AGENCY IN EARTH SYSTEM GOVERNANCE

Edited by

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Acknowledgments

Part One

Introduction and Overview

1

Introduction: Agency in Earth System Governance

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Chapter Highlights

- Agency is one of five core analytical problems in the Earth System Governance (ESG) Project's research framework, which offers a unique approach to the study of environmental governance.
- *Agency in Earth System Governance* draws lessons from ESG–Agency research through a systematic review of 322 peer-reviewed journal articles published between 2008 and 2016 and contained in the ESG–Agency Harvesting Database.
- ESG–Agency research draws on diverse disciplinary perspectives with distinct clusters of scholars rooted in the fields of global environmental politics, policy studies, and socio-ecological systems.
- Collectively, the chapters in *Agency in Earth System Governance* provide an accessible synthesis of some of the field's major questions and debates and a state-of-the-art understanding of how diverse actors engage with and exercise authority in environmental decision-making.

1.1 Introduction

The advent of the Anthropocene, with humans now driving earth system transformation, has created unprecedented governance challenges (Biermann, 2007; Galaz et al., 2012a). Decision makers from the global to the local level must find ways to limit human impacts on biochemical and geophysical cycles that sustain life on Earth and advance long-term sustainability goals by changing political, economic, social, and legal systems at multiple scales. Governance in the face of the challenges posed by earth system transformation today includes a broad range of actors including national and subnational governments, international

organizations, environmental and development non-governmental organizations (NGOs), expert networks, corporations, and communities. *Agency in Earth System Governance* presents current understandings of how these diverse actors exercise authority in steering society towards a more sustainable future as well as their capacity to deliver effective, legitimate, and equitable environmental governance.

This volume synthesizes research findings from the past decade of multi-disciplinary scholarship on these questions of agency within the context of the Earth System Governance (ESG) Project, the world's largest network of social scientists conducting research at the intersection of governance and global environmental change (earthsystemgovernance.org). In looking at how researchers in the ESG Project community have taken up this agenda, we seek to make sense of what this body of work has to say about the role of agency in environmental governance more broadly. Drawing on more than 300 peer-reviewed scientific publications on agency, each chapter in this volume identifies notable patterns and trends over the past decade and highlights key findings and debates. This volume brings together social science research from diverse disciplinary perspectives and draws on a broad range of theoretical and methodological approaches to provide a rich understanding of agency as it operates in earth system governance across multiple scales, issues areas, and geographies.

In addition to taking stock of what we have learned, *Agency in Earth System Governance* can inform the future trajectory of research as the ESG network continues to develop, and as more scholars engage with questions of agency in environmental governance. In examining how understanding of agency has evolved and changed, we have uncovered critical trends and themes as well as gaps in knowledge, theoretical approaches, and methodologies. These insights clarify critical questions that remain about the role of agency in environmental governance – among others, how shifting agency dynamics impact institutions and governance architectures; the implications of these shifts in authority and power in governance processes and outcomes; and how global networks operate and influence governance (Earth System Governance Project, 2018a).

This chapter begins by situating the ESG Project in the broader context of environmental governance scholarship. It then elaborates on the specific issue of agency in earth system governance and details the process by which we compiled the ESG–Agency Harvesting Database, a set of 322 articles published between 2008 and 2016 that form the basis for the volume's systematic review of ESG–Agency research. We conclude by reviewing the volume's structure and the contributions of individual chapters.

