -ADP 2.11 (19 October 2015) <http://www4.unfccc.int/Submissions/Lists/OSPSubmissionUpload/88_129_130897230954649738-Intervenci%C3%B3n%20Final%20ALBA%2019.10.15.pdf> accessed 20 January 2017; ALBA Countries, 'ALBA Declaration on Copenhagen Climate Summit' (28 December 2009) <https://venezuelanalysis.com/analysis/5038> accessed 20 January 2017.

[28] This sub-section and the next draw, in part, from Daniel Bodansky, *The Durban Platform Negotiations: Goals and Options* (Harvard Project on Climate Agreements, July 2012) <http://belfercenter.ksg.harvard.edu/files/bodansky_durban2_vp.pdf> accessed 20 January 2017; Daniel Bodansky, *The Art and Craft of International Environmental Law* (Cambridge, MA: Harvard University Press, 2010) 62–70.

[29] Paris Agreement, Art 4.1.

of an emissions pathway to achieve the necessary concentration level. In the Paris Agreement, states agreed to the goal of limiting temperature increase to 'well below' 2° C (compared to pre-industrial levels), and also to pursue efforts to limit global warming to 1.5° C.[30] Achievement of the 2° C limit would likely require stabilization of GHG concentrations at no more than 450 ppm, and global emissions to peak and then fall by 40–70% by 2050.[31]

Since we are not currently close to achieving these reductions, the environmental effectiveness of the international climate regime can be measured by the magnitude of global emissions reductions achieved over time—how close they come to putting the world on a pathway to reaching the 2° C or 1.5° C temperature limit. This might appear to depend on the stringency of the regime's emissions reduction commitments: the more stringent the commitments, the better. But environmental effectiveness is a function not only of the stringency of commitments, but also of the levels of participation and compliance by states.[32] Weakness along any of these three dimensions will undermine the climate regime's effectiveness, regardless of how well it does on the other two. And because stringency, participation, and compliance are interlinked, we must consider how varying one factor affects the others. More stringent requirements promote environmental effectiveness, all other things being equal. But they do not necessarily boost climate effectiveness if they result in lower participation and/or compliance. Conversely, high participation and compliance are desirable in and of themselves, but they do not necessarily make an agreement more environmentally effective if they are secured at the price of watering down the agreement's substantive requirements. Achieving the greatest emissions reductions requires solving an immensely complex equation involving all three factors. Moreover, since climate change depends on cumulative emissions rather than on emissions at any particular point in time,[33] we need to consider stringency and participation as dynamic variables. Less stringent commitments or participation now might produce greater environmental effectiveness in the long run, if they are part of an evolutionary framework that leads to greater action.

B. Climate change as an economic problem

Climate change can also be seen as an economic problem. From this perspective, the goal of climate policy is to achieve the 'efficient' outcome—that is, the outcome with the highest net benefits.[34] Accordingly, we should reduce emissions only so long as the benefits of further reductions outweigh the costs. And, to the extent

[30] Ibid, Art 2.1.
[31] IPCC, *Climate Change 2014: Mitigation of Climate Change* (n 11) 10–12.
[32] Barrett, *Environment and Statecraft* (n 16).
[33] IPCC, *Climate Change 2013: The Physical Science Basis* (n 8) SPM, 27.
[34] Examples of the economic perspective include William D. Nordhaus, *The Climate Casino: Risk, Uncertainty, and Economics for a Warming World* (New Haven, CT: Yale University Press, 2013); Nicholas Stern, *The Economics of Climate Change: The Stern Review* (Cambridge University Press, 2007); Gernot Wagner and Martin L. Weitzman, *Climate Shock: The Economic Consequences of a Hotter Planet* (Princeton University Press, 2015).

adaptation is cheaper than mitigation, then that should be the preferred policy. Calculating costs and benefits is extremely difficult, of course, particularly given that many of the benefits of reducing emissions involve non-market goods that are difficult to value and will be realized far in the future. Nevertheless, some rough weighing of costs and benefits, even if not explicit, is the basis of most decision-making.

In addition to defining a goal of efficiency, the economic perspective focuses on the means of achieving that goal, namely, by reducing emissions as cost-effectively as possible.[35] In general, a policy is cost-effective if it equalizes the marginal cost of compliance across time and place. If GHG emissions can be reduced more cheaply in the future than now, or by one country more cheaply than another, then it may be possible to achieve the same climate benefit at a lower cost by shifting some of the pollution reductions into the future or to countries with lower mitigation costs.[36] In the climate regime, cost-effectiveness has been the rationale for the use of market mechanisms such as emissions trading, which allow emissions to be reduced wherever this can be done most cheaply.[37]

C. Climate change as an ethical problem

A third perspective on the climate change problem is that of equity and climate justice.[38] Cost-benefit analysis simply seeks to maximize aggregate economic value and does not address the ethical issues raised by climate change. If one country receives the benefits from a polluting activity and another bears the costs, the policy is still efficient as long as, in the aggregate, the benefits exceed the costs. The ethical perspective, in contrast, focuses on issues of distributive and corrective justice, including: how do we equitably distribute the burdens of mitigating and adapting to climate change, and who, if anyone, is ethically responsible for the damages caused by climate change?

In contrast to environmental effectiveness and economic efficiency, for which there are relatively well-accepted metrics, there is little consensus about what equity and climate justice entail.[39] Some accounts focus on historical responsibility, others on duties to future generations, others on a fair division of burdens based on

[35] This paragraph and the next are based on Bodansky, *Art and Craft of International Environmental Law* (n 28) 68–9.

[36] The timing and location of emissions reductions generally do not affect the resulting climate benefits, because climate change is what economists refer to as a 'stocks' rather than a 'flows' problem. What matters to the climate system is not the level of emissions at any particular time and place, but cumulative global emissions over time.

[37] See Chapter 6, Section V.

[38] See generally Stephen M. Gardiner *et al.*, *Climate Ethics: Essential Readings* (Oxford University Press, 2010); Dale Jamieson, *Reason in a Dark Time: Why the Struggle Against Climate Change Failed – and What It Means for Our Future* (Oxford University Press, 2014); Henry Shue, *Climate Justice: Vulnerability and Protection* (Oxford University Press, 2014).

[39] John Ashton and Xueman Wang, 'Equity and Climate: In Principle and Practice', in Joseph E. Aldy *et al.*, *Beyond Kyoto: Advancing the International Effort against Climate Change* (Arlington, Virginia: Pew Center on Global Climate Change, December 2003) 61.

current capabilities, and yet others on the egalitarian principle that people have an equal right to the 'atmospheric space'.

Consider, for example, the question: how should we allocate emission reductions among countries? Developed countries account for the majority of cumulative CO_2 emissions, suggesting that they bear greater historical responsibility for the climate change problem.[40] In per capita terms, even today GHG emissions from industrialized countries are 2.5 times greater than those from developing countries.[41] However, total emissions from developing countries have overtaken those from industrialized countries,[42] and emissions from large developing countries are projected to continue to rise sharply.[43] In 2005, China surpassed the United States as the world's largest emitter of CO_2;[44] in 2013, its share of global emissions was 29%, compared to 15% for the US and 11% for the European Union (EU). China's per capita emissions (7.4 tonnes) slightly exceeded those of the EU (7.3 tonnes), although both remained significantly below the per capita emissions of the US (16.6 tonnes).[45] Given these figures, it is unclear how emissions reductions are to be shared between countries, and on what basis. Several metrics have been suggested over the years. These range from emission-based indicators (such as cumulative emissions, total emissions, or per capita emissions) to those relating to a state's capabilities and developmental needs (such as gross domestic product per capita, the UN Development Programme's Human Development Index, or electrification rates).[46] Thus far, the parties to the UN climate regime have not agreed on any objective indicators or other means of allocating emissions reductions among states, except through political negotiations or national decision-making.

Climate justice issues are also raised by the fact that the countries most vulnerable to climate change, such as small island states, have contributed the least

[40] CO_2 emissions from Annex I countries from 1850 to 2012 are 937,952 $MtCO_2$ and from non-Annex I are 388,623 $MtCO_2$. Data for Cumulative Total CO_2 Emissions Excluding Land-Use Change and Forestry from 1850 to selected years—2012 from World Resources Institute (WRI), 'CAIT Climate Data Explorer' <http://cait.wri.org/> accessed 20 January 2017. Note also that the preamble to the Framework Convention on Climate Change specifically acknowledges that 'the largest share of historical and current emissions has originated in developed countries', United Nations Framework Convention on Climate Change (adopted 9 May 1992, entered into force 21 March 1994) 1771 UNTS 107 (FCCC), preambular recital 3.

[41] IPCC, *Climate Change 2014: Mitigation of Climate Change* (n 11) 113.

[42] Ibid; see also Sheila M. Olmstead and Robert N. Stavins, 'Three Key Elements of a Post-2012 International Climate Policy Architecture', *Review of Environmental Economics and Policy*, 6/1 (2012): 65, 70.

[43] US Energy Information Administration, 'International Energy Outlook 2013' (July 2013) <http://www.eia.gov/forecasts/archive/ieo13/pdf/0484(2013).pdf> accessed 20 January 2017, 159–65. See also IPCC, *Climate Change 2014: Mitigation of Climate Change* (n 11) 125–30.

[44] Based on data from the WRI, CAIT Climate Data Explorer (n 40).

[45] Jos G.J. Olivier *et al.*, *Trends in Global CO_2 Emissions: 2014 Report* (The Hague: PBL Netherlands Environmental Assessment Agency, 2014) <http://edgar.jrc.ec.europa.eu/news_docs/jrc-2014-trends-in-global-co2-emissions-2014-report-93171.pdf> accessed 20 January 2017, 24.

[46] See eg Submission by Swaziland on behalf of the African Group under Workstream I of the ADP (8 October 2013) <https://unfccc.int/files/documentation/submissions_from_parties/adp/application/pdf/adp_african_group_workstream_1_20131008.pdf> accessed 20 January 2017.

to causing it.[47] Climate change is likely to disproportionately affect developing countries, many of which are acutely vulnerable.[48] It is projected 'to slow down economic growth, make poverty reduction more difficult, further erode food security, and prolong existing and create new poverty traps…'.[49] While developing countries need to adopt climate resilient sustainable development pathways, there are limits to adaptation. Some countries, communities, and ecosystems may be able to adapt to 1.5°–2° C warming, but few will be able to adapt to 3°–4° C warming. In the absence of robust international support mechanisms, the primary burden of adapting to climate change is likely to fall on such developing countries, diverting scarce resources from other critical human development priorities.

