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An Introduction to India's Evolving Climate Change Debate

From Diplomatic Insulation to Policy Integration

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Climate change has been evocatively described as a 'wicked' problem– it has no unambiguous definition, is riven with scientific uncertainty, and proposed solutions are complicated by their embedding in social, political, and economic systems (Hulme 2009). If climate change is an environmental issue for some people, for others it is predominantly about justice and equity, and for yet others, it is largely an economic and technical challenge. In contrast with 'tame' problems, even the problem definition is fraught, and, therefore, how we discuss and debate climate change is a challenge; differences in interests are further confounded by differences in interpretation. As a result, even as evidence mounts that climate change could result in a near-unliveable 'hothouse earth', raising the spectre of an existential dilemma (Steffen et al. 2018), action on climate change proceeds at a glacial pace, seemingly embedded in endless and protracted debate.

From an Indian perspective, the challenges of productively engaging with the climate change debate are further amplified for both pragmatic and political reasons. Pragmatically, India faces enormous, and immediate, challenges of lifting its citizens out of poverty; providing access to basic needs such as health, education, energy, and water and sanitation; and addressing governance challenges of corruption and communal tensions. By comparison, climate change appears less immediate, less certain, and therefore, less of a priority. Politically, there is a long-standing perspective that India has contributed relatively little to causing the climate problem and should not be asked to be in the forefront of solving it. India's contribution to the stock of emissions that has built up in the atmosphere is low, and its emissions per person are far lower than the global average.

Despite these complications, there is an overarching reason why India should, indeed, find ways of productively engaging with the climate debate: a development path that is innocent of climate change is no longer possible. The impacts of climate change will increasingly threaten development outcomes, as the chapters in this book show comprehensively. Also, a growing range of development decisions, including but not limited to energy, will have to account for a global context shaped by climate politics and policymaking. There are at least three ways in which this interplay between climate and development demands Indian attention.

First, India is a country that is deeply vulnerable to climate impacts. Put more starkly, potential climate impacts are sufficiently large that they could serve as a barrier to fully achieving India's development aspirations. As chapters in this volume explore, climate change can disrupt agricultural systems, water availability, forest health, and coastal ecology, thereby affecting the lives and livelihoods of millions. From a climate impacts perspective, the success or failure of global efforts to address climate change is deeply salient to India's interests, particularly to those of its poorest citizens.

Second, development-focused actions and interventions are closely intertwined with climate change–related objectives. For example, air pollution–related policies may also reduce greenhouse gas (GHG) emissions and more efficient use of water can not only enhance development outcomes but also climate resilience. Notably,

these interactions may not always be positive; there may also be trade-offs between development and climate objectives. Whether positive or negative, the interactions between climate and development are widely present. Development innocent of climate change implications is not an option.

Third, climate change is salient to India's engagement with other countries and the global community, with implications for India's energy economy and foreign policy. India's energy economy is strongly shaped by global context through energy trade and technology development patterns. Climate change is highly likely to affect energy prices across different supply sources, as well as patterns of investment in research and development, both with implications for India's energy planning. Moreover, climate change as a foreign policy issue is rising up in the global agenda, and India's engagement with the issue is material to its aspirations as a rising power.

Notably, focusing on these issues of vulnerability, potential synergies between climate and development, and foreign policy helps address India's concerns about being held responsible unfairly for addressing climate change, despite the problem being largely caused by others. Given India's vulnerability to climate change, India's interests lie in promoting effective global cooperation to address climate change. With low per capita and historical emissions, India may not have a responsibility *for* climate, but as the third largest annual emitter it may have a responsibility *to* vulnerable populations to engage climate change. This need not mean that India prioritizes climate action over development. As climate actions are not always costly to development actions but sometimes complementary, a possible path forward exists for India to engage with both climate and development productively.

Finally, India's foreign policy aspirations as a responsible power require not just that India is part of the solution but is *seen* to be part of the solution. Collectively, these themes provide a possible answer to why India should devote some attention to climate change, even in the face of pressing domestic concerns.

They also provide a focus for how India should address climate change, which also motivates the subtitle for this book: integrating climate change and development. In both concept and practice,

this is not an easy task. Over the course of the past decade, a past construction of climate change as a largely diplomatic problem has given way to one that takes more seriously this question of integrating climate change and development. For example, Indian science has begun to grapple with climate impacts; Indian negotiators have begun internalizing this approach into their diplomacy; civil society, business, and labour have reframed their work using this language; policymakers have sought to internalize this integration into their policies; and sectoral experts have sought to understand how this integration would occur in particular sectors.

The central objective of this book is to find useful ways of talking about climate change in India and by so doing, explore ways in which to productively engage and act on the climate change challenge. Through these chapters, we hope to deepen clarity both on why India should engage climate change and how it can best do so, even while appreciating and representing the challenges inherent in doing so.

Approach

This collection is designed to encourage public debate and deliberation on climate change as part of India's larger development discourse. As a result, each chapter is meant to provide an accessible entry point to a topic. The chapters do this by developing a conceptual road map for key issues in the climate debate, with the intention of providing readers the concepts and ideas necessary to follow and participate in debates. Frequently, this approach requires laying bare disagreements or differing perspectives, rather than proclaiming premature unanimity. More than a primer then, the aim is to invite readers into a conversation even when, and perhaps particularly when, the topic is messy and issues are conflicted.

While the amount of writing on climate change and India has increased sharply in recent years, much of this writing is specialized in particular areas, such as energy policy, foreign policy, or climate negotiations. Moreover, a great deal of knowledge rests with practitioners of various sorts, who may not typically have the time or inclination to put down their ideas in writing for a broader audience. Of the existing literature, an earlier *Handbook of Climate Change and*

India attempted the most comprehensive review then available of climate negotiations and domestic politics and policy, but since all these areas have transformed significantly in the interim, much of this material requires updating (Dubash 2012b). Another set of volumes aims at providing a critical perspective on Indian climate policy: in one case, an edited collection by activists (Dutta 2013), and another by a journalist (Bidwai 2012, 2010). Other volumes are more specialized, focusing on India's role in negotiations (Saran and Jones 2016), modelling India's emissions (Shukla, Garg, and Dholakia 2015), or reviewing impacts and adaptation (Chattopadhyay 2014). This collection builds on these past works, and aims to systematically collate the work of experts as well as harvest the work of specialists whose work is not widely available.