1.2 Earth System Governance

The ESG Project adopts a unique perspective on environmental governance. Lemos and Agrawal (2006, p. 298) define environmental governance as 'a set of regulatory processes, mechanisms, and organizations through which political actors influence environment actions and outcomes.' It involves the purposeful steering of society toward common targets and goals related to the environment, raising questions about the processes by which those targets are established and the instruments actors use to move social systems in desired directions (Evans, 2012; Young, 2016b). Environmental governance scholars often begin by observing that the problems confronting humanity, such as climate change, biodiversity loss, and deforestation, coupled with the forces of globalization, pose challenges to the capacities and existing strategies of national governments to improve human–nature relations. In focusing on *governance*, scholars emphasize the role of multiple actors, including governments as well as businesses, communities, civil society, scientists, individuals, and networks (Armitage et al., 2012; Evans, 2012; Lemos and Agrawal, 2006; Plummer et al., 2013). Steering may be achieved through diverse instruments ranging from formal laws and policies to market mechanisms and self-regulation, all of which can be implemented at and across different levels of social and political organization. Given this, environmental governance constitutes a multidisciplinary effort by scholars of political science, international relations, legal studies, public administration, anthropology, sociology, geography, and ecology, among others (Evans, 2012).

A number of recurring concepts and themes characterize the diverse disciplines involved in environmental governance scholarship (see Armitage et al., 2012; Durant et al., 2016; Evans, 2012; and Plummer et al., 2013 for excellent summaries). *Fit and scale* call attention to the spatial, temporal, and political boundaries (and their interconnections) in which environmental problems are experienced and addressed (Bulkeley, 2005; Cash et al., 2006; Lemos and Agrawal, 2006; Sternlieb et al., 2013; Young et al., 2008). Notions of *adaptiveness and learning* draw on complex systems thinking and highlight the unique challenges of governing in the face of high levels of uncertainty and non-linear dynamics (Folke et al., 2004 Gupta et al., 2010). Effective environmental governance requires multiple forms of *knowledge* including, but not limited to, science and the processes that generate knowledge (Cash et al., 2003; Lemos and Agrawal, 2006) and diverse *actors* drawing on multiple sources of authority while carrying out a range of governance roles and responsibilities (Betsill, 2014; Bulkeley et al., 2014; Lemos and Agrawal, 2006). The use of new modes of governance raises important questions about their *accountability and legitimacy* (Bäckstrand, 2006; Cashore, 2002) and their ability to deliver *equitable and just* environmental governance (Schlosberg, 2009).

The ESG Project is firmly situated in this broader landscape, especially in its interdisciplinarity, but offers a unique approach to the study of environmental governance in at least two respects.[1] First, in using the term 'earth system governance', the ESG Project signals its roots in, and continued relationship to, the global change research community and earth system science, emphasizing an explicitly planetary perspective (Biermann, 2007). This vantage point foregrounds challenges such as the global food crisis, ocean acidification, dying coral reefs, climate migration, water shortages, land degradation, and Arctic melting that were overlooked by previous generations of environmental governance scholars. The second way the ESG approach differs from much of the environmental governance literature (see the Lemos and Agrawal definition given earlier) is in its normative commitment to sustainable development. The ESG Project defines earth system governance as "the interrelated and increasingly integrated system of formal and informal rules, rule-making systems, and actor-networks at all levels of human society (from local to global) that are set up to steer societies towards preventing, mitigating, and adapting to global and local environmental change and, in particular, earth system transformation, within the normative context of sustainable development" (Biermann et al., 2010a, p. 279).

This volume grows out of and links to the broader ESG Project, which introduced a research framework organized around five core analytical problems and four cross-cutting themes (Biermann et al., 2009). As discussed in greater detail in the text that follows, *Agency* research focuses on the diverse actors engaged in earth system governance. The analytical problem of *Architecture* focuses on the broad array of public, private, and hybrid institutions and rule systems for earth system governance as well as the extent to which they are integrated across socio-political levels and political and economic sectors. Research on the analytical problem of *Adaptiveness* seeks to understand the types of institutions and governance mechanisms that allow for flexibility and learning given the uncertainty inherent in earth system transformation. *Accountability* is about the democratic quality of earth system governance while *Allocation & Access* highlights issues of equity and justice by considering how the benefits and burdens of earth system governance are distributed in society. The four cross-cutting themes are integral to each of the analytical problems and essential to a more comprehensive understanding of earth system governance. While *Knowledge* and *Scale* are widely addressed throughout the environmental governance literature, the ESG Project is unique in its more focused attention to questions of *Power* as well as *Norms*, which brings ideational elements to the centre of earth system governance scholarship.