The World Bank estimates that the combined needs of developing countries for mitigation and adaptation will be approximately $275 billion per year by 2030,[50] and the FCCC estimates costs of tens and possibly hundreds of billions of dollars per year just for adaptation.[51] Industrialized countries have larger economic and technological capacity, but the extent of their responsibility for supporting developing countries is disputed. Needless to say, creating adequate funding in the system to address the demands of climate change is still a work in progress. It is clear, however, that current and projected demand for resources to mitigate and adapt to climate change vastly outstrips the funds that are available.

Finally, climate change raises issues of inter-generational equity, since most of the burdens of climate change will be borne by future generations, especially those from developing countries that are likely to have very limited resources to adapt. Does the present owe duties to the future? If so, what are those duties and what are their implications for climate policy?[52]

The environmental perspective can, at times, be in tension with the ethical perspective. Equity principles, for example, are often cited to argue that developed countries should bear the primary burden of reducing emissions, since they, as a group, have higher historical and per capita emissions than developing countries. But, from an environmental standpoint, reducing developing country emissions

[47] IPCC, *Climate Change 2014: Impacts, Adaptation and Vulnerability* (Cambridge University Press, 2014) SPM, 30–2.

[48] See generally, IPCC, *Climate Change 2014: Synthesis Report* (n 1) SPM, 13–16. See also FCCC, 'Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries' (Bonn: UNFCCC, 2007) <http://unfccc.int/resource/docs/publications/impacts.pdf> accessed 20 January 2017; and The Climate Vulnerable Forum <http://www.thecvf.org/> accessed 20 January 2017.

[49] IPCC, *Climate Change 2014: Impacts, Adaptation and Vulnerability* (n 47) SPM, 20.

[50] World Bank, *World Development Report 2010: Development and Climate Change* (Washington, D.C.: World Bank, 2010). A 2007 FCCC secretariat report has similar figures, estimating that an additional $200–$210 billion per year would be needed in global investment and financial flows to reduce CO_2e emissions by 25% by the year 2030, roughly half of it in developing countries. FCCC, 'Investment and Financial Flows to Address Climate Change' (Bonn: UNFCCC, 2007) <http://unfccc.int/resource/docs/publications/financial_flows.pdf> accessed 20 January 2017.

[51] FCCC, ibid. See also UNEP, *Adaptation Finance Gap Report 2016* (Nairobi: UNEP, May 2016), notes that the cost of adapting to climate change in developing countries could rise to between $280 and $500 billion per year by 2050.

[52] See generally Edith Brown Weiss, *In Fairness to Future Generations: International Law, Common Patrimony, and Intergenerational Equity* (New York: Transnational Publishers, 1989).

is also crucial. For this reason, many industrialized countries insist on developing country participation as a matter of pragmatic problem solving, or even 'fairness'.[53]

Nevertheless, environmental effectiveness and ethics are also intertwined, since considerations of climate justice are important factors in determining what level of climate change (1.5° C or 2° C) is deemed environmentally acceptable. For example, one might prefer a 1.5° C rather than a 2° C limit because of concern about the injustice of inflicting catastrophic damage on small island and least developed countries. Yet a 1.5° C limit also raises equity issues, since it could dramatically shrink the carbon budget for those countries that have large populations without access to modern forms of energy, and need to increase their emissions to address energy poverty in their countries. In any case, unless climate policy is perceived as equitable, it is unlikely to be accepted and followed, making it less environmentally effective. The challenge is to find ways of reflecting ethical considerations that are acceptable to the major emitters, both developed and developing, so as not to discourage participation and compliance.

III. DEMARCATING INTERNATIONAL CLIMATE CHANGE LAW

Climate change has been a major international issue since the late 1980s, and states have developed a significant body of international law in response.[54] Much of that law has been treaty based, adopted under the auspices of the 1992 United Nations Framework Convention on Climate Change (FCCC), including the 1997 Kyoto Protocol,[55] the 2015 Paris Agreement, and the numerous decisions of the parties to these instruments. We will refer to this vast and complex web of principles, rules, regulations, and institutions as the UN climate regime. It serves a variety of functions, including to facilitate the ongoing negotiations; to track and enable the implementation of core commitments relating to mitigation, adaptation, and provision of support; and to supervise compliance. Chapter 3 provides a general introduction to treaty-based approaches, Chapter 4 traces the development of the UN climate regime, and Chapters 5–7 provide a detailed analysis of the principal agreements in the UN climate regime.

Although the UN climate regime forms the core of international climate change law, international climate change law, conceived more broadly, includes not only the UN regime, but also rules and principles of general international law relevant to climate change; norms developed by other treaty regimes and international bodies;

[53] See eg Umbrella Group Statement, High Level Segment, <http://unfccc.int/resource/docs/cop18_cmp8_hl_statements/Statement%20on%20behalf%20of%20the%20Umbrella%20Group.pdf> accessed 20 January 2017. See generally J. Timmons Roberts and Bradley C. Parks, *A Climate of Injustice: Global Inequality, North-South Politics, and Climate Policy* (MIT Press, 2007) ch. 5.

[54] See Chapter 4 for the history of the climate change issue.

[55] Kyoto Protocol to the United Nations Framework Convention on Climate Change (adopted 11 December 1997, entered into force 16 February 2005) 2303 UNTS 162 (Kyoto Protocol).

regulations, policies, and institutions at the regional, national, and sub-national levels; and judicial decisions of national, regional, and international courts.[56] Although the core of this book focuses on the UN climate regime, Chapter 2 considers general international law, notably customary law, and Chapter 8 surveys polycentric governance of the climate change problem. In addition, Chapter 9 examines the intersection of climate change law with other areas of international law, including human rights law, migration law, and trade law.

In referring to 'international climate change law', we do not mean to suggest that it is a discrete body of law with its own sources, methods of law-making, and principles, or that is it a self-contained regime. Quite the opposite, international climate change law sits squarely within the fields of international environmental law and public international law more broadly.[57] Indeed, Chapter 2 is devoted to locating international climate change law within the broader context of international law, including the rules and principles of general international law, the evolution of which helps account for the predominant role of treaty-based climate change law. Similarly, Chapter 3 explores treaty-based law-making in detail. And Chapter 9 examines the implications of climate change for other areas of international law, and vice versa. In short, this books attempts to avoid 'issue fragmentation' and to tease out the 'legal inter-relationships and commonalities' that exist across international law.[58] As the book reveals, international climate change law is, in some respects, an exemplar of international environmental law. In other respects, it is a potential portent of future risks for other areas of international law.[59] In either case, international climate change law, as it is emerging, functions as a laboratory for the development of international law more generally.

IV. THE SUBJECT MATTER OF INTERNATIONAL CLIMATE CHANGE LAW

International climate change law focuses on four basic issues: (1) mitigation of climate change—that is, limiting it or preventing it from happening; (2) adaptation to climate change, in order to limit its harmful effects; (3) financial and other means of support for mitigation and adaptation; and (4) international oversight to promote implementation, compliance, and effectiveness.

In the development of international climate change law, states have taken differing views on whether the climate regime should focus primarily on mitigation,

[56] For a brief discussion of climate change litigation, see Chapter 8, Section VI.

[57] Birnie, Boyle, and Redgwell make a similar argument in relation to 'international environmental law' and public international law. Patricia Birnie, Alan Boyle, and Catherine Redgwell, *International Law and the Environment* (Oxford University Press, 3rd edn, 2009) 2–4.

[58] Elizabeth Fisher *et al.*, 'Maturity and Methodology: Starting a Debate about Environmental Law Scholarship', *Journal of Environmental Law*, 21/2 (2009): 213, 241.

[59] See generally Duncan French and Lavanya Rajamani, 'Climate Change and International Environmental Law: Musings on a Journey to Somewhere', *Journal of Environmental Law*, 25/3 (2013): 437.

or should strike a balance between mitigation and adaptation. Although the objective of the FCCC refers to both mitigation and adaptation,[60] in the first decade of the UN climate regime's existence, the focus was squarely on mitigation. The negotiation and elaboration of the Kyoto Protocol, prescribing GHG mitigation targets and timetables for developed countries, preoccupied states from 1995 until 2001. It was only thereafter that the climate regime began seriously considering ways to enhance adaptation action, co-operation, and support. Meanwhile, throughout the history of the regime, developing countries, in particular, have been focused on financial assistance and other means of implementation, including technology transfer and capacity building. Finally, a major emphasis of the UN climate regime has been to develop a robust system of reporting and review, in order to promote transparency, and, perhaps less consistently over the years, to develop strong procedures to determine and impose consequences for non-compliance.

A. Mitigation

Much of international climate change law focuses on mitigation, which encompasses both measures to limit GHG emissions and measures to preserve or enhance sinks.[61] Policies to reduce emissions include energy efficiency standards, subsidies for renewable energy, a carbon tax, an emissions trading system, funding of urban mass transit systems, and technology research and development. Sinks policies generally relate to land use, land-use change, and forestry (LULUCF), and include measures to reduce emissions from deforestation and forest degradation (REDD+) and to encourage afforestation.