To this end, the chapters are of two types. Most chapters are written as even-handed reviews of an issue, aiming to present multiple perspectives on an issue. Authors undoubtedly have a viewpoint, but they present this after laying out the range of different opinions and analyses on an issue. Review chapters are written by experts, with a wide range of expertise represented: law, economics, environmental studies, sociology, science and technology studies, atmospheric science, and political science among them. Since climate change is a fast-moving topic, the review chapters are also written to transcend short-term developments and focus on providing a conceptual framework that readers can draw on in engaging an issue.

The second type of chapters present perspectives on an issue, identified as such by their subtitles, and are typically written by practitioners to lay out important positions in discussions. These practitioners include diplomats, including leaders of India's climate delegation at various times, business people, labour activists, and consultants. The mix of review and perspective chapters is aimed at providing the reader a rounded entry point to various debates around climate change and India.

The volume is divided into five thematic sections: climate change impacts; international debates and negotiations; politics; policies; and climate and development. While this book is focused on social scientific understandings of climate change, a necessary starting point is an understanding of what climate science suggests we know about impacts in India. Some aspects of the science are also covered

in Chapters 24–29 focused on particular sectors, in the climate and development section. Climate negotiations have historically dominated climate discourse. While chapters on this topic adequately cover developments in climate negotiations, notably the build-up to the implications of the Paris Agreement, this section of the book occupies only about a third of the volume.

The majority of the book is devoted to national developments, where a great deal of ferment has occurred in recent years. The volume provides three different entry points to these developments. One approach is to explicitly look at the shifting politics around climate change by examining the perspectives of different political actors—environmentalists, business, and labour—and reviewing themes in Indian print media reports on climate change. Another entry point is to specifically examine emergent policies around climate change at multiple scales—national and state—and in key cross-cutting areas, particularly finance and technology. Climate policy developments at the city scale are addressed separately in Chapter 25.

A final section provides the third entry point and speaks most directly to the central theme of this book: integrating climate change and development. While many treatments of climate change are divided into mitigation (or emissions reduction) and adaptation, this volume follows a sectoral logic. The reason is that in India, as in many other places, governance and institutions remain organized around sectors, such as energy, agriculture, urbanization, forests, and coasts, and there is no cross-cutting structure of climate governance. The chapters in this section examine the implications of climate change for objectives in these sectors, and whether and how mainstreaming climate change into sectoral plans and policies has been discussed and implemented.

The remainder of this 'Introduction' provides a substantive entry point to each of these sections. I describe the intellectual rationale for the contributions, set them in context, and highlight links across chapters.

Climate Change Impacts

The volume starts with three chapters on the potential impacts of climate change, which is a necessary starting point for discussion

on climate politics, policy, and governance. Notably, this section, and the book, does not explicitly cover the underlying science of climate change and the complex interaction between the biosphere and human patterns of economic activity that are changing the climate. An interested reader is best served by referring to the various reports of the Intergovernmental Panel on Climate Change (IPCC), in order to better understand these scientific issues. For the purposes of this volume, this section lays out three perspectives on climate impacts on India, respectively, focused on observed and future impacts, evidence of linkage between climate change and specific events, and narratives of impact on human and animal life.

To begin with, Srinivasan, in Chapter 2, provides an overview of what we know about likely climate impacts on India and, equally important, what we do not know, as yet, with much certainty. His chapter addresses both observed and potential future impacts, projected with the assistance of complex climate models. Notably, Srinivasan also explains the methods of climate science—how we know what we know. He highlights that there is clear evidence from the twentieth-century record that India's climate is changing and that this change is likely to accelerate. Impacts such as extreme rainfall, more severe heatwaves, and longer dry spells are all likely, although information on rainfall, critical for monsoon-dependent India, is less reliable than for temperature. While enhanced effects are highly likely, climate models are not sufficiently advanced to predict regional impacts as yet, which are necessary for design of local adaptation programmes.

An emergent science of attribution studies seeks to go further than explaining broad aggregate impacts, by exploring the likelihood that any given weather event—such as a flood or heatwave—is due to global climate change versus other, perhaps local, environmental drivers. The potential implications of this new science are profound; they could transform climate change from an abstract concept to one linked to tangible impacts and could even open the door to claims for legal damages from weather impacts. In Chapter 3, AchutaRao and Otto review the (so far very limited) India-specific evidence available from attribution studies. While globally two-thirds of attribution studies find some role for climate change in explaining

extreme events such as droughts, heavy rainfall, and heatwaves, the evidence available for India is much thinner as yet. Of the three cases reviewed, they find that climate change is definitely the main driver of impacts in one of the three case studies available—a heatwave in Andhra Pradesh that was made 25 times more likely to occur by climate impacts—but not so in the other two. They stress that these studies measure climate effects as of now, and not future climate effects as GHGs increase as is projected. This science is in its infancy, particularly in India, and will undoubtedly sharpen discussion and debate on climate impacts as it advances.

Chapter 4 by Adve is intended precisely to address the often-abstract nature of climate impacts. Writing with a view 'from-below', Adve explores existing stories of the potential impacts of climate change as they are experienced in people's lives. While a direct link cannot be assumed between any potential impact and climate change without the benefit of a positive attribution study, Adve's work illustrates the human effects of the sorts of impacts that climate science predicts will get more likely to occur. As such, it helps in engagement with climate change and its likely impacts by relating them to lived experience. The areas he covers include displacement due to sea-level rise, species migration, and effects on Himalayan ecosystems.

In addition to these chapters, sector-specific impacts on water, forests, and coasts are also discussed in the relevant chapters in Section V. Collectively, these chapters help reinforce the reality that climate change will have serious impact on India, and in some cases is already doing so, and help translate this seemingly abstract issue to the realities of India's citizens, particularly the most vulnerable among them.

International Debates and Negotiations

Climate change has typically been framed as a global collective action problem. Since GHGs emitted anywhere have a warming effect everywhere, no reduction by any single country (with the possible exception of the two giants—China and US) has a significant effect on climate outcomes. Every country's actions towards mitigation is only meaningful in the context of every other country's actions. But

if every country has to act, then how much mitigation action should each take and how is that to be decided? The first two decades of global climate politics, and India's engagement in it, has revolved around this question.