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[1] Thanks to Frank Biermann, founding chair of the ESG Project, for helping us articulate these points.

1.3 Agency in ESG Research

Agency in Earth System Governance reviews how scholars in the ESG research community have engaged the analytical problem of Agency, which evolved from the idea that governing changes in the Earth's system effectively requires the consent and involvement of a broad range of actors. In the late 1990s and early 2000s, many scholars in political science, geography, and international relations challenged the predominant focus on the nation-state as the primary actor in environmental governance. They argued that because of the transboundary and complex nature of many contemporary environmental problems, these issues could not be solved by the state alone (Falkner, 2003; Okereke et al., 2009; Wapner, 1995). Non–nation-state actors, such as cities, regions, companies, and civil society organizations, already were engaged in earth system governance, either on their own or through participation in broader institutions. They were involved in setting standards for, monitoring, and shaping interactions between human beings and their natural environment, exhibiting a form of agency that had not yet received much scholarly attention.

An oft-cited figure illustrating the increasing complexity of earth system governance is that states have negotiated more than 1,300 multilateral environmental agreements (Mitchell, 2018). Starting somewhere in the 1970s and accelerating in the 1990s, states negotiated on various environmental issues, ranging from specific treaties addressing oil pollution, nuclear emergencies, and specific fish stocks to mega-treaties on desertification, biodiversity, and climate change. After 2000, however, states began to sign fewer new multilateral environmental agreements. New types of actors claimed authority, illustrating Rosenau and Czempiel's (1992) notion that there is often 'governance without government.' The 'privatization' of environmental governance became a hot topic as researchers documented the growing influence of various nonstate actors (Clapp, 1998; Levy and Newell, 2005; Pattberg, 2005). Pattberg (2005, p. 591), for instance, analysed the Forest Stewardship Council (FSC) and the Coalition for Environmentally Responsible Economies (CERES), concluding that there was an ongoing 'institutionalization of private governance' and that 'the locus of authoritative problem solving does not rest with governments and their international organizations alone'. These actors included companies and private businesses (Levy and Newell, 2005), NGOs and civil society (Betsill and Corell, 2008), bureaucracies (Biermann and Siebenhüner, 2009b), and science networks (Gupta et al., 2012), among others.

As new actors took on more pronounced roles in earth system governance, new types of collaborations emerged between private actors and between public and private actors. Networked agency via multi-stakeholder partnerships and public-private partnerships embodied the increasingly blurred border

between public and private (Okereke et al., 2009; Pattberg and Stripple, 2008). States soon embraced partnerships as central mechanisms of earth system governance. In particular, the 2002 World Summit on Sustainable Development (WSSD) gave nonstate and subnational actors central roles in implementing the sustainable development goals set by governments (Andonova and Levy, 2003). A key outcome of the WSSD was the establishment of more than 330 'Type II Partnerships' (Hale and Mauzerall, 2004), collaborations between governments and private actors in which all parties were to contribute resources and benefit from cooperation. While the effectiveness of these partnerships has been questioned (see, e.g., Pattberg et al., 2012), it marked a shift in the discourse of who should be responsible for sustainable development. More recently, Sustainable Development Goal number 17 aims to 'Revitalize the global partnership for sustainable development', highlighting the role of private sector and civil society for implementing the 2030 agenda.

At the start of the twenty-first century, making sense of how new and old actors exercise authority and the causes and consequences of these actions became a central research concern (Dellas et al., 2011). The slowdown in the number of MEAs being signed and the rise of private and hybrid governance initiatives meant a shift in research focus away from the international level to the transnational level, opening up a range of new questions regarding effectiveness, legitimacy, and accountability. The ESG Science Plan (Biermann et al., 2009) identified questions around agency such as 'To what extent is the state (at all levels) an agent of earth system governance?', suggesting that there had been a demise or at least shift in state authority. Also, questions regarding 'Who are the key agents in a particular issue area and how are they related to one another?' and 'What broad types of agents are central in the area of earth system governance?' hinted towards a knowledge gap regarding whether the rise in nonstate and subnational actors was a general trend or existed only in certain issue areas or regions (Newell et al., 2012).