Issues relating to mitigation include:

- *Whether to address emissions on an economy-wide basis or at a sectoral level*? Generally, the UN climate regime has sought to address aggregate national emissions and has not separated out particular sectors such as electricity generation or buildings.[62] But a few sectors receive specific attention, including emissions from international maritime and air transport, which are addressed through the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO), respectively,[63] and forestry, which is the subject of REDD+.[64]
- *Whether to regulate greenhouse gases comprehensively or gas-by-gas?* Although CO_2 accounts for more than two-thirds of total GHG emissions[65] and, except

[60] FCCC, Art 2.
[61] IPCC, *Climate Change 2014: Mitigation of Climate Change* (n 11) SPM, 4.
[62] Ibid. By contrast, the IPCC report on mitigation analyzes policy on a sectoral basis, with sections discussing energy supply, energy end-use sectors, land use, buildings, infrastructure, and so forth.
[63] See Chapter 8, Sections IV.A.1. and IV.A.2.
[64] See generally Christina Voight (ed), *Research Handbook on REDD+ and International Law* (Cheltenham: Edward Elgar Publishing, 2016).
[65] IPCC, *Climate Change 2014: Synthesis Report* (n 1) SPM, Figure SPM 1.2.

for emissions from land use, can be accurately accounted, the UN climate regime has not focused specifically on CO_2. Instead, it seeks to promote cost-effectiveness by addressing GHGs comprehensively, which allows states to focus on whichever gases can be reduced at the least cost.[66] In contrast, efforts to address climate change through the Montreal Protocol have focused on particular gases—hydrochlorofluorocarbons (HCFCs) initially and, currently, hydrofluorocarbons (HFCs).[67]

- *Whether to prescribe particular measures internationally or give states flexibility?* In general, international climate change law has not tried to prescribe particular mitigation measures. Instead, as discussed in Section V.2 below, it has adopted either a bottom-up approach that allows states to develop and report on their own policies, or, when it has prescribed rules internationally, the rules have been obligations of result—for example, to reduce emissions by some specified amount—which allow states to choose what policies they will use to achieve the required result. One exception to this general rule is IMO's work to limit emissions from maritime shipping under the International Convention for the Prevention of Pollution from Ships (MARPOL),[68] which has involved the adoption of mandatory energy efficiency standards for vessels.[69]
- *Whether to give states flexibility in deciding where to reduce emissions?* Market mechanisms such as emissions trading allow countries to implement their mitigation commitments through emissions reductions in another country. The FCCC contained an embryonic market mechanism by allowing parties to undertake activities jointly to reduce emissions.[70] The Kyoto Protocol employs market mechanisms much more extensively, by allowing states to (1) receive credits for undertaking emissions projects in another country through the Clean Development Mechanism and joint implementation; and (2) trade emissions allowances with other parties, selling to countries with higher mitigation costs and buying from countries with lower costs.[71]
- *The extent to which commitments of states should be tailored to their differing capabilities and responsibilities, and how?* The issue of differentiation has been one of the most controversial in the context of mitigation, and is discussed separately in Section V.C below.

[66] See Chapter 5, Section IV.B.2.

[67] Montreal Protocol on Substances that Deplete the Ozone Layer (adopted 16 September 1987, entered into force 1 January 1989) 1522 UNTS 3 (Montreal Protocol). For a discussion of the Montreal Protocol, see Chapter 8, Section IV.B.

[68] Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships (adopted 17 February 1978, entered into force 2 October 1983) 1340 UNTS 61 (MARPOL 73/78).

[69] See Chapter 8, Section IV.A.1.

[70] See Chapter 5, Section IV.B.3.

[71] These market mechanisms are discussed in detail in Chapter 6, Section V.

B. Adaptation

Scientists predict that climate change will have dramatic impacts on coastal areas, agriculture, forests, human health, and biodiversity, creating a need for adaptation. Adaptation involves 'anticipating the adverse effects of climate change and taking appropriate action to prevent or minimize the damage they can cause'.[72] Some adaptation activities focus specifically on climate change impacts, such as developing heat-resistant crops and building sea walls. But many adaptation activities are aimed at improving the resilience of societies against risks generally, by building capacity, reducing poverty, and strengthening disaster preparedness.

In contrast to mitigation, which requires collective action, adaptation can usually be undertaken by individual states. Moreover, states have an individual incentive to act, since the benefits of adaptation measures generally flow to the state undertaking them, rather than to the international community as a whole. For these reasons, the role of international cooperation is very different for adaptation than for mitigation. An international climate regime need not impose commitments to adapt, since states have an interest in doing so on their own. Instead, the primary function of international cooperation is to provide support for adaptation and to facilitate information sharing.

International action to address adaptation has three basic rationales. First, since the biggest impacts of climate change will fall on states that contribute little to the problem, such as small island states, the countries that are causing the problem should, as a matter of restorative justice, provide assistance to those that will bear a disproportionate share of the burden. Second, the countries most severely affected by climate change tend to be poor, with limited capacity to respond. So international assistance is needed to build their capacity. Finally, since the adaptation challenges faced by different countries are similar, states can learn from one another by exchanging information—for example, about tools for evaluating impacts or about successful policies and practices.

C. Finance

Finance emerged as a major issue in international environmental law in the late 1980s. The 1985 Vienna Convention for the Protection of the Ozone Layer did not provide for the transfer of financial resources.[73] Even the 1987 Montreal Protocol, which established specific control measures for developing countries, contained only a very weak commitment by developed countries to 'facilitate the provision of subsidies, aid, credits, guarantees or insurance programmes' to developing countries.[74] Following Montreal, however, developing countries began to assert that

[72] European Commission, Climate Action, 'Adaptation to Climate Change' <http://ec.europa.eu/clima/policies/adaptation/index_en.htm> accessed 20 January 2017.

[73] Vienna Convention for the Protection of the Ozone Layer (adopted 22 March 1985, entered into force 22 September 1988) 1513 UNTS 293.

[74] Montreal Protocol, Art 5.3.

they would accept obligations to limit their use of ozone-depleting substances only if developed states agreed to provide them with additional financial resources and technology. The 1990 London Amendments responded by establishing a World Bank-administered fund to help developing countries implement the Montreal Protocol.[75] For the most part, the UN climate regime picked up where the negotiations on the London Amendments left off.

Given the scale of resources required for mitigation and adaptation, and the arguable inequities inherent in visiting costly mitigation and adaptation measures on developing countries, especially those with negligible emissions and capacity, the extent of support offered to these countries is key to addressing climate change. But the world of finance brings its own set of complications, technocrats, and sensitivities. It involves many inter-related issues, which have plagued negotiators over the years:

- *What should be the overall magnitude of international funding?* As noted earlier, the World Bank and FCCC secretariat have estimated costs of hundreds of billions of dollars per year.[76] How much of these costs should be funded internationally? Although developed countries pledged at the 2009 Copenhagen conference (and again in the 2015 Paris Agreement) to mobilize $100 billion per year for climate finance,[77] this amount still falls well short of the World Bank and FCCC estimates. And, there are differing reports on the extent to which even this relatively modest commitment is on track to being fulfilled.[78]
- *Where should international funding come from—public sources, private sector investment flows, or automatic mechanisms such as a carbon tax?* The $100 billion mobilization pledge by developed countries includes funds mobilized from private sources (which, according to the FCCC secretariat, currently account for 86% of climate finance[79]).

[75] Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer (adopted 29 June 1990, entered into force 10 August 1992) (1991) 30 ILM 537.

[76] See nn 50–51 above and accompanying text.

[77] Decision 2/CP.15, 'Copenhagen Accord' (30 March 2010) FCCC/CP/2009/11/Add.1, 4 (Copenhagen Accord), para 8 (pledging to mobilize $100 billion per year by 2020); Decision 1/CP.21 (n 20) para 53 (extending $100 billion pledge through 2025).

[78] Compare Organisation for Economic Co-operation and Development (OECD), 'Climate Finance in 2013-2014 and USD 100 Billion Goal' (2015) <http://www.oecd.org/env/cc/Climate-Finance-in-2013-14-and-the-USD-billion-goal.pdf> accessed 20 January 2017 ($62 billion in climate finance mobilized in 2014) with Climate Change Finance Unit, Ministry of Finance, Government of India, 'Climate Change Finance, Analysis of a Recent OECD Report: Some Credible Facts Needed' (2015) <http://pibphoto.nic.in/documents/rlink/2015/nov/p2015112901.pdf > accessed 20 January 2017 (criticizing the methodology of the OECD report).

[79] FCCC, 'Fact sheet: Financing climate change action: Investment and financial flows for a strengthened response to climate change' <http://unfccc.int/press/fact_sheets/items/4982.php> accessed 20 January 2017. See generally Barbara Buchner *et al.*, 'The Landscape of Climate Finance 2012' (Climate Policy Initiative, November 2012) <http://climatepolicyinitiative.org/wp-content/uploads/2012/12/The-Landscape-of-Climate-Finance-2012.pdf> accessed 20 January 2017; Smita Nakhooda, Neil Bird, and Liane Schalatek, 'Climate Finance Fundamentals Brief 3: Adaptation Finance' (Heinrich Böll Stiftung and Overseas Development Institute, November 2011).

- *If public funds are used, which countries should have funding obligations and how should the level of their contributions be determined?* Should provision of support, and the quantum, be mandatory or voluntary? The UN climate regime imposes obligations to provide finance only on countries included in Annex II to the FCCC (comprising members of the Organization of Economic and Cooperation and Development (OECD) as of 1992), but allows each Annex II party to decide on the amount of its contribution.
- *Which countries should be entitled to receive assistance?* Should all developing countries be included, a sub-set that have special circumstances such as Least Developed Countries (LDCs) and Small Island Developing States, or a broader group that includes economies in transition (EITs) and Turkey? The UN climate regime generally provides assistance only to developing countries,[80] but does not define exactly which countries count as developing.
- *What types of costs should be covered?* Should finance be provided only for the costs of preparing GHG inventories and reports or also for implementing measures to reduce emissions, for adapting to climate change, and for the 'loss and damage' caused by climate change? There is some appetite among developed countries to provide financial assistance for reporting, but little or none for the other categories of costs.
- *How should financial resources be administered?* Who should decide how the money is spent? Should spending be determined bilaterally through negotiations between the donor and recipient states? Or should financial assistance be administered multilaterally—for example, by an existing institution such as the Global Environment Facility (GEF) or by a new institution created under the FCCC? The FCCC established a multilateral financial mechanism (initially operated by the GEF, now also by the Green Climate Fund), but also recognized that states could provide assistance bilaterally.[81]

D. Oversight

International oversight encompasses mechanisms to promote implementation, compliance, and effectiveness. These can include: (1) national reporting on GHG emissions and on mitigation and adaptation measures, (2) expert review of information provided by states, (3) mechanisms to assess implementation and compliance, (4) reviews of effectiveness, and (5) formal dispute settlement. All but the latter figure prominently in international climate change law. The FCCC established reporting requirements, authorized the development of an expert review process, and provided for a review of effectiveness. The Kyoto Protocol created more stringent oversight for states with binding emissions targets, including a compliance mechanism that can take enforcement actions. And the Paris Agreement provides

[80] FCCC, Art 4.3. [81] Ibid, Art 11.5.

for an enhanced transparency framework applicable to all parties, an implementation and compliance mechanism, and regular stocktakes of progress.

V. RECURRING THEMES IN THE UN CLIMATE REGIME

In seeking to address the climate change problem, the UN climate regime has explored different solutions—tweaking, amending, and even changing course. Three recurring issues have characterized these explorations: the legal form of climate instruments and the legal character of provisions in them; the architecture of climate instruments; and differentiation among countries, in particular, between developed and developing countries.