This question of which country does how much, and how fast, is closely tied to competing and contending interpretations of GHG emission numbers of various countries and how they change over time. Understanding these debates is important to understanding India's role in global climate politics. As Figure 1.1 shows, India has contributed very little to the cumulative build-up of GHGs over time in the atmosphere because it is a late developer (due to data limitations, only carbon dioxide [CO_2] emissions excluding land use change are reported in Figure 1.1). Moreover, as a poor country, it has relatively low GHG emissions per capita that were, even in 2014, well below the global average (Figure 1.2). On the other hand, in terms of total annual emissions emitted, by 2014 India was the third-largest emitter, albeit a long way behind China and the US, and is also among the more rapidly growing (Figure 1.3).

These various formulations of the data illustrate the political challenge: what is reasonable to expect of each country differs based

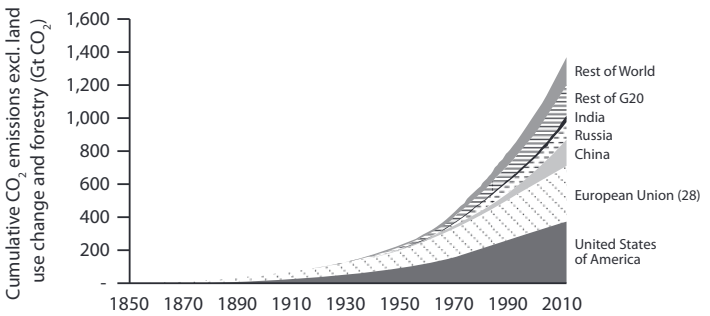

Figure 1.1 Cumulative CO_2 Emissions Excluding Land Use Change and Forestry (1850–2014)
Source: CAIT Climate Data Explorer (2018).

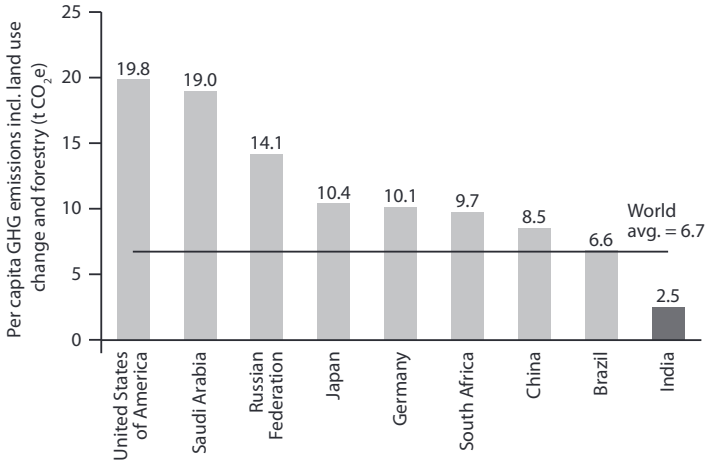

Figure 1.2 Per Capita GHG Emissions Including Land Use Change and Forestry in tCO_2e (2014)
Source: CAIT Climate Data Explorer (2018).

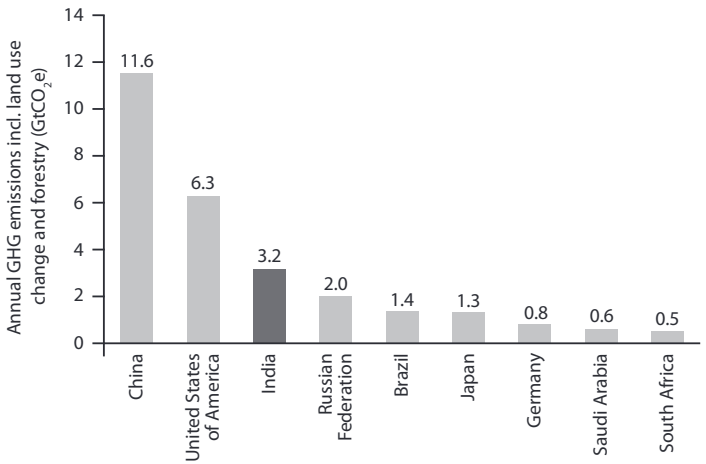

Figure 1.3 Annual GHG Emissions Including Land Use Change and Forestry in $GtCO_2e$ (2014)
Source: CAIT Climate Data Explorer (2018).

on how the data is sliced and represented. However, they also illustrate the dilemma from an Indian perspective: it is simultaneously true that India has little responsibility for past emissions but it is likely to contribute a large share of future emissions, and is therefore material to future efforts to solve climate change. As the third-largest emitter, a global political resolution to the collective action problem is unlikely without India. This low responsibility for past accumulations and low capacity to address the problem, coincident with India's relatively large share of current emissions, has strongly shaped India's role in global climate politics.

The first two chapters in this section explicate this dilemma. In selected excerpts from a foundational 1991 article, Agarwal and Narain argue in Chapter 5 that mathematical jugglery with numbers has resulted in developing countries like India being burdened unfairly with responsibility for addressing climate change. Their article was deeply influential in shaping perceptions of climate change as a fraught diplomatic challenge, one that has climate equity at its core and that requires diplomatic watchfulness if India is not to be unfairly blamed for this problem or bear unfair costs in trying to resolve it.

Over the years, the debate over both concepts and numbers around climate equity has expanded greatly. In Chapter 6, Kanitkar and Jayaraman review this literature, explaining key concepts, such as the important principle of 'common but differentiated responsibilities and respective capabilities' (CBDR&RC) (also see Rajamani 2012), and explaining that when it comes to a mitigation burden, it is important to discuss both what is to be divided among countries and how it is to be divided. The chapter concludes by revisiting climate equity in light of the Paris Agreement.

The next cluster of six chapters squarely deals with climate negotiations. This sequence of chapters captures an important broadening in the conceptualization of climate change as well as the architecture of negotiations. While the global collective action construction of climate change remains salient and important, an emergent strand of literature suggests that it may also usefully be thought of as amenable to 'polycentric' approaches—multiple actions at diverse scales—that are an important complement to global action (Jordan et al. 2018; Ostrom 2010). This conceptual plurality has taken shape internationally in the form of the Paris Agreement of 2015, which combines

'bottom-up' national pledges, which could be thought of as unleashing polycentric action, with complementary 'top-down' elements that are intended to enhance transparency of national pledges and ratchet them up over time. Understanding the recent history of climate negotiations requires understanding this shift, and the politics that led to it.