ESG–Agency research distinguishes between actors and agents. An *agent* is understood as an individual or an organization possessing the ability to prescribe behaviour and to obtain the consent of the governed (Biermann et al., 2009, p. 38). We define agents, not by their mere participation in decision-making, but as *authoritative actors* whose ability to exercise power legitimately emerges through a relationship with those whom they seek to influence or govern (Dellas et al., 2011). Agents include actors such as governments, NGOs, corporations, and individuals who work alone and often collectively to improve various aspects of earth system governance. Linked to broader questions of social science, agency draws attention to how nonstate actors relate to the state; the sources of authority on which different types of actors rely; the relationship between agency and structure;

and variations in governance and agency across different spheres and tiers of society.

The ESG Science Plan (Biermann et al., 2009) outlined four research questions meant to guide scholarship on the analytical problem of Agency and directed at addressing the most pressing knowledge gaps on the relationship between Agency and earth system governance.

1. *What is Agency in earth system governance?* This question addresses Agency from a theoretical and conceptual perspective, inquiring into its foundational elements. Can agency be understood as the capacity to act in the face of earth system transformation or in the production of effects that shape natural processes? Is it static or dynamic? Does it operate in a zero-sum fashion or can agency be shared? Can non-human entities have agency in earth system governance?

2. *Who are the agents of earth system governance?* This question asks not only which agents are involved in governing the earth system, but also how is agency configured across policy domains and at different social and political levels. It considers both nonstate (e.g., companies, NGOs, communities) and state agents with attention to how these agents interact with one another.

3. *How is agency exercised in earth system governance?* This question focusses especially on the process by which actors become agents and the important sources of authority such as gender, material resources, knowledge, and social connections that underlie agency.

4. *How can we evaluate the significance of agents and agency in earth system governance?* Finally, the 2009 Science Plan acknowledges the importance of assessing the impacts and effectiveness of agency and calls attention to the methodological challenges of doing so. To what extent are institutional measures of effectiveness (e.g., outcome–output–impact) applicable to evaluation of agency? Is there a Pareto-optimum of agency that can simultaneously realize goals related to environmental change and human livelihoods? This question also acknowledges the need to evaluate agency that is used to block environmental governance.

Finally, ESG–Agency scholarship engages with many literatures and debates in the field of environmental governance. For example, ESG–Agency scholars draw on theories and concepts in global environmental governance (GEG) to focus on responses to environmental degradation across international borders. According to Biermann and Pattberg (2008), the field of GEG differs from traditional international environmental politics through a focus on (1) new types of agency and actors; (2) new mechanisms and institutions; and (3) segmentation and fragmentation of governance efforts. GEG scholars are broadly split between

'multilateralists', focussed on traditional mechanisms that rely heavily on inter-actions among nation-states (intergovernmental organizations and treaty regimes) and 'transnationalists', who look at governance mechanisms and pro-cesses led by nonstate actors (Betsill et al., 2015). Policy studies scholars incorporate ideas from new public management to analyse agency through stakeholder engagement and participatory decision-making processes (e.g., Mukhtarov et al., 2013). They also focus on the configuration and operation of agency in the context of hybrid and private forms of governance (e.g., Auld et al., 2015) and the changing role of the state in these new forms of governance (e.g., Jordan and Huitema, 2014b). Adaptive governance scholars draw on ecological concepts of resilience and coupled socio-ecological systems and emphasize agency in the context of continuous change and uncertainty (e.g., Armitage et al., 2012; Lebel et al., 2016). Much of this work highlights the role of communities in earth system governance. *Agency in Earth System Governance* presents a novel synthesis of these diverse approaches.