The experimentation within the climate regime, in relation to all three recurring themes, reflects parties' sustained effort to develop a regime that is both effective and equitable.[82] For the regime to be effective, it must attract wide, if not universal, participation, it must provide for deep cuts in global emissions, and it must be complied with. However, securing universal participation as well as deep cuts has proven difficult because of concerns about reciprocity, economic harm, and fairness or equity in burden sharing. To be effective over time, the agreement also needs to be responsive to evolving science and technology as well as changing economic conditions and emissions profiles of countries and regions. This dimension too has proven difficult to secure in the UN climate regime. Many of the difficulties in securing participation, deep cuts, and evolution in the climate regime can be traced to a lack of trust among its participants. Ultimately, for an agreement to be effective it must generate a sense of ownership and commitment, which can only develop under conditions of mutual confidence and understanding. The climate regime's experiments with legal form and character, architecture, and differentiation speak to the issues of building trust, encouraging participation and promoting learning, dynamism, compliance, and effectiveness. These issues are further discussed in Chapter 3, and the three recurring themes introduced below provide the context and sub-text for much of the discussion in the subsequent chapters of this book.

A. Legal bindingness

The potentially high costs of climate change action, combined with the deeply discordant political context in which the climate regime has evolved, have led to considerable innovation in developing legal instruments and provisions of varying degrees of normative force,[83] thereby blurring the boundaries between

[82] See eg Kal Raustalia, 'Compliance and Effectiveness in International Regulatory Cooperation', *Case Western Reserve Journal International Law*, 32/3 (2000): 387.

[83] This section draws on material from French and Rajamani, Climate Change and International Environmental Law (n 59).

law and non-law. A legally binding instrument 'communicates expectations', 'produces reliance', and generates 'compliance pull'.[84] In these ways, it helps generate 'credible commitments',[85] and its violation entails higher reputational costs.[86] Legally binding instruments also typically are more durable and survive domestic political changes more than non-binding ones.[87] However, committing to a legally binding instrument also entails significant real and perceived 'sovereignty costs'.[88] States may lose autonomy over decision-making in some of the areas regulated by the agreement as well as expose national decision-making to international scrutiny.[89] There is a risk, therefore, that making an instrument legally binding will lead to less participation or less ambitious commitments, thereby negatively impacting its effectiveness.[90] For example, many states, including China, India, and the US, were unwilling to accept legally binding limits on their emissions in the Kyoto Protocol and, as a result, it covered only about a quarter of global emissions. In turn this outcome helped prompt innovation and experimentation with informal, soft, and hortatory norms, which could garner more widespread participation. These issues are discussed in further detail in Chapter 3.

1. Treaties

The 1992 FCCC, its 1997 Kyoto Protocol, and the 2015 Paris Agreement, as treaties, are legally binding instruments. However, provisions within these instruments vary in their legal force, ranging from those that merely provide context or narrative to those that establish legal obligations.[91] The legal 'bindingness' of a treaty provision depends on many factors, including:

- Where it occurs—in the preamble or operative part of an agreement.
- Who the provision addresses—states, collectively or individually, or others.
- Whether it uses mandatory or recommendatory language.
- How precise it is.

[84] Dinah Shelton, 'Introduction', in Dinah Shelton (ed), *Commitment and Compliance: The Role of Non-Binding Norms in the International Legal System* (Oxford University Press, 2000) 8; Thomas M. Franck, *The Power of Legitimacy Among Nations* (Oxford University Press, 1993).

[85] Kenneth Abbott and Duncan Snidal, 'Hard and Soft Law in International Governance', *International Organisation*, 54/3 (2000): 421, 426.

[86] Ibid, 427; see also Jacob Werksman, 'The Legal Character of International Environmental Obligations in the Wake of the Paris Climate Change Agreement' (Brodies Environmental Law Lecture Series, 2016).

[87] Werksman, ibid. There are exceptions of course. Consider the example of Canada, which signed and ratified the Kyoto Protocol under one government but changed its attitude toward, and eventually withdrew from, the protocol under another government.

[88] Abbott and Snidal (n 86) 436–41. [89] Ibid.

[90] Daniel Bodansky, 'Legally-Binding versus Non-Legally Binding Instruments', in Scott Barrett, Carlo Carraro, and Jaime de Melo (eds), *Towards a Workable and Effective Climate Regime* (London: Centre for Economic Policy Research Press, 2015) 155.

[91] See Chapter 7, Section II.A.

- What institutional mechanisms exist for transparency, accountability, and compliance.[92]

Thus, for instance, the GHG mitigation obligation in the FCCC's Article 4.2 requiring developed countries to take policies and measures, 'with the aim of' returning to 1990 emissions levels, is a soft obligation or a 'quasi-target'.[93] The GHG mitigation obligation in Article 3 of the Kyoto Protocol requiring developed countries to meet their GHG targets listed in Annex B is a hard obligation (parties 'shall'),[94] as are the obligations in Article 4.2 of the Paris Agreement to prepare, communicate, and maintain nationally determined contributions (NDCs). The distinction between 'obligations of conduct' and 'obligations of result' is also significant, and the international climate regime is replete with instances of both. Kyoto Protocol Article 3 is an obligation of result in that parties are bound to achieve the targets listed in Annex B, in contrast to Paris Agreement Article 4.2, which establishes obligations of conduct (eg to 'prepare, communicate and maintain' NDCs).

2. Decisions of parties

In addition to treaties, the international climate regime contains hundreds of decisions taken by the conferences of parties to the FCCC and the Kyoto Protocol.[95] Conference of the parties (COP) decisions are not in a formal sense legally binding, unless the parent treaty provides explicit authority to the COP to take binding decisions.[96] COP decisions have come, however, to acquire tremendous operational and legal significance in the climate regime. They have enriched and expanded the normative core of the regime by fleshing out treaty provisions,[97] reviewing the adequacy of existing obligations,[98] and launching negotiations to adopt further agreements.[99] COP decisions have also created an elaborate institutional

[92] Lavanya Rajamani, 'The 2015 Paris Agreement: Interplay Between Hard, Soft and Non-Obligations', *Journal of Environmental Law*, 28/2 (2016): 337; see also Bodansky, Legally Binding versus Non-Legally Binding Instruments (n 90); Daniel Bodansky, 'The Legal Character of the Paris Agreement', *Review of European, Comparative and International Law*, 25/2 (2016): 142.

[93] Chapter 5, Section IV.B.1.

[94] Kyoto Protocol, Art 3.1.

[95] See FCCC, Art 7; Kyoto Protocol, Art 9; some argue that the legislative competencies provided in some multilateral environmental agreements to progressively develop the regime amount to 'powers of formal revision of the treaty'. See Volker Röben, 'Institutional Developments under Modern International Environmental Agreements', *Max Planck Yearbook of United Nations Law*, 4/1 (2000): 363, 391.

[96] From a formal legal perspective COP decisions are not, absent explicit authorization, legally binding. See Jutta Brunnée, 'COPing with Consent: Law-Making under Multilateral Environmental Agreements', *Leiden Journal of International Law*, 15/1 (2002): 1.

[97] See eg Kyoto Protocol, Arts 6.2, 12.7, and 17, and Decision 2/CMP.1, 'Principles, Nature and Scope of the Mechanisms pursuant to Article 6, 12 and 17 of the Kyoto Protocol' (30 March 2006) FCCC/KP/CMP/2005/8/Add.1.

[98] Pursuant to FCCC, Art 4.2(d).

[99] See eg Decision 1/CP.1, 'The Berlin Mandate: Review of the adequacy of Article 4, paragraph 2(a) and (b), of the Convention, including proposals related to a protocol and decisions on follow-up' (6 June 1995) FCCC/CP/1995/7/Add.1, 4 (Berlin Mandate); Decision 1/CP.17, 'Establishment of an Ad Hoc Working Group on the Durban Platform for Enhanced Action' (11 December 2011) FCCC/CP/2011/9/Add.1, 2 (Durban Platform).

architecture to supervise implementation and compliance.[100] The operational significance of COP decisions is further strengthened by the fact that treaty language in the climate regime is often marked by constructive ambiguity, reflecting and auguring protracted dissonance. Therefore, agreed language, even in COP decisions, is often highlighted, cited, and reproduced in subsequent legal texts. For instance, selective language from the Berlin Mandate, a COP decision, is reflected verbatim in operational provisions of the Kyoto Protocol.[101] In addition, COP decisions such as the Berlin Mandate, the Bali Action Plan,[102] and the Durban Platform, which launched new rounds of negotiations, created frameworks and attendant boundaries that parties seldom diverged from. The Berlin Mandate, for instance, specifically excluded new commitments for developing countries and the Kyoto Protocol consequently contained none.

COP decisions also often contain many of the characteristics that provide normative force, despite the fact they are not a formal source of law. They can be precise, as for instance decisions relating to the eligibility requirements to participate in emissions trading.[103] They, on occasion, use mandatory language ('shall').[104] As a result, COP decisions may influence and condition state behavior—indeed, even exert a compliance pull—to a greater extent than imprecise or hortatory treaty provisions.

3. Political agreements

In addition to treaties and decisions of parties, the international climate regime contains political agreements of tremendous salience, most notably the 2009 Copenhagen Accord.[105] The Copenhagen Accord was reached among heads of state and government of twenty-eight parties to the FCCC, including all major emitters and economies, as well as those representing the most vulnerable and least developed states, but was only noted by the COP, not formally adopted.[106] The Copenhagen Accord therefore was neither a COP decision that could be operationalized through the FCCC institutional architecture, nor an independent

[100] For example, bodies with considerable influence and consequences for state and non-state actors, such as the Clean Development Mechanism Executive Board, the Joint Implementation Supervisory Committee, and the Compliance Committee, were all constituted by COP decisions. See Decisions 2-24/CP.7, 'Marrakesh Accords' (21 January 2002) FCCC/CP/2001/13 (Marrakesh Accords).

[101] Compare paragraph 2(b), Berlin Mandate, and the chapeau of Article 10, Kyoto Protocol. Both contain language on not 'introducing any new commitments for Parties not included in Annex I, but reaffirming existing commitments'.

[102] Decision 1/CP.13, 'Bali Action Plan' (14 March 2008) FCCC/CP/2007/6/Add.1, 3 (Bali Action Plan).

[103] Decision 11/CMP.1, 'Modalities, rules and guidelines for emissions trading under Article 17 of the Kyoto Protocol' (30 March 2006) FCCC/KP/CMP/2005/8/Add.2.