In Chapter 7, Sengupta provides the long view, explaining the arc of the international negotiation process and India's shifting role in climate negotiations from the early days of the United Nations Framework Convention on Climate Change (UNFCCC) to the Paris Agreement. He explains, for example, India's reluctance to embrace the Clean Development Mechanism—allowing a country to invest in carbon reduction in another country and win carbon credits—followed by its enthusiastic future adoption of the approach. He also tracks the shifting politics of climate change in India and how this aggregated, over time, to an India that was willing to strike a deal at Paris.

Three remarkably candid accounts by India's lead negotiators at Rio (1992), Copenhagen (2009), and Paris (2015) follow. What jostling for position was occurring and hidden or not-so-hidden signals being sent in the weeks before these critical negotiations? What efforts were made to reinforce alliances? Why, ultimately, did India make the calls that it did? These inside perspectives by those best placed to know India's stance shine light on these questions. In Chapter 8, Ambassador Dasgupta, discussing the making of the UNFCCC in the build-up to the foundational negotiations in Rio de Janeiro in 1992, explains how key principles were hard-fought for and won to preserve India's interest in climate equity. Ambassador Saran, in Chapter 9, takes the reader through the tortuous negotiations between US President Obama and the leaders of the four 'BASIC' countries—Brazil, South Africa, India, and China—in an effort to strike a deal in Copenhagen in 2009. He also explains how India, and other developing countries, argued strongly for placing finance and technology on the table, and how this issue was sought to be made a point of leverage by some industrialized countries. Discussing the landmark Paris negotiations of 2015 in Chapter 10, Lavasa explains the conditions that allowed India to reshape its international reputation, an unfair one, he argues, as a

potential spoiler to being an enabler of the Paris Agreement. He also discusses India's proactive efforts to project its forward-looking initiatives, such as accelerating renewable energy adoption, as key shapers of this image.

As a counterpoint to these insider views, in Chapter 11, Raghunandan provides critical view from the outside on India's approach to negotiations, drawing on his long experience as an analyst and activist on climate negotiations and policy. He probes, for example, whether India's negotiation stance is consistent with science and with India's domestic interests. He suggests that India has not adequately pursued the interests of its climate-vulnerable population, failing to fully support an ambitious global agreement. Instead, he argues, foreign policy considerations especially focused on its relationship with the US, as opposed to India's climate-focused interests, play a disproportionate role in shaping India's negotiating stance.

Two further chapters examine the Paris Agreement and the legal and political process of reaching this agreement. In Chapter 12, Rajamani draws on her long engagement as a legal scholar and practitioner to explain how the Paris Agreement marks a substantial departure from earlier legal instruments on climate change, and describes how this transition occurred. She explains the shift in terms of the architecture of the agreement—a hybrid of bottom-up and top-down—the legal form of the agreement and the legal character of its provisions, and shifts in the key concept of differentiation between groups of countries. In these ways, she suggests, the Paris Agreement did mark an innovation in climate and, indeed, international law.

Mathur, in Chapter 13, provides an important perspective on Paris, from the perspective of someone who brings both insider knowledge of negotiations and an outside eye as a researcher. He explains how Paris provided a pragmatic way for the world, and for India, to move forward with climate action. He suggests that the Paris Agreement introduces a learning-by-doing dynamic that, over time, will build a virtuous cycle of trust between countries.

These chapters provide a useful entry point to what is a robust debate beyond the pages of this volume about the benefits and costs of the Paris Agreement for India. Some condemn what they see as

its core bottom-up approach built around 'Nationally Determined Contributions' (NDCs) as inadequate, and worry that it will perpetuate climate inequalities (Narain 2015; Sethi 2015). Others suggest that India's interests were reasonably well served at Paris, as a result of a series of carefully calibrated compromises, even while its ultimate effectiveness awaits realization (Dubash 2017). Across countries, the global climate regime, including the Paris Agreement, has expanding international participation in climate governance; for example, a recent study finds that, by 2017, 89 per cent of GHGs were covered by an emissions target and 70 per cent by some form of climate legislation or strategy (Iacobuta et al. 2018). Whether these measures, by generating a virtuous cycle that Mathur describes, can compensate for the relative weakness of top-down measures will only become apparent over time.

Climate negotiations do not occur only under the auspices of the UNFCCC. Increasingly, the climate arena resembles a 'regime complex' (Keohane and Victor 2011), with sub-negotiations in different forums and under different rules. In the last chapter in this section (Chapter 14), Ghosh takes us through two such important negotiations: limits on hydrofluorocarbons (HFCs) under the Kigali Amendment to the Montreal Protocol and a new global market-based measures approach on aviation emissions. He also notes, by taking the reader through the process, that India departed from its usual negotiation style on occasion during these processes, particularly the negotiations on limits on HFCs, including on key issues such as differentiation.

Collectively, the chapters in this section tell the story of an international climate process that has been substantially transformed over the last decade. They also explain how India has worked, and on occasion struggled, to retain and rearticulate its interests in this emergent landscape. From a relatively narrow focus on principles of equity and differentiation, India has explored more nuanced views around several key negotiation issues. These include, in particular, openness to more diffused approaches to differentiation in the Paris Agreement and HFC negotiations and agreement to a legal requirement to submit regular national pledges, both of which were critical to a global deal. There remain debates within India on whether these are progressive or regressive shifts, and

on the overall effectiveness of the global climate regime. But in a shifting and fluid environment of global climate politics, there is certainly scope for India to play a larger role in determining global cooperation outcomes.

Politics

A stylized description of domestic Indian climate politics around the time of the 2009 Copenhagen climate negotiations described three broad perspectives: 'growth-first realists' who advocate economic growth, staving off international pledges, and who see climate change as a geostrategic issue rather than an immediate threat to India; 'sustainable-development realists' who take seriously challenges of sustainable development and climate change, but who are deeply sceptical of the international process; and 'sustainable-development internationalists' who take seriously sustainability and climate concerns and see India's interests lying in furthering global cooperation, including through enhanced Indian action (Dubash 2012a). All three positions have historically been simultaneously present in public debate, but in the years from Copenhagen in 2009 to Paris in 2015, there has been greater openness to an internationalist stance (Dubash et al. 2018).