1.4 The ESG–Agency Harvesting Initiative

Agency in Earth System Governance is part of the ESG Project's 'harvest' of research findings from its first decade. Specifically, we draw lessons from ESG research on agency through a systematic review of 322 peer-reviewed journal articles published between 2008 and 2016. In compiling the ESG–Agency Harvesting Database, we followed Weed's (2008) approach to interpretive synth-esis to go beyond a mere literature review. We coded these articles (details in the text that follows) on multiple dimensions to reveal the broad contours of agency-related research conducted within the context of the ESG Project. The ESG–Agency Harvesting Database provides a unique basis for examining how scholars within this research community have approached the analytical problem of Agency, in the process identifying key findings and debates. It also allows for reflection on how the ESG Project engages with broader environmental governance and social science scholarship.

1.4.1 Compiling the ESG–Agency Harvesting Database

The ESG–Agency harvesting process began with a planning meeting at the Nairobi Conference on Earth System Governance in December 2016. Rather than predefin-ing a set of topics and commissioning author teams, the team adopted a bottom-up approach that began by identifying the 'field' or body of work from which to harvest research results and then chose to explore how that field had developed and evolved over its first decade. Figure 1.1 outlines our approach.
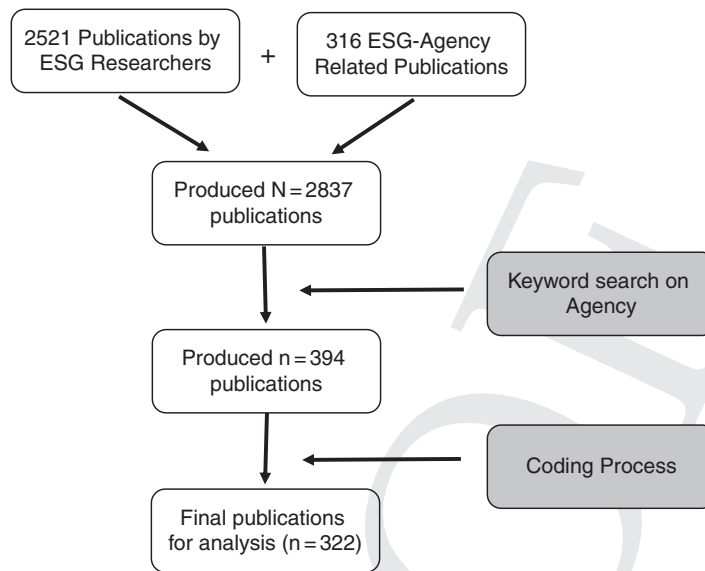
Figure 1.1 Process for creating the ESG–Agency database.

First, we gathered work broadly reflective of 'ESG Research'. Although questions of agency speak to the field of environmental governance and social science more generally, our narrower approach is intentional. We sought to review work that reflected the broad scholarship taking place within the ESG Project rather than to produce a comprehensive review of all scholarship related to agency. We selected peer-reviewed articles from the Web of Science[2] using two key criteria. Our first step was to download publications by all researchers officially affiliated with the ESG research network (e.g., steering committee members, lead faculty, and ESG research fellows as identified on the ESG Project's website). We supplemented this list with publications that directly address the ESG research framework by referencing core ESG publications such as the 2009 Science Plan or the specific issue of Agency (Betsill et al., 2011; Biermann, 2007; Biermann et al., 2010a,b; Dellas et al., 2011; Schroeder, 2010). This first step produced an initial pool of 2,837 'ESG-related' publications.

Next, we sought to select only those publications that specifically addressed the analytical problem of Agency. As many scholars engage questions of agency using other terms, we identified several keywords (see Table 1.1). We identified 394 articles published between 2008 and 2016 that used three or more of these keywords in their abstract, title, or keywords.

[2] We recognize the limitation of relying on the Web of Science, which does not catalogue books, edited volumes, and publications in law journals, but reasoned that the content of these types of publications may also appear in journal articles.