[104] Brunnée, COPing with Consent (n 96) 26, 29.

[105] Other examples include Report of the Conference of the Parties on its Second Session, held at Geneva from 8 to 19 July 1996, Addendum (29 October 1996) FCCC/CP/1996/15/Add.1, Annex: The Geneva Ministerial Declaration; Decision 1/CP.8, 'Delhi Ministerial Declaration on Climate Change and Sustainable Development' (28 March 2003) FCCC/CP/2002/7/Add.1.

[106] Decision 2/CP.15 (n 77) preambular recital.

plurilateral agreement with its own operational architecture and legal commitments. The FCCC Secretariat, in fact, has made it clear that the Accord's provisions 'do not have any legal standing' in the UN climate regime.[107] Yet the Accord is arguably one of the most influential documents to have emerged from the climate negotiations. Its architecture, which privileges national sovereignty over international prescription,[108] captures self-selected targets and actions, and focuses on transparency provisions, represented a step change in the evolution of the climate regime, and provided a template for the design of the 2015 Paris Agreement.[109] The true significance of the Accord lies not in its legal character, but rather in the emerging political consensus that it reflects. First, unlike any multilateral agreement in living memory, the heads of state of the world's largest economies negotiated the Copenhagen Accord. It thus provides unparalleled political guidance in an area rife with discord.[110] Second, 141 states representing over 87%[111] of global emissions eventually associated themselves with the Accord.[112] By contrast, although the Kyoto Protocol has 192 parties, its emissions reductions commitments cover only a fraction of global emissions.[113] Third, the political compromises in the Accord were fleshed out and adopted into the formal UN process a year later through the Cancun Agreements adopted by COP16.[114] The influence of the Copenhagen Accord exemplifies the now increasingly credible thesis that, in international environmental law, 'informal, non-binding norms may come to shape practice quite effectively'.[115] In contrast, the Kyoto Protocol, despite its legally binding character

[107] See FCCC, 'Notification to Parties, Clarification relating to the Notification of 18 January 2010' (25 January 2010) <http://unfccc.int/files/parties_and_observers/notifications/application/pdf/100125_noti_clarification.pdf> accessed 20 January 2017.

[108] See Submission from the US 'Submission of the United States to the AWG-LCA Chair' (30 April 2010) FCCC/AWGLCA/2010/MISC.2, 79 (noting that '[t]he Accord text also usefully bows in the direction of national sovereignty').

[109] See Daniel Bodansky, 'The Paris Climate Agreement: A New Hope?', *American Journal of International Law*, 11/02 (2016): 288.

[110] See Submission from Japan (30 April 2010) FCCC/AWGLCA/2010/MISC.2, 66 (noting that the Accord is an 'extremely important document' and it provides 'high level political guidance'), Submission from New Zealand (30 April 2010) FCCC/AWGLCA/2010/MISC.2, 72 (noting that 'it is a clear letter of political intent and unprecedented in its conception'); the Submission from the United States (16 March 2010) FCCC/KP/AWG/2010/MISC.1 and FCCC/AWGLCA/2010/MISC.1, 48 (noting 'the historic nature' of the Copenhagen Conference).

[111] See US Climate Action Network, 'Who's On Board with the Copenhagen Accord?', <http://www.usclimatenetwork.org/policy/copenhagen-accord-commitments> accessed 20 January 2017.

[112] See FCCC, 'Copenhagen Accord' <http://unfccc.int/meetings/copenhagen_dec_2009/items/5262.php> accessed 20 January 2017.

[113] Japan cited this as the reason for its decision not to adopt second commitment period targets under Kyoto. See Ministry of Foreign Affairs, Government of Japan, 'Japan's Position Regarding the Kyoto Protocol' (December 2010) <http://www.mofa.go.jp/policy/environment/warm/cop/kp_pos_1012.html> accessed 20 January 2017.

[114] Decision 1/CP.16, 'The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention' (15 March 2011) FCCC/CP/2010/7/Add.1, 2 (Cancun Agreements LCA).

[115] Stephen J. Toope, 'Formality and Informality', in Daniel Bodansky, Jutta Brunnée, and Ellen Hey (eds), *Oxford Handbook of International Environmental Law* (Oxford University Press, 2007) 108, 119.

and its many innovations,[116] did not see much of its architecture survive in the 2015 agreement.

It is not unusual in international environmental law for a soft law instrument to act as a precursor for a hard law instrument,[117] as the Copenhagen Accord did for the Paris Agreement. What is unusual is that the soft law in this instance did not predate the entire formal regime, viz. the FCCC and Kyoto Protocol, but was resorted to at a particular stage in the evolution of the climate regime—an experimental stage that necessitated a roll back in the formality of the law. The progression of norms in the climate regime thus did not assume a linear trajectory from soft to hard. Rather, it meandered back and forth, from the comparatively vague and in some cases hortatory provisions of the FCCC, to the hard obligations of result in the Kyoto Protocol, to the political agreement reflected in the Copenhagen Accord, to the hard obligations of conduct in the Paris Agreement.

B. Architecture

International agreements vary widely in the latitude that they give participating states.[118] Some take a top-down approach, defining particular policies and measures that parties must undertake. Others adopt a more bottom-up approach, allowing each participating state to define its own commitments. In the environmental realm, the Convention on International Trade in Endangered Species (CITES)[119] illustrates the top-down approach. It prescribes which species to protect and how to do so (through a permitting system for imports and exports).[120] Similarly, MARPOL prescribes very specific rules regarding the construction, design, and performance of oil tankers.[121] Conversely, the US–Canada Air Quality Agreement illustrates a more bottom-up approach, largely codifying in an international agreement the domestic air pollution programs of the two participating states.[122]

[116] Differentiation in central obligations, and the enforcement branch of the compliance system, to name two.

[117] For example, in regulating trade in chemicals and pesticides, states initially negotiated the International Code of Conduct on the Distribution and Use of Pesticides (adopted on 28 November 1985 by Resolution 10/85 by the Food and Agriculture Organization of the United Nations Conference at its Twenty-third Session) and the London Guidelines for the Exchange of Information on Chemicals in International Trade (adopted by the UNEP Governing Council at its Fourteenth session). See UNEP Governing Council Decision 14/27 'Environmentally safe management of chemicals, in particular those that are banned and severely restricted in international trade' Official Records of the General Assembly, Forty-second Session (8–19 June 1987) (28 September 1987) Supplement No. 25 (A/42/25). These two documents became the basis for the Rotterdam Convention. See Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (adopted 10 September 1998, entered into force 24 February 2004) 2244 UNTS 337.

[118] This paragraph is drawn from Daniel Bodansky, 'A Tale of Two Architectures: The Once and Future U.N. Climate Change Regime', *Arizona State Law Journal*, 43/6 (2011): 697.

[119] Convention on International Trade in Endangered Species of Wild Fauna and Flora (adopted 3 March 1973, entered into force 1 July 1975) 993 UNTS 243.

[120] Ibid. [121] MARPOL 73/78 (n 69) Annex I.

[122] Agreement Between the Government of Canada and the Government of the United States of America on Air Quality (entered into force 31 March 1991) (1991) 30 ILM 676.

Similarly, the Ramsar Convention on Wetlands encourages countries to promote the conservation and 'wise use' of wetlands, but gives countries broad discretion to determine the policies and measures that they will use to do so.[123]

In the UN climate regime, states have continually grappled with the issue of how much latitude to give states in developing their own climate change policies. Some argue that the nature of climate change as a classic collective action problem demands a top-down approach, which prescribes collectively negotiated emissions targets for states. Others advocate a bottom-up, facilitative approach in which international pledges grow out of, and reflect, domestic policies.[124] They argue that such an approach is necessary, since climate change is not simply an international issue; it engages virtually every aspect of domestic policy.

In essence, the history of the UN climate regime ever since has consisted of variations on these two architectures:

- The FCCC had elements of both architectures. On the one hand, it established a system of 'pledge and review', in which states put forward nationally determined policies and measures subject to international review. On the other hand, it established an internationally negotiated emissions aim for the developed countries and other parties listed in Annex I to the FCCC.[125]
- The Kyoto Protocol reflected a more top-down prescriptive approach. Although it gave parties flexibility in deciding how to implement their emissions targets, the targets themselves were internationally negotiated rather than nationally determined.[126]
- The Copenhagen Accord/Cancun Agreements moved toward a bottom-up facilitative approach, centered around nationally determined pledges.[127]
- Finally, the Paris Agreement reflects a hybrid architecture, containing both bottom-up and top-down elements.[128]

As the Kyoto Protocol and the Copenhagen Accord illustrate, the top-down and bottom-up approach each have advantages and disadvantages. The Kyoto Protocol represents the archetypal 'top-down' architecture, with its pursuit of a common objective implemented through multilaterally negotiated targets and timetables, a strong measurement, reporting and verification (MRV) system, and a compliance mechanism with an enforcement branch.[129] However, while these elements all promoted ambition, they came at the expense of participation. The Kyoto Protocol

[123] Convention on Wetlands of International Importance especially as Waterfowl Habitat (adopted 2 February 1971, entered into force 21 December 1975) 996 UNTS 245 (Ramsar Convention) Art 3.1.
[124] Bodansky, Paris Climate Agreement (n 109).
[125] See generally Chapter 5, discussing the FCCC.
[126] See generally Chapter 6, discussing the Kyoto Protocol.
[127] See generally Bodansky, Tale of Two Architectures (n 118).
[128] See generally Chapter 7, discussing the Paris Agreement.
[129] For a defense of the top-down architecture, see William Hare *et al.*, 'The Architecture of the Global Climate Regime: A Top-Down Perspective', *Climate Policy*, 10/6 (2010): 600. See also Harald Winkler and Judy Beaumont, 'Fair and Effective Multilateralism in the Post-Copenhagen Climate Negotiations', *Climate Policy*, 10/6 (2010): 638.

excluded developing countries' emissions from the ambit of its emissions targets, and failed to attract the participation of the US. Moreover, participation further shrunk in the Kyoto Protocol's second commitment period running from 2013 to 2020, with several developed countries opting out, including Japan and Russia.[130] Although the parties with emissions targets were all assessed in compliance at the end of first commitment period in 2012, they accounted for only 24% of 2010 global emissions,[131] and the Kyoto Protocol will cover an even smaller fraction of global emissions in its second commitment period, assuming the relevant amendment enters into force.[132]