Shifts in India's negotiating approach are very likely rooted in shifts in domestic politics. Underlying factors driving this shift include more information on India's vulnerability to climate impacts, greater appreciation of the potential synergies between climate and development policies, and a heightened concern with geopolitical perceptions of India as a cooperative player on climate change (Atteridge et al. 2012; Dubash 2013; Michaelowa and Michaelowa 2012; Sengupta 2012; Vihma 2011). At the same time, attention to climate change as an electoral issue does not appear to be growing. Indeed, the last focused debates on climate change in India's Parliament occurred in the build-up to the Copenhagen negotiations and focused heavily on negotiation issues and limiting India's concessions, rather than addressing climate change through international coordination (Parliamentary Debates 2012).

This section lays out three important perspectives on climate change—civil society, private sector, and labour—that provide a

window to the shifting domestic politics of climate change in India. A fourth chapter analyses an extremely important shaper of public perception, namely, media coverage of climate change. Collectively, these chapters suggest growing engagement with the issue, but the terms of engagement are dominated by relating climate change to existing concerns.

In his review of India's civil society action on climate change, Swarnakar, in Chapter 15, shows how civil society organizations can broadly be defined by one of the two approaches: sustainability focused and relatively apolitical; or climate justice focused and more overtly political. He further notes that the justice perspective has both an outward-facing emphasis on distribution within countries as well as inward-facing focus on distribution questions within India. The climate justice perspective often brings organizations into a complex relationship with national policymaking, as they seek to balance the tension between internal and external critiques. On balance, Swarnakar argues that a coherent climate change movement is yet to fully emerge in India.

In a perspective from business, Venkateswaran and Rajan argue in Chapter 16 that, in a 'triple-bottom line' formulation, Indian business has been paying greater attention to the social and environmental bottom line, in greater balance with a financial bottom line. They observe greater participation in efforts to prepare environmental reporting and governance frameworks, as well as adoption of significant internal actions, such as emission targets and internal carbon markets. They attribute these shifts, in part, to greater pressures from investors, customers, employees, and communities. At the same time, these changes are limited to larger, global companies; and the micro, small, and medium enterprises are less engaged with this agenda. This chapter, however, represents one snapshot and one perspective among the large and complex business community. Other efforts at reviewing business at large find similar trends, but the sample size remains small. A more systematic review is yet to be written, that takes into account the full range of actors. With this substantial caveat, the emergence of at least some voices within Indian business that are seriously engaging climate change is worthy of note.

In Chapter 17, Roy, Kuruvilla, and Bhardwaj, outline the thought process within another significant and politically important

community, labour. They explain the concept of a 'just transition' that recognizes the need for an energy transition, but also assert the need that social goals must be simultaneously met. In India, an important objective of doing so must include the retraining of labour in the coal industry and rehabilitation of coal-mining areas. Furthermore, climate change will impact the health of vulnerable workers and their households, indicating that a just transition will also involve improving access to social services in workplaces, streets, and homes. This chapter demonstrates the complexity of the task facing India, as the country attempts to address development challenges, provide energy for development, address climate change, and maintain a commitment to social inclusion.

Chapter 18 by Jogesh provides a rare analysis of Indian print media from several newspapers and across seven years. Several interesting themes emerge from this analysis. For example, stories of scepticism on climate science are noteworthy by their relative absence and articles on climate impact are also more prominent. However, mitigation issues continue to receive more widespread coverage than adaptation issues. In a validation of the observation that there has been an uptick in domestic action, media coverage of domestic policy rivals that of international negotiations.

These four chapters provide only a snapshot of how key constituencies are engaging climate change in India. While attention to the issue is growing and explicit consideration of it among groups such as business and labour is increasingly apparent, it would be overstating the case to suggest that climate change is a mainstream political issue or is likely to be one soon. However, it is increasingly part of the broad slew of issues considered when various interest groups assess their strategies.

Policies

The previous discussion suggests that, in the years since 2009, various developments have set the stage for an active debate around Indian policymaking on climate change. The international process has shifted to emphasize 'bottom-up' domestic actions, a vibrant domestic civil society sector has emerged to engage with climate policy, and media coverage illustrates a steep rise in coverage of

domestic policy. To what extent and how has this shifting context resulted in the broadening and deepening of climate policymaking at various scales? This section examines this question across national and sub-national scales, with a focus on not only policy but also climate institutions. In addition, some aspects of climate policy as they pertain to specific sectors are also covered in the next section on climate and development.

Dubash and Ghosh, in Chapter 19, set the stage by reviewing the emergence of national policies, and also national institutions. This discussion starts with the National Action Plan on Climate Change (NAPCC) and its various missions, extensions of these often driven by the pursuit of 'co-benefits' that bring both climate and development gains, and the formulation of India's NDC for the Paris Agreement. Significantly, the chapter also covers the spread of climate institutions, which while weak and in their early stages, provide the spaces within which climate discussion is likely to be mainstreamed, if at all, in the coming years.

Significantly, climate policymaking has expanded to the state level, as discussed in the next two chapters. In Chapter 20, Dubash and Jogesh describe the process of formulating state action plans, identifying significant shapers of these plans, such as high-level political support, the process through which the plan is created, and its institutional home. They find that plans have been 'door-openers' for more discussions about sustainability, but, as of the time of writing in 2014, they had not fully provided a platform for mainstreaming climate change, nor had they added the necessary institutional capacity to do so in the future. Chapter 21 by Gogoi provides a more complementary recent update to the state plan process, from the perspective of a consultant engaged in assisting states. She discusses how in their further evolution beyond initial formulation, these plans have become vehicles for integrating climate change risks and opportunities into development policies, or 'mainstreaming'. She finds that there are limited examples of state plans serving to reorient the work of line departments, but the plans have provided a structure that helps shape new donor-funded programmes. The chapter then examines various governance challenges to mainstreaming, including political ownership and extent of convergence with existing development agendas. In

addition to national and state policy development, many cities are exploring climate policies, which are discussed further in the chapter on urban India in the next section.

The policy section ends with two cross-cutting enablers of climate policy: finance and technology. Both have long been central elements of India's negotiating position, on the grounds that India needs to have adequate support in terms of finance and technology in order to take climate action. While touching on India's international stance, these chapters focus substantially more on understanding these issues in India's climate policy context. Mandal, in Chapter 22, begins by explaining some conceptual confusions that can obscure India's approach to climate finance. Although India has been firm that climate finance should be 'additional' to development finance, this boundary is far more blurred in terms of its own domestic climate finance. He goes on to examine important institutional questions: how is India organized internally to mobilize domestic and international climate finance, identify uses for it, and ensure its full deployment? As much as availability of finance, these issues could limit the effectiveness of climate finance in India.