Table 1.1 *Agency keyword protocol*

Actor* (or Act*?)	Capacity	Partici*
Agenc*	'Decision within [5] of mak*'	Power*
Agent*	Govern* [not government]	Role
Authority	Influence	

Table 1.2 *Agency Harvest simplified coding scheme*

Coding topic	Description
Relevance to Agency	Does this article contain research on the influence, roles, and responsibilities of actors; the ways in which authority is granted to these agents; and how it is exercised?
Link to the ESG Science Plan	Does this article speak to one of the four 'core questions' identified in the original science plan?
Issue(s)	What is (are) the specific environmental issue area(s) covered?
Type(s) of actors	What type(s) of actors are analysed?
Theoretical approaches	If possible, identify the primary theoretical approach used or advocated in the study of ESG.
Research design and methods	What research design and/or methods for data collection and analysis are used in the article?
Links to broader social science debates	In the ESG Science Plan, the problem of Agency is linked to four broad areas of social science inquiry that address questions of *who* governs and *how* (p. 38): (1) nonstate actors in governance; (2) actors, authority, and agency; (3) the structure–agent debate; and (4) agency in a multilevel context.
Links to other ESG analytical problems	Does the article speak to linkages between 'agency' and the four other analytical problems in the ESG Science Plan (Architecture, Accountability; Adaptiveness, and Access & Allocation).
Links to ESG cross-cutting themes	Does the article speak to linkages between 'agency' and the four cross-cutting themes identified in the original science plan (Power, Knowledge, Norms, and Scale)?
Other themes or issues	Identify any other themes or issues of note in the article.

We coded this subset of articles in spring and summer 2017, using a crowd-sourced approach involving volunteers from the ESG research network. We developed a coding instrument to sort articles and identify common trends, approaches, and key priorities (see Table 1.2 and the Appendix). For instance, one coding topic

identified which agency-related questions raised in the 2009 ESG Science Plan the articles addressed (Biermann et al., 2009), others aimed to classify each article's theoretical perspective and methodological approach, and still others identified geographical regions and issue areas addressed in the article. We also tracked links to other ESG analytical problems (Architecture, Access & Allocation, Accountability, and Adaptiveness), cross-cutting themes (Power, Knowledge, Norms, and Scale) and broader social science debates. In addition, we explored the types of actors that have been studied as part of ESG–Agency research. Using a Google-form coding sheet, 22 individuals coded more than 700 entries over three rounds of coding (see Acknowledgements). Four master coders adjudicated conflicts to finalize the coded data. Eventually, 333 articles were determined to be relevant to ESG–Agency research, of which the 322 (96.7%) that had been coded at least twice were ultimately included in the ESG–Agency Harvesting Database. These articles represent the 'field' from which the findings in this volume are derived. For greater detail on the coding process and a list of the 333 articles, see the Appendix.

1.4.2 Broad Contours of ESG–Agency Scholarship

The chapters that follow explore, in detail, different aspects of the articles included in the ESG–Agency Database. Here we provide a general overview[3] that reveals some broad patterns and trends to provide a context for later chapters. We find that the research represented in the ESG–Agency Harvesting Database represents a multidisciplinary and growing field of scholarship with distinct clusters of researchers working in the areas of global environmental politics, policy studies, and socio-ecological systems. Figure 1.2 illustrates the historical publication levels of ESG–Agency research, which has grown steadily since 2008. Higher levels in 2012 and 2015 may reflect high-profile international events such as the Rio +20 summit and the Paris climate negotiations.

ESG–Agency articles appeared in 128 publication outlets, although more than a third were published in 10 interdisciplinary environment journals (Table 1.3). The articles confirm that ESG–Agency research, like environmental governance scholarship generally, is multidisciplinary, with contributions from political science, international relations, legal studies, development studies, public administration, anthropology, sociology, geography, and ecology, among others. No single, dominant publication existed for such research between 2008 and 2016.[4]

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[3] The images created here include the full sample of 333 ESG–Agency related articles from the coding exercise.
[4] In 2019, the ESG Project launched a new flagship journal, *Earth System Governance*.