In contrast, the FCCC, the Copenhagen Accord, and the Cancun Agreements all, to varying degrees, endorse a 'bottom-up' approach, and garnered much greater participation. Although a top-down approach is not necessarily incompatible with flexibility, a bottom-up approach grants more discretion and autonomy to states and therefore, arguably, is better suited to their diversity of national circumstances, political constraints, and developmental choices.[133] The FCCC has attracted universal participation, and 141 countries put forward emissions pledges under the Copenhagen Accord, representing more than 85% of global emissions.[134] This broader participation not only increases the regime's environmental effectiveness; it can also reduce costs by including more low cost mitigation options across a larger market.[135] Nevertheless, greater participation does not necessarily produce greater effectiveness, since greater heterogeneity of participants often comes at the expense of ambition and rigor.[136] The Copenhagen/Cancun pledges were modest in their

[130] See Letter to Ms Christiana Figueres, Executive Secretary of the UNFCCC, from the Head of Roshydromet, National Climate Change Coordinator, The Russian Federation (8 December 2010) <http://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/russianfederation_cph10.pdf> accessed 20 January 2017; Letter to Ms Christiana Figueres, Executive Secretary of the UNFCCC, from the Japanese Ambassador for COP16 of the UNFCCC (10 December 2010) <http://unfccc.int/files/meetings/ad_hoc_working_groups/kp/application/pdf/japan_awgkp15.pdf> accessed 20 January 2017. New Zealand has decided not to accept an emissions target in Kyoto's second commitment period, see Tim Groser, 'New Zealand Commits to UN Framework Convention', *Government of New Zealand Press Release* (9 November 2012) <https://www.beehive.govt.nz/release/new-zealand-commits-un-framework-convention> accessed 20 January 2017. Canada has formally withdrawn from the Kyoto Protocol. See United Nations, Kyoto Protocol to the United Nations Framework Convention on Climate Change, 11 December 1997, 'Canada: Withdrawal' (16 December 2011) C.N.796.2011.TREATIES-1 <http://unfccc.int/files/kyoto_protocol/background/application/pdf/canada.pdf.pdf> accessed 20 January 2017.

[131] Igor Shishlov, Romain Morel, and Valentin Bellassen, 'Compliance of the Parties to the Kyoto Protocol in the First Commitment Period', *Climate Policy*, 16/6 (2016): 768.

[132] Australia, Belarus, the EU, Iceland, Kazakhstan, Norway, Switzerland, and Ukraine between them account for 13.96% of global GHG emissions in 2010, excluding emissions from the land sector. Even if contributions to the global carbon stock or historical responsibility are factored in, these countries will account only for 24% of global CO_2 emissions. Cumulative CO_2 emissions excluding LULUCF during 1850–2012 (in % of world total)—the EU (24%), Australia (0.01%), Norway (0.001%), Switzerland (0.002%). See WRI, CAIT Climate Data Explorer (n 40).

[133] For a defense of the bottom-up architecture see Steve Rayner, 'How to Eat an Elephant: A Bottom-up Approach to Climate Policy', *Climate Policy*, 10/6 (2010): 615.

[134] US Climate Action Network, Copenhagen Accord (n 111).

[135] See discussion in IPCC, *Climate Change 2014: Mitigation of Climate Change* (n 11) 1014.

[136] As the LDCs warned in the Durban Platform negotiations, '[a] voluntary, non-binding, pledge and review regime is unable to deliver what is required by science to address the climate challenge

ambition and also, in some cases, heavily qualified and conditioned on actions by others.[137] As a result, their aggregate effect[138] fell well short of the emissions pathways consistent with the goal of limiting global average temperature increase to below 2° C above pre-industrial levels.[139]

The Paris Agreement seeks to find a middle ground, through a hybrid architecture that combines a bottom-up approach to promote flexibility and participation with a top-down system of international rules to promote ambition and accountability.[140] The bottom-up element comprises the NDCs of parties.[141] Although these are subject to expectations of 'progression' and 'highest possible ambition'[142] for all and leadership for developed countries, they are ultimately self-determined, making it possible for countries across the entire spectrum of differing national circumstances to participate. The top-down elements comprise these expectations referred to, the five-year cycles of global stocktake to assess collective progress toward long-term goals and successive NDCs,[143] a transparency framework applicable to all,[144] and a facilitative compliance system.[145] The Paris Agreement, with its hybrid architecture, has proven its ability to attract virtually universal participation: 191 states,[146] accounting for 99% of global emissions,[147] have submitted NDCs in the context of the Paris Agreement. A record 175 FCCC parties signed the Agreement on 22 April 2016,[148] when it opened for signature, and the Paris Agreement entered into force on 4 November 2016, less than a year after it was adopted.[149] However, the contributions submitted by parties so far, like the pledges submitted under the Copenhagen Accord and Cancun Agreements, are not consistent with limiting temperature rise to 2° C.[150] Moreover, many of the top-down

and could lead towards 4° C warming world'. Submission by Nepal on behalf of the Least Developed Countries Group on the ADP Work Stream 1: The 2015 Agreement, Building on the Conclusions of the ADP 1-2 (3 September 2013) <http://unfccc.int/files/documentation/submissions_from_parties/adp/application/pdf/adp_ldcs_20130903.pdf> accessed 20 January 2017.

[137] See generally Lavanya Rajamani, 'The Making and Unmaking of the Copenhagen Accord', *International and Comparative Law Quarterly*, 59/3 (2010): 824.

[138] Compilation of economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention, Revised note by the secretariat (7 June 2011) FCCC/SB/2011/INF.1/Rev.1; Compilation of information on nationally appropriate mitigation actions to be implemented by Parties not included in Annex I to the Convention, Note by the secretariat (18 March 2011) FCCC/AWGLCA/2011/INF.1.

[139] UNEP, 'Bridging the Emissions Gap – A UNEP Synthesis Report' (UNEP, 2011).

[140] Bodansky, Paris Climate Agreement (n 109). [141] Paris Agreement, Art 4.2.

[142] Ibid, Art 4.3. [143] Ibid, Art 14. [144] Ibid, Art 13. [145] Ibid, Art 15.

[146] FCCC, 'INDCs as communicated by the Parties' <http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx>, accessed 20 January 2017.

[147] FCCC, Aggregate Effect of the Intended Nationally Determined Contributions: An Update, Synthesis report by the secretariat (2 May 2016) FCCC/CP/2016/2, 4.

[148] See for a list of signatories, FCCC, 'List of 175 signatories to Paris Agreement' <http://newsroom.unfccc.int/paris-agreement/175-states-sign-paris-agreement/> accessed 20 January 2017.

[149] See for the status of ratification, FCCC, 'Paris Agreement - Status of Ratification' <http://unfccc.int/paris_agreement/items/9485.php> accessed 20 January 2017.

[150] UNEP, 'The Emissions Gap Report 2015' (Nairobi: UNEP, November 2015) 26 (INDCs are most consistent with long-term scenarios that limit global average temperature increase to below 3–3.5° C by the end of the century with >66% chance); FCCC, Aggregate Effect of the Intended Nationally Determined Contributions (n 147) 13. (According to the AR5, the total global cumulative emissions since 2011 that are consistent with a global average temperature rise of less than 2° C above

elements of the Agreement have yet to be fleshed out, and it remains to be seen how rigorous they will be.

As this history of the UN climate regime illustrates, trade-offs between breadth of participation and depth of commitments are central to the design of international instruments. In essence, the top-down and bottom-up architectures reflect two contrasting strategies for developing a treaty regime over time: a start-deep-and-broaden strategy, and a start-broad-and-deepen strategy. The top-down approach of the Kyoto Protocol sought to achieve depth of commitments first, in the expectation that breadth of participation would develop over time. But when participation in the Kyoto system instead shrunk, parties changed course and adopted the Copenhagen/Cancun approach, which sought to achieve breadth of participation first.[151] The Paris Agreement continues this focus on breadth, but also establishes an expectation of 'progression' and thus of greater depth over time. It remains to be seen whether this hybrid approach will be adequate to respond to the urgency of the climate challenge.

In general, the approach to oversight in international climate change law has reflected the 'managerial' rather than the 'enforcement' model—that is, it has tried to encourage and facilitate national action through transparency, peer pressure, and capacity building, rather than to force states to act through legal prescriptions and sanctions.[152] As explored in Chapters 6 and 7, the Kyoto Protocol experimented with an enforcement-oriented approach, to ensure compliance with its legally-binding emissions targets, but the Paris Agreement returns international climate change law to the managerial model.

C. Differentiation

Like the questions of legal bindingness and architecture, differentiation[153] has been a central issue in the development of international climate change law. The

pre-industrial levels at a likely (>66%) probability are 1,000 Gt CO_2. Considering the aggregate effect of the INDCs, global cumulative CO_2 emissions are expected to equal 53% (51–6%) by 2025 and 74% (70–7%) by 2030 of that 1,000 Gt CO_2.)

[151] See discussion in IPCC, *Climate Change 2014: Mitigation of Climate Change* (n 11) 1014–15.

[152] Abram Chayes and Antonia Handler Chayes, *The New Sovereignty: Compliance with International Regulatory Agreements* (Cambridge US: Harvard University Press, 1996) ch. 1.

[153] On CBDRRC, see generally Tuula Honkonen, *The Common But Differentiated Responsibility Principle in Multilateral Environmental Agreements: Regulatory and Policy Aspects* (Alphen aan den Rijn: Kluwer Law International, 2009); Lavanya Rajamani, *Differential Treatment in International Environmental Law* (Oxford University Press, 2006); Christopher D. Stone, 'Common But Differentiated Responsibilities in International Law', *American Journal of International Law*, 98/2 (2004): 276; Jutta Brunnée and Charlotte Streck, 'The UNFCCC as a Negotiation Forum: Towards Common but More Differentiated Responsibilities', *Climate Policy*, 13/5 (2013): 589; Philippe Cullet, 'Principle 7: Common but Differentiated Responsibilities', in Jorge E. Viñuales (ed), *The Rio Declaration on Environment and Development: A Commentary* (Oxford University Press, 2015); D.B. Magraw, 'Legal Treatment of Developing Countries: Differential, Contextual and Absolute Norms', *Colorado Journal of Environmental Law and Policy*, 1/1 (1990): 69; Lavanya Rajamani, 'The Reach and Limits of the Principle of Common but Differentiated Responsibilities and Respective Capabilities in the Climate Change Regime', in Navroz K. Dubash (ed), *Handbook of Climate Change and India:*

principle of common but differentiated responsibilities and respective capabilities (CBDRRC), first articulated in the FCCC, represents a departure from the traditional approach of international agreements, namely, to define a common set of obligations for all parties. It gives expression to the profound equity concerns raised by the climate change challenge, by providing that the climate change commitments of parties should be differentiated, based on their different responsibilities and capabilities.