In Chapter 23, Sagar starts by reviewing technology in the UNFCCC process, but quickly moves on to explain how, in practice, understanding the implementation of technological change in the climate arena requires attention to a variety of scales, from the firm up to the larger ecosystem of actors—research institutions, government agencies, consultancies—and the institutions within which they are embedded. He then discusses examples of how technology adoption plays out in India's energy sector, with a few successes in deployment. He leaves the reader with an important question: what are the elements of a strategic approach to technology innovation, beyond deployment alone, required to fully meet India's needs in climate change–related technology?

These chapters suggest that the discussion has moved on from whether India should develop domestic climate policies, to the content and form of those policies. While their cogency and effectiveness is undoubtedly a work in progress, policies have also been accompanied by institutional construction, which has left lasting sites for their further refinement.

Climate and Development

The discussion on climate policies and institutions suggests that there is no overarching national institution for climate policymaking, nor indeed do such institutions exist in states. This is of a piece with most global experience, where the main challenge for climate change is to stimulate internalization of climate change considerations in various line ministries and departments (Somanathan et al. 2014). Doing so is as much a conceptual as an institutional challenge. It requires bringing climate concerns into conversation with a host of existing objectives that command the attention of line departments. Climate change then enters this conversation as one among multiple stressors, and both mitigation and adaptation as important additions to multiple existing objectives (Bhardwaj et al. 2019; Khosla et al. 2015; Lele et al. 2018). To be tractable, a policy conversation thus framed has to occur on a sector-by-sector basis; both stressors and objectives will vary by sector. Laying out and beginning this conversation is the task of this section, which examines integration in terms of the implications of climate for development and vice versa, and the efforts to internalize these linkages in policymaking across issues of mitigation and adaptation in key sectors.

The future of the energy sector is most directly, and closely, tied to climate mitigation. Sreenivas and Gambhir, in Chapter 24, starkly paint India's dilemma in this sector: should India focus on the short-term immediate challenges of energy poverty, access, and reliability, or should it also consider the longer-term challenges of avoiding lock-in in the face of a rapidly changing sector? They suggest the answer lies in simultaneously considering multiple objectives, and apply this approach through a tour of energy demand and supply sectors. They highlight key challenges facing the sector, such as deepening the adoption of energy efficiency, electrifying transportation, and managing the shift from coal to renewable energy which could disrupt electricity. One of the important lessons they draw is that if India is to meet its social and economic needs even while turning to a lower carbon trajectory, the process of policymaking needs to be more deliberate and transparent in order to address governance challenges that have held back the sector in the past.

Khosla and Bhardwaj, in Chapter 25, draw our attention to an ongoing transformation that is likely to shape Indian society and economy, as well as its energy future: urbanization. The energy needs to meet the shift to urban lifestyles of an estimated 400 million new urban citizens are immense, but this shift also provides an opening to build both low-carbon and climate-resilient cities. They document the upsurge of efforts to integrate climate adaptation and mitigation into India's urbanization, driven both by government and by non-state networks and alliances, including international partners. They particularly highlight the need for attention to large-term structural patterns that would lock-in India's cities to energy consumption paths, a focus on multiple objective-based approaches given India's pressing development needs, and the institutionalization of decision making that enables fluid coordination across sectors and objectives, rather than silo-based decisions.

Indian forests are important to climate mitigation, as a source of carbon sinks, but climate change can also affect forests both directly, through impacts, and indirectly, through efforts at mitigation that have secondary impacts on India's forests. Lele and Krishnaswamy, in Chapter 26, explain that climate change adds a controversial objective to an already confusing governance context where forests are expected to be simultaneously repositories of biodiversity, provide ecosystem services, produce timber, and enable livelihoods through use of non-timber forest products. Following through on India's forest-related pledge as part of the Paris Agreement adds further challenges to what is already tortuous terrain and presents substantial governance challenges. These challenges are exacerbated by confused and contested data on the sequestration potential of India's forests.

The three chapters that follow deal with significant adaptation challenges in various fields: from the water sector to agriculture and to coastal zones. The impacts of climate change are often cited as among the most worrisome consequences for South Asia. The realities of science, data, and policy formulation, however, as Srinivasan shows in Chapter 27, suggest that translating this concern into an agenda of action is fraught with challenges. While climate change is expected to lead to water stress, multiple other stressors such as land-use change, groundwater abstraction, and urbanization, to

name a few, may dominate in the short run. Moreover, as with forests, urbanization, and energy, the water sector also has to be managed for multiple objectives, including the short-term objectives of adequate supply, quality, and reliability. Srinivasan suggests that operationalizing these multiple-stressors, multiple-objectives approach, requires mainstreaming into multiple scales of climate planning, a challenge which water policymaking in India is only just beginning to grapple with.

For a country where a large share of livelihoods is tied to agriculture, the impacts of climate change on this sector are of great concern. In Chapter 28, Kavi Kumar and Viswanathan take the reader through the state of knowledge on impacts of climate change on yields of key crops such as rice and wheat. They then examine the prospects and experience of adaptation strategies in India, such as adoption of new technologies, risk management through insurance, and, in an extreme, migration. To mainstream adaptation, however, requires understanding of how climate change interacts with other stressors to induce harms. Responses, they suggest, can vary from 'climate proofing' existing initiatives to correct for past planning that fails to account for climate impacts, to a 'climate-first' approach that prioritizes climate-resilient strategies, to 'development first' that integrates climate change concerns from the start. The last, in particular, requires institutional structures capable of such integration.

Finally, in Chapter 29, Arthur takes the reader on a careful and vivid tour of the implications of climate change for India's vast coastlines and marine ecosystem. Like the other impact-focused chapters, he starts by reviewing the likely drivers of impacts: rise in sea-level; increased surface sea temperature; ocean current disruption; ocean acidification; and intensity and frequency of weather events. Complicating the story are how these drivers interact with non-climate factors, such as higher pollutant and chemical loads from land run-off, and the fact that ocean responses are likely to be non-linear. He reviews the coastal-specific components of selected state plans to assess how well they account for these complexities, and provides details with a case study of the Lakshadweep. He concludes by outlining strategies for resilience, but also cautions the need for back-up strategies, including, in the extreme, retreat from coastal areas.