Table 1.3 *Top 10 publication outlets for ESG–Agency-related research*

International Environmental Agreements: Politics, Law and Economics	26
Global Environmental Change	17
Environmental Science and Policy	16
Ecology and Society	14
Global Environmental Politics	14
Environment and Planning C: Government and Policy	7
Environmental Management	7
Land Use Policy	7
Regional Environmental Change	7
Wiley Interdisciplinary Reviews-Climate Change	7
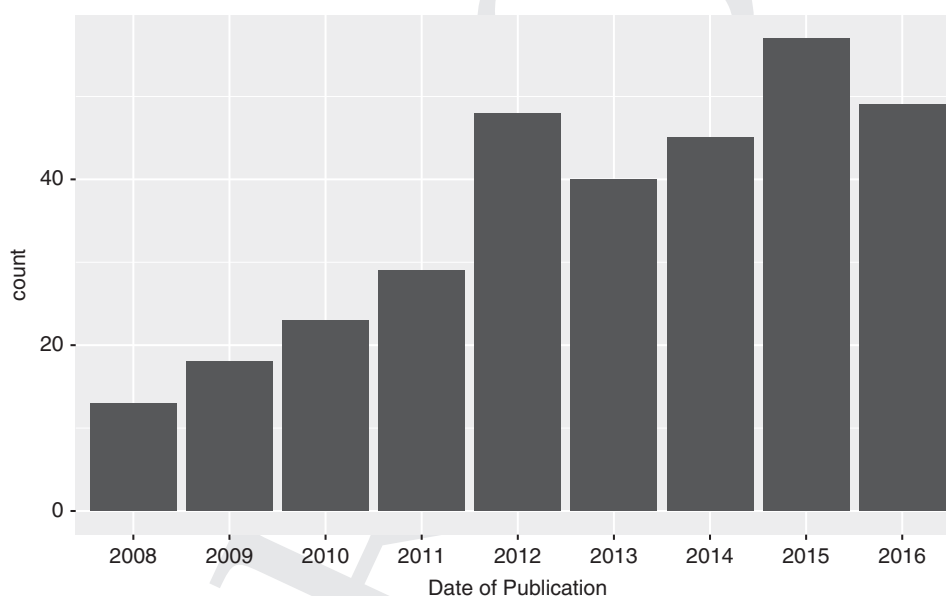
Figure 1.2 Number of ESG–Agency-related articles by year.

Using bibliometric data, we can identify key authors in the ESG–Agency Harvesting Database as well as the intellectual foundations for this scholarship. We found 676 distinct scholars represented in the database. Figure 1.3 shows a co-authorship network of 281 connected authors, with nodes representing individual authors and edges indicating co-authorship between two authors. The size of the nodes represents the total number of documents in the dataset by this author. The figure illustrates distinct clusters of authors who collaborate frequently with one

Figure 1.3 Co-authorship network.

another as well as a few authors who connect different clusters in the network, such as Frank Biermann, who chaired the ESG Project until 2018.

We can also examine similarities among authors in the literature on which they draw to identify any common intellectual foundations. Figure 1.4 is a bibliographic coupling analysis that shows relatedness among authors based on the number of shared references. To keep the figure legible, we include those 81 authors in the ESG–Agency Harvesting Database who have at least three publications. The edges connect authors that cited the same references and edge strength represents the number of shared references, which is highly correlated with co-authorship. Node size represents the number of documents by each author in the database. Again, the various groupings represent different clusters of authors whose work is based on a similar scholarly foundation.