The principle of CBDRRC is deeply embedded in the UN climate regime. It is anchored in FCCC Article 3. It also features in the Kyoto Protocol,[154] and in several provisions of the Paris Agreement, although in the Paris Agreement it contains the qualifier 'in light of different national circumstances'.[155] Furthermore, the CBDRRC principle is highlighted in numerous COP decisions,[156] and finds reflection in the Copenhagen Accord of 2009.[157]

Although there is universal support for the principle of CBDRRC, there is very little agreement on its rationale, core content, and application in particular situations.[158] With respect to the rationale for differentiation, developing countries have tended to focus on the term 'responsibilities', which they understand to be a function of 'historical emissions', whereas some developed countries—the US, in particular—have focused on the term 'capabilities'. If the different historical contributions of countries to the climate change problem provide the basis for differentiation, as developing countries contend, then differentiation will change relatively slowly. In contrast, if capabilities provide the basis for differentiation, then a country's obligations could evolve more rapidly, as it develops and gains greater financial, technological, and administrative capabilities. The principle of CBDRRC preserves the positions of both sides in this debate, by including both 'responsibilities' and 'respective capabilities' as bases for differentiation.

CBDRRC also does not specify *how* commitments should be differentiated. The Montreal Protocol differentiates the commitments of developed and developing countries in terms of timing. The same control measures apply to all countries, but developing countries get an additional ten years in which to comply.[159] In contrast, the climate regime has differentiated the substantive content of countries' commitments. Some apply to all states, and others only to particular groups of states. The Kyoto Protocol takes differentiation the furthest, establishing quantified emissions limitation targets for Annex I countries but not for non-Annex I countries.

Development, Politics and Governance (New Delhi: Oxford University Press, 2011); Harold Winkler and Lavanya Rajamani, 'CBDR&RC in a Regime Applicable to All', *Climate Policy*, 14/1 (2014): 50.

[154] Kyoto Protocol, Art 10. [155] Paris Agreement, Art 2.2; see Chapter 7.

[156] See eg Berlin Mandate; Bali Action Plan; Cancun Agreements LCA; Decision 1/CMP.6, 'The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol at its fifteenth session' (15 March 2011) FCCC/KP/CMP/2010/12/Add.1.

[157] Copenhagen Accord, para 1.

[158] For a detailed analysis see Rajamani, CBDRRC Reach and Limits (n 153) 118.

[159] Montreal Protocol, Art 5.

Finally, CBDRRC is usually associated with the division between 'developed' and 'developing' countries (and the associated division in the FCCC and the Kyoto Protocol between Annex I and non-Annex I parties), but this is not the only basis on which countries might be differentiated. Certainly, in the climate regime, CBDRRC has focused on the respective commitments of developed and developing countries, and the invocation of CBDRRC is followed in FCCC Article 3.1 by the statement, '[a]ccordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof', and then, in FCCC Article 3.2, by a recognition of the specific needs and special circumstances of developing countries. But the UN climate regime also recognizes other bases for differentiation, including countries' economic structures and resource bases and their vulnerability to climate change.[160]

The continuing controversies over the issue of differentiation have led to considerable innovation and experimentation in international climate change law.[161] The FCCC and the Kyoto Protocol take a categorical approach to differentiation: that is, they categorize parties into different groups and match particular commitments to particular categories of parties. The FCCC establishes four such categories: (1) parties listed in Annex I (often equated with 'developed countries'), (2) parties listed in Annex II, (3) parties listed in Annex I but not Annex II (the EITs), and (4) parties not listed in Annex I (often equated with 'developing countries'). The norms of differential treatment in evidence in the FCCC and its Kyoto Protocol are of several general types:[162] first, provisions that differentiate between Annex I and non-Annex I parties with respect to the central obligations contained in the treaty, such as emissions reduction targets and timetables, and reporting requirements;[163] second, provisions that differentiate between different categories of parties with respect to implementation, such as delayed compliance schedules,[164] permission to adopt subsequent base years,[165] delayed reporting schedules,[166] and softer approaches to non-compliance;[167] and third, provisions that grant assistance to developing countries, inter alia, financial[168] and technological.[169] Of these, the provisions that differentiate between Annex I and non-Annex I parties with respect to central obligations—such that Annex I parties have targets and timetables for GHG mitigation, while non-Annex I parties do not[170]—have proven the most

[160] The FCCC recognizes differences between countries in their economic structures and resources bases, available technologies, and other individual circumstances (Art 4.2(a)). Moreover, it differentiates the commitments not only of Annex I and non-Annex I countries, but also of countries with EITs (Art 4.6), and highlights several other categories of countries, including especially vulnerable states (Arts 3.2, 4.8), least-developed states (Art 4.9), and countries that are highly dependent on fossil fuels (Art 4.10).

[161] See generally Rajamani, *Differential Treatment* (n 153). [162] Ibid, 93–114.

[163] See eg Kyoto Protocol, Art 3. [164] Ibid, Art 3.5. [165] Ibid.

[166] See eg FCCC, Art 12.5.

[167] See eg Decision 24/CP.7, 'Procedures and Mechanisms Relating to Compliance under the Kyoto Protocol' (21 January 2002) FCCC/CP/2001/13/Add.3, 64.

[168] See eg FCCC, Art 4.3. [169] Ibid, Art 4.5. [170] Kyoto Protocol, Art 3.

controversial, and the US rejection of the Kyoto Protocol in 2001 can be sourced, in part, to such differentiation.[171]

In the negotiations since the Kyoto Protocol, and in particular since its rejection by the US, there has been a gradual erosion of categorical, annex-based differentiation and a move toward self-differentiation.[172] This shift occurred in response to consistent demands from developed countries that specific mitigation commitments be extended to developing countries. Many developing countries, for their part, vigorously resisted such efforts; some even came together in a negotiating coalition—the Like Minded Developing Countries (LMDCs)—expressly to preserve annex-based differentiation. In Paris, a compromise was struck on differentiation that bypassed the FCCC annexes, built on self-differentiation, and took different approaches to differentiation in different issues areas. In contrast to the explicit categorization of countries seen in the FCCC and Kyoto Protocol annexes, the self-differentiation approach allows parties to define their own commitments, tailor these to their national circumstances, capacities, and constraints, and thus differentiate themselves from each other. The 2009 Copenhagen Accord was built around this type of self-differentiation, and the 2013 Warsaw decision inviting parties to 'initiate or intensify domestic preparations for their intended nationally determined contributions'[173] presaged such a self-differentiated approach in the 2015 Paris Agreement. The development of this approach represented a step change in the climate regime, and set the stage for a more nuanced approach to differentiation in the Paris Agreement. The Paris Agreement neither creates explicit categories of parties nor tailors commitments to categories of parties as the FCCC and the Kyoto Protocol do. Rather, it tailors differentiation to the specificities of each issue area it addresses—mitigation, adaptation, finance, technology, capacity building, and transparency.[174] In effect, this approach has resulted in different forms of differentiation in different issue areas. In the area of mitigation, for instance, the Paris Agreement combines self-differentiation with normative expectations for all countries of 'progression' and 'highest possible ambition', and for developed countries of leadership.[175] In contrast, in the area of transparency, differentiation is tailored to capacities, by providing flexibility to those developing countries 'that need it in the light of their capacities'.[176]

While this fine-grained operationalization of differentiation in the Paris Agreement proved sufficient to secure agreement, it nevertheless leaves several

[171] Text of a Letter from the President to Senators Hagel, Helms, Craig, and Roberts (The White House, Office of the Press Secretary, 13 March 2001) <https://georgewbush-whitehouse.archives.gov/news/releases/2001/03/20010314.html> accessed 20 January 2017.

[172] See generally, Lavanya Rajamani, 'The Changing Fortunes of Differential Treatment in International Environmental Law', *International Affairs*, 88/3 (2012): 605.

[173] Decision 1/CP.19, 'Further advancing the Durban Platform' (31 January 2014) FCCC/CP/2013/10/Add.1 (Warsaw decision).

[174] Lavanya Rajamani, 'Ambition and Differentiation in the 2015 Paris Agreement: Interpretative Possibilities and Underlying Politics', *International and Comparative Law Quarterly*, 65/2 (2016): 493.

[175] See Chapter 7, Section II.D.2.a. [176] Ibid, Section II.D.2.b.

lingering equity concerns unaddressed.[177] For instance, the Paris Agreement uses the terms 'developed' and 'developing' countries without either defining them or using lists as the FCCC and Kyoto Protocol do. Some developing countries may suggest using the FCCC annexes to provide concrete content to these terms. Further in relation to transparency, parties will need to consider which developing countries need flexibility, what kind of flexibility will be provided,[178] and for how long. In these and other areas, the devil of differentiation will lie in the details of the post-Paris negotiations.

Over its more than two-decade evolution, the UN climate regime has explored a variety of approaches to differentiation. In this time, the nature and extent of differentiation has shifted gradually but significantly—from differentiation in central obligations in the Kyoto Protocol, to bounded self-differentiation and tailored flexibility in the Paris Agreement. Yet equity and differentiation remain salient in the regime, and will continue to evolve as the regime evolves.

VI. THE BROADER CONTEXT FOR INTERNATIONAL CLIMATE CHANGE LAW

Responses to the climate change challenge have emerged at multiple levels, in multiple forums across levels, and involve a multitude of actors.[179] The landscape of climate cooperation at the international level includes: action taken under other multilateral environmental agreements; action taken by other treaty regimes and international bodies; and, policy guidance and political signals provided by multilateral, plurilateral, and bilateral 'clubs'.[180] In addition, there is informal cooperation among state and non-state actors across levels and across countries. Cooperation across the full landscape of climate agreements, institutions, and actors plays a critical role in filling gaps in and bolstering, complementing, and implementing international climate change law.

Nearly all human activities contribute to climate change. And climate change will, in turn, have enormous impacts on both humans and the natural environment. Not surprisingly, then, climate change engages many different areas of international law:

- Both climate change and climate change policies could affect the enjoyment of human rights. Climate change, for example, could threaten the rights to life, food, housing, and health,[181] while mitigation and adaptation measures could

[177] See eg T. Jayaraman and Tejal Kanitkar, 'The Paris Agreement', *Economic and Political Weekly*, 51/3 (2016): 10.