Collectively, the chapters in this section illustrate both the conceptual gains as well as the challenges of integrating climate change into a multi-stressor and multiple-objective conceptual framework of development challenges. In some areas, such as energy, there is considerable scope for co-benefits—the joint realization of climate mitigation and development objectives. In others, such as agriculture, coasts, and, with a longer horizon, water, development planning that ignores climate change impacts risks being highly incomplete.

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India has had a long and somewhat fraught history of engagement with the climate challenge. For about the first two decades since this discussion formally began with negotiation of a climate treaty, the public discussion in India was limited and focused on *whether* to engage climate change as a challenge, given pressing development concerns and the dominant responsibility of others for causing the problem. Over the last decade, attention has turned to *how* to engage with climate change, and the framing has shifted to one of integrating climate change and development. This shift is due, in part, to the growing recognition of India's vulnerabilities, the awareness that, in some cases, development and climate mitigation may actually complement each other, and the internalization of climate change as a factor in foreign policy and strategic thinking.

Much of this book has focused on the question of how India can fruitfully engage with climate change in the context of India's larger development challenges. While the complexity of the issue requires engagement with the details of each chapter, collectively the chapters offer at least four high-level conclusions.

First, to advance the understanding and internalization of climate change challenges in India requires careful understanding of the linkages between climate change and development outcomes in both mitigation and adaptation realms. The discussion in the chapters presented here suggests that these linkages are best understood on a sector-by-sector basis and are usefully informed by a multi-stressor and multi-objective framework.

Second, a clear understanding of how climate change is relevant to development outcomes can also provide a pathway to more

progressive and supportive politics around climate change. Clear analysis of cases of co-benefits (where climate and development gains go together) can lead to a convergence of support for certain policies. For example, climate change could also be a political force multiplier for certain 'no-regrets' policies, such as energy and water efficiency. In some cases, climate change considerations can bring in new constituencies to long-standing debates, such as around agricultural cropping systems, leading to productive new alliances and conversations. Of course, climate change could also complicate political conversations by highlighting trade-offs rather than finding synergies, but even in such cases a clear understanding that informs a political choice is important. An example might be the shift underway in India away from biomass-based cooking to commercial fuel-based cooking, which brings health and social gains, but likely also carbon costs; a context in which policymakers are correctly likely to prioritize the former. Fortunately, the sector studies here suggest many more instances of alignment between climate change and development outcomes than trade-offs, a finding also reinforced by the global literature (IPCC 2018: Figure SPM 4).

Third, India's first decade of domestic climate policymaking has provided some gains through experimentation, but was hampered by the early state of integrative knowledge and limited institutional capacity. On the plus side of the ledger, the scale of expanded policymaking, from cities to states and at the national level, has started conversations and set in place processes that provide a useful platform for deepening policymaking. To do so requires explicit attention to policies that are designed to attend to multiple and simultaneous objectives (Bhardwaj et al. 2019). Moreover, institutions of climate governance remain embryonic; capacities are limited and the challenge of coordinating and managing incentives across disparate and diverse institutions is considerable. Given the multilevel governance framework of climate change, devising means to have national policies that are informed by global contexts, particularly in the areas of finance and technology, also needs attention.

Finally, for too long India's negotiation policy has placed the cart before the horse; negotiating objectives have shaped domestic policymaking rather than the other way around. The history of India's negotiations suggests a reflexive effort to maintain the issue

at diplomatic arm's length, and indeed modulate domestic policy to enable this diplomatic outcome. This has begun to change, but the reorientation is not complete and, indeed, the chapters here suggest continuing debate on the extent to which it is needed. However, if, as many chapters in this book also suggest, India has interests in an effective global regime due to its vulnerability, and that co-benefits provide a plausible pathway to mitigation policies, then India's negotiation strategy should be directed by a clear-headed understanding of how those domestic interests should be reflected at the international level. This clarity also provides an opportunity to play a larger role in shaping the global debate in a post-Paris scenario, marked by the fluid geopolitical context of a retreating US and an advancing China. This said, the debate continues apace within India on an appropriate negotiation strategy, the continued role of equity as a driving consideration, and to what extent India's interests were met in the Paris Agreement, as illustrated by the chapters in this volume. Going forward, the salient question is: can a climate-vulnerable India, empowered by knowledge on how climate change policy and development outcomes can be made to work together, actively advance its interests in a fluid international arena, rather than assuming its interests lie in insulating itself from the international regime?

Taken together, these four points suggest that Indians and India are getting better at talking about, understanding, and acting on the challenge of bringing together climate change and development. It is in the nature of 'wicked' problems that these understandings are continually contested and reformulated, and the discussion on advancing climate policy in India is no exception. Nonetheless, a road has been laid towards productive engagement on the interaction between climate change and development. It is now up to various sections of Indian society—policymakers, academics, media, business, and civil society, among others—to walk this path towards enhanced debate and improved action.

References

Atteridge, Aaron, Manish Kumar Shrivastava, Neha Pahuja, and Himani Upadhyay. 2012. 'Climate Policy in India: What Shapes International, National and State Policy?', *Ambio*, 41(1): 68–77.

Bhardwaj, Ankit, Madhura Joshi, Radhika Khosla, and Navroz K. Dubash. 2019. 'More Priorities, More Problems? Decision-Making with Multiple Energy, Development and Climate Objectives', *Energy Research & Social Science*, 49(March): 143–57. Available at https://doi.org/10.1016/j.erss.2018.11.003.

Bidwai, Praful. 2010. 'An India That Can Say Yes: A Climate-Responsible Development Agenda for Copenhagen and Beyond—Climate & Resources', Heinrich Böll Stiftung India. Available at https://in.boell.org/2010/03/01/india-can-say-yes-climate-responsible-development-agenda-copenhagen-and-beyond-climate; accessed on 6 May 2019.

_____. 2012. 'The Politics of Climate Change and the Global Crisis', Transnational Institute, 12 January. Available at https://www.tni.org/en/publication/the-politics-of-climate-change-and-the-global-crisis; accessed on 6 May 2019.

CAIT Climate Data Explorer. 2018. Available at https://cait.wri.org/historical; accessed on 17 January 2019.

Chattopadhyay, Sulagna. 2014. *Climate Change in India: Views on the Concerns of Adaptation and Survival in a Fast Changing World*. New Delhi: Iris Publications Ltd.

Dubash, Navroz K. 2012a. 'Climate Politics in India: Three Narratives', in Navroz K. Dubash (ed.), *Handbook of Climate Change and India: Development, Politics and Governance*, pp. 197–207. New Delhi: Oxford University Press.

_____ (ed.). 2012b. *Handbook of Climate Change and India: Development, Politics and Governance*. Routledge.

_____. 2013. 'The Politics of Climate Change in India: Narratives of Equity and Cobenefits', *WIRES Wiley Interdisciplinary Reviews: Climate Change*, 4(3): 191–201. Available at https://doi.org/10.1002/wcc.210.

_____. 2017. 'Safeguarding Development and Limiting Vulnerability: India's Stakes in the Paris Agreement', *Wiley Interdisciplinary Reviews: Climate Change* 8 (2): e444. Available at https://doi.org/10.1002/wcc.444.

Dubash, Navroz K., Radhika Khosla, Ulka Kelkar, and Sharachchandra Lele. 2018. 'India and Climate Change: Evolving Ideas and Increasing Policy Engagement', *Annual Review of Environment and Resources*, 43(1): 395–424.

Dutta, Soumya. 2013. *Climate Change and India: Analysis of Political Economy and Impact*. New Delhi: Daanish Books; South Asia: Rosa Luxemburg Stiftung.

Hulme, Mike. 2009. *Why We Disagree about Climate Change: Understanding Controversy, Inaction and Opportunity*. Cambridge: Cambridge University Press.

Iacobuta, Gabriela, Navroz K. Dubash, Prabhat Upadhyay, Mekdelawit Deribe, and Niklas Hohne. 2018. 'National Climate Change Mitigation Legislation, Strategy and Targets: A Global Update', *Climate Policy*, 18(9): 1114–32.

Intergovernmental Panel on Climate Change (IPCC). 2018. *Global Warming of 1.5°C*. An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Geneva: IPCC, World Meteorological Organization. Available at https://www.ipcc.ch/sr15/; accessed on 6 May 2019.

Jordan, Andrew, Dave Huitema, Harro van Asselt, and Johanna Forster. 2018. *Governing Climate Change*. Cambridge: Cambridge University Press.

Keohane, Robert O. and David G. Victor. 2011. 'The Regime Complex for Climate Change'. *Perspectives on Politics*, 1: 7–23.

Khosla, Radhika, Srihari Dukkipati, Navroz K. Dubash, Ashok Sreenivas, and Brett Cohen. 2015. 'Towards Methodologies for Multiple Objective-Based Energy and Climate Policy', *Economic & Political Weekly*, 50(49): 49–59.

Lele, Sharachchandra, Veena Srinivasan, Bejoy K. Thomas, and Priyanka Jamwal. 2018. 'Adapting to Climate Change in Rapidly Urbanizing River Basins: Insights from a Multiple-concerns, Multiple-stressors, and Multi-level Approach', *Water International*. Available at https://doi.org/10.1080/02508060.2017.1416442.

Michaelowa, Katharina and Axel Michaelowa. 2012. 'India as an Emerging Power in International Climate Negotiations', *Climate Policy*, 12(5): 575–90. Available at https://doi.org/10.1080/14693062.2012.691226.

Narain, Sunita. 2015. 'Paris—The Endgame for Climate Justice', *Business Standard*, 20 December. Available at https://www.business-standard.com/article/opinion/sunita-narain-paris-the-endgame-for-climate-justice-115122000640_1.html; accessed on 6 May 2019.

Ostrom, Elinor. 2010. 'Polycentric Systems for Coping with Collective Action and Global Environmental Change', *Global Environmental Change*, 20(4): 550–7. Available at https://doi.org/10.1016/j.gloenvcha.2010.07.004.

Parliamentary Debates. 2012. 'Climate Change and Parliament', in Navroz K. Dubash (ed.), *Handbook of Climate Change and India: Development, Politics and Governance*, pp. 230–45. New Delhi: Oxford University Press.

Rajamani, Lavanya. 2012. '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: Development, Politics and Governance, pp. 118–29. New Delhi: Oxford University Press. Available at http://www.cprindia.org/research/chapters/reach-and-limits-principle-common-differentiated-responsibilities-and-respective; accessed on 6 May 2019.

Saran, Samir and Aled Jones. 2016. *India's Climate Change Identity: Between Reality and Perception*. Cham, Switzerland: Palgrave Macmillan.

Sengupta, Sandeep. 2012. 'International Climate Negotiations and India's Role', in Navroz K. Dubash (ed.), *Handbook of Climate Change and India: Development, Politics and Governance*, pp. 101–17. New Delhi: Oxford University Press.

Sethi, Surya. 2015. 'The Ultimate Cirque Du Soleil', *The Hindu Business Line*, 22 December. Available at https://www.thehindubusinessline.com/opinion/the-ultimate-cirque-du-soleil/article8018665.ece; accessed on 6 May 2019.

Shukla, P.R., A. Garg, and Hem H. Dholakia. 2015. *Energy-Emissions Trends and Policy Landscape for India*. New Delhi: Allied Publishers.

Somanathan, Eswaran, Thomas Sterner, Taishi Sugiyama, Donald Chimanikire, Navroz K. Dubash, Joseph Kow Essandoh-Yeddu, Solomone Fifita, Lawrence Goulder, Adam Jaffe, and Xavier Labandeira. 2014. 'National and Sub-National Policies and Institutions'. In *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, O. Edenhofer, R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, et al. (eds), pp. 1141–205. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.

Steffen, Will, Johan Rockström, Katherine Richardson, Timothy M. Lenton, Carl Folke, Diana Liverman, Colin P. Summerhayes et al. 2018. 'Trajectories of the Earth System in the Anthropocene', *Proceedings of the National Academy of Sciences*, 115(33): 8252–9. Available at https://doi.org/10.1073/pnas.1810141115.

Vihma, A. 2011. 'India and the Global Climate Governance: Between Principles and Pragmatism', *The Journal of Environment & Development*, 20(1): 69–94. Available at https://doi.org/10.1177/1070496510394325.