[178] Decision 1/CP.21 (n 20) para 89 specifies flexibility in 'scope, frequency, and level of detail of reporting, and in the scope of review'.

[179] See IPCC, *Climate Change 2014: Mitigation of Climate Change* (n 11) Fig 13.1.

[180] Robert O. Keohane and David G. Victor, 'The Regime Complex for Climate Change', *Perspectives on Politics*, 9/1 (2011): 7.

[181] Office of the High Commissioner for Human Rights (OHCHR), 'Understanding Human Rights and Climate Change: Submission of the Office of the High Commissioner for Human Rights

impinge on indigenous rights. In 2008, the Office of the High Commissioner of Human Rights initiated a stream of work on Human Rights and Climate Change,[182] and the Human Rights Council has adopted a series of resolutions alerting states to the inter-connections between human rights and climate change, and reminding them of their obligations under human rights instruments.[183] Due in large part to these interventions, and those of various non-state actors, the 2015 Paris Agreement recognizes the intersections between human rights and climate change, albeit in a preambular recital.[184]

- Rising temperatures and ocean acidification will affect the marine environment and, in particular, coral reefs, thereby raising law of the sea issues. In addition, sea level rise will change the baselines from which states' maritime zones are measured and is likely to submerge some low-lying island states—issues also addressed by the law of the sea.
- Rising sea levels and extreme weather events may force people to move within and across national borders. The United Nations High Commissioner for Refugees and the International Organization on Migration, among others, have a range of policy, research, and operational activities to prevent forced migration, to the extent possible, assist affected populations where migration occurs, and facilitate migration as an adaptation strategy.[185] However, existing international legal frameworks are poorly designed to respond to such large-scale movements of persons due to climate and other factors.[186]
- Climate change is likely to severely impact biodiversity and sensitive ecosystems and thus has enormous implications for other multilateral environmental regimes, including the Biological Diversity Convention,[187] the Ramsar Wetlands Convention, and the World Heritage Convention.[188] In

to the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change' (26 November 2015) <http://www.ohchr.org/Documents/Issues/ClimateChange/COP21.pdf> accessed 20 January 2017.

[182] See generally OHCHR, 'Human Rights and Climate Change' <http://www.ohchr.org/EN/Issues/HRAndClimateChange/Pages/HRClimateChangeIndex.aspx> accessed 20 January 2017.

[183] See Human Rights Council Res 32/33, 'Human Rights and Climate Change' (28 June 2016) A/HRC/32/L.34; Human Rights Council Res 29/15, 'Human Rights and Climate Change' (30 June 2015) A/HRC/29/L.21; Human Rights Council Res 26/27, 'Human Rights and Climate Change' (25 June 2014) A/HRC/26/L.33/Rev.1; Human Rights Council Res 18/22, 'Human Rights and Climate Change' (28 September 2011) A/HRC/18/L.26/Rev.1.

[184] Paris Agreement, preambular recital 11.

[185] International Organization for Migration (IOM), 'Migration and Climate Change' <https://www.iom.int/migration-and-climate-change> accessed 20 January 2017; United Nations High Commissioner for Refugees (UNHCR), 'Climate Change and Disasters' <http://www.unhcr.org/pages/49e4a5096.html> accessed 20 January 2017.

[186] See Chapter 9, Section III.

[187] Convention on Biological Diversity (adopted 5 June 1992, entered into force 29 December 1993) 1760 UNTS 79.

[188] Convention for the Protection of the World Cultural and Natural Heritage (adopted 16 November 1972, entered into force 17 December 1975) 1037 UNTS 151 (World Heritage Convention); see generally Catherine Redgwell, 'Climate Change and International Environmental Law', in Rosemary Gail Rayfuse and Shirley V. Scott (eds), *International Law in the Era of Climate Change* (Cheltenham: Edward Elgar Publishing, 2012) 119.

response, these regimes have all begun to consider climate change in various ways. Parties to the Biodiversity Convention have taken a series of decisions to encourage coherence and mutual supportiveness between the biodiversity and climate regimes,[189] including with respect to measures to respond to climate change that could have impacts on species and habitat protection.[190] Ramsar Wetlands Convention conferences have adopted resolutions encouraging parties, inter alia, to increase the resilience of wetlands, promote and restore wetlands that are significant GHG sinks, and ensure that forest-based mitigation measures do not damage the ecological character of wetlands.[191] And the World Heritage Committee has launched initiatives to assess the impacts of climate change on world heritage and define appropriate management responses.[192]

- Climate change could also have security implications. It could act as a 'threat multiplier' for national and international security, exacerbating other sources of violence and conflict.[193] In the last decade the UN Security Council has held several debates on climate change. The first of these led to a UN General Assembly Resolution[194] and a Report by the Secretary-General.[195]
- Measures to address climate change could affect competitiveness and trade flows between countries. Conversely, measures to promote international trade could affect climate change both positively and negatively. As a result, there is the potential for both synergy and conflict between the climate change and trade regimes.

In general, these relationships between climate change and other areas of international law fall into one of two general baskets. In a few cases, other international regimes directly seek to address climate change. The work of the International

[189] See eg Decision XI/19, 'Biodiversity and Climate Change related issues: advice on the application of relevant safeguards for biodiversity with regard to policy approaches and positive incentives on issues relating to emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries' (5 December 2012) UNEP/CBD/COP/DEC/XI/19.

[190] Ibid. For example, reforestation could have positive impacts on biodiversity protection, while ocean iron fertilization could have negative impacts on marine biodiversity.

[191] See eg Resolution XI.14, 'Climate change and wetlands: implications for the Ramsar Covention on Wetlands' (6–13 July 2012).

[192] United Nations Educational, Scientific and Cultural Organization (UNESCO), 'Climate Change and World Heritage' (World Heritage Reports 22, UNESCO, May 2007) <http://whc.unesco.org/en/series/22/> accessed 20 January 2017; UNESCO, 'Development of Policy Document on Impacts of Climate Change and World Heritage' (UNESCO, 2008) <http://whc.unesco.org/en/CC-policy-document/> accessed 20 January 2017; and see generally UNESCO, 'Climate Change: Climate Change and World Heritage' <http://whc.unesco.org/en/climatechange/> accessed 20 January 2017. See also Redgwell, Climate Change and International Environmental Law (n 188).

[193] Permanent Mission of Spain to the United Nations, 'Security Council open Arria-formula meeting on the role of Climate Change as a threat multiplier for Global Security' *Press Office* <http://www.spainun.org/climatechange/> accessed 20 January 2017.

[194] United Nations General Assembly Res 63/281, 'Climate Change and its Possible Security Implications' (11 June 2009) UN Doc A/RES/63/281.

[195] UN Secretary-General, 'Climate Change and its Possible Security Implications' (11 September 2009) UN Doc A/64/350.

Maritime Organization to limit maritime emissions and that of the Montreal Protocol regime to limit HFCs fall into this basket. These will be considered in Chapter 8 as part of the fabric of polycentric climate governance. A much broader array of international legal regimes will be engaged by climate change, but do not (yet) exercise governance functions. Since this book cannot be a book about everything, we will necessarily be selective in 'mapping the edges' of international climate change law, focusing in Chapter 9 on the intersection of climate change law with human rights law, migration law, and trade law.

Climate change is also addressed in various multilateral or plurilateral 'clubs'.[196] Clubs can act as forums for dialogue or focus on implementation.[197] The most prominent among those focused on dialogue is the Major Economies Forum on Climate Change and Energy (MEF). The MEF consists of seventeen developed and developing countries[198] between them accounting for about 80% of the world's emissions.[199] Several 'G' clubs also provide political direction to the climate regime. These 'G' clubs are distinguishable from negotiating coalitions and groups[200] in that they have formal membership, their members have objectively similar characteristics, they have rotating Presidencies, and their mandates cover a broader universe than climate change. 'G' clubs forge common positions, but typically for the purpose of setting a standard rather than negotiating as a block. The G-8, G-8+5, and the G-20 have all played a prominent role, albeit to varying degrees. In addition to these multilateral and plurilateral clubs, bilateral climate cooperation between countries has also played a critical role in reaching a climate deal and shaping its contours, and will likely play a role in implementing it. These 'clubs' will be discussed in greater detail in Chapter 8.

The proliferation of multilateral, plurilateral, and bilateral initiatives to address climate change, and the many inter-connections between climate change law and other areas of international law, have led to a vibrant debate about the fragmentation of global climate governance architecture,[201] the utility and continuing relevance of the FCCC process,[202] and the potential for such clubs to be 'transformational'.[203] Although these debates are of continuing relevance, the 2015 Paris Agreement marks a new phase in international climate cooperation, reflecting a

[196] Keohane and Victor, Regime Complex (n 180).

[197] See Lutz Weischer, Jennifer Morgan, and Milap Patel, 'Climate Clubs: Can Small Groups of Countries Make a Big Difference in Addressing Climate Change?', *Review of European, Comparative and International Environmental Law,* 21/3 (2012): 177.

[198] The participants of the MEF include Australia, Brazil, Canada, China, the EU, France, Germany, India, Indonesia, Italy, Japan, Korea, Mexico, Russia, South Africa, the United Kingdom, and the US. 'Major Economies Forum on Energy and Climate' <http://www.majoreconomiesforum.org/> accessed 20 January 2017.

[199] WRI, CAIT Climate Data Explorer (n 40).

[200] The negotiating coalitions active in the climate change negotiations are discussed in Chapter 3, Section II.

[201] Frank Biermann *et al.*, 'The Fragmentation of Global Governance Architectures: A Framework for Analysis', *Global Environmental Politics*, 9/4 (2009): 14.

[202] See eg Keohane and Victor, Regime Complex (n 180) and, compare with Harald Winkler and Judy Beaumont, 'Fair and Effective Multilateralism in the Post-Copenhagen Climate Negotiations', *Climate Policy,* 10/6 (2010): 638.

[203] See Weischer *et al.*, Climate Clubs (n 197).

greater degree of political will and sense of ownership among states. But activities at many other levels, by many other actors, will continue to play a significant role in international climate change law. What will be essential is that these activities by other international institutions, sub-and non-state actors, and clubs of public and private actors complement rather than compete with the FCCC process.

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