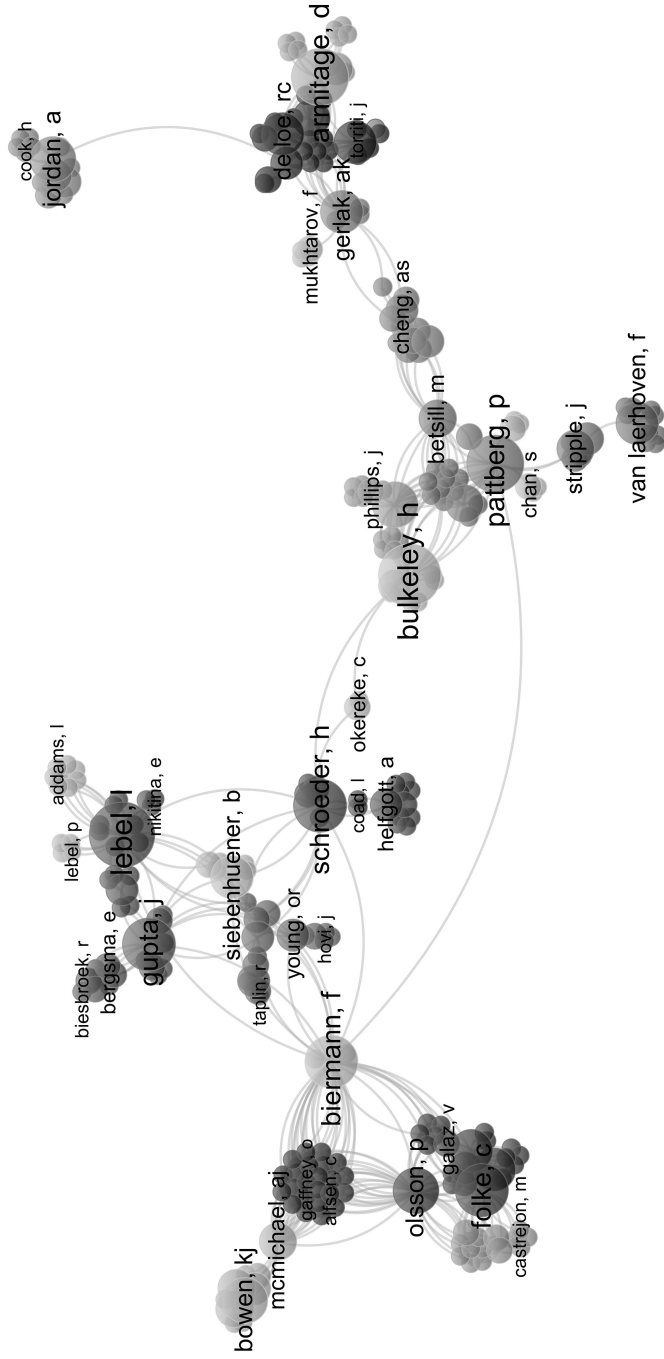Figure 1.5 is a bibliographic coupling analysis that shows relatedness among journals based on the number of shared references. To keep the figure legible, we include only journals that appear at least three times in the ESG–Agency database. The edges connect journals that cited the same references and edge strength represents the number of shared references. Node size represents the frequency of the journal's appearance in the database. Again, the various groupings represent different clusters of journals where work is based on a similar scholarly foundation. Figures 1.3, 1.4, and 1.5 all suggest distinct, yet interconnected, clusters of scholarship rooted broadly in the fields of global environmental politics, policy studies, and socio-ecological systems, reflecting the disciplinary diversity of this research field and the ways in which ESG–Agency scholars are situated in the broader field of environmental governance research.

Finally, Figure 1.6 is a co-citation analysis that reveals the relatedness among the 50 most cited journals (each cited at least 39 times), reflecting the number of times they are cited together in publications in the ESG–Agency Database. The nodes represent the journals in which a source was published and node size represents the number of sources published in that journal. Edges indicate co-citations (only 200 are shown) and the different clusters represent the various journals that are frequently cited together. This figure illustrates the breadth of the ESG–Agency research community while the distinct clusters again suggest disciplinary distinctions between publications situated in the social sciences and those whose work draws more heavily on ecology and natural sciences.

1.5 Overview of the Volume

Agency in Earth System Governance provides state-of-the-art understanding of how diverse actors engage with environmental decision-making and exercise authority in steering society towards (or away from) a more sustainable future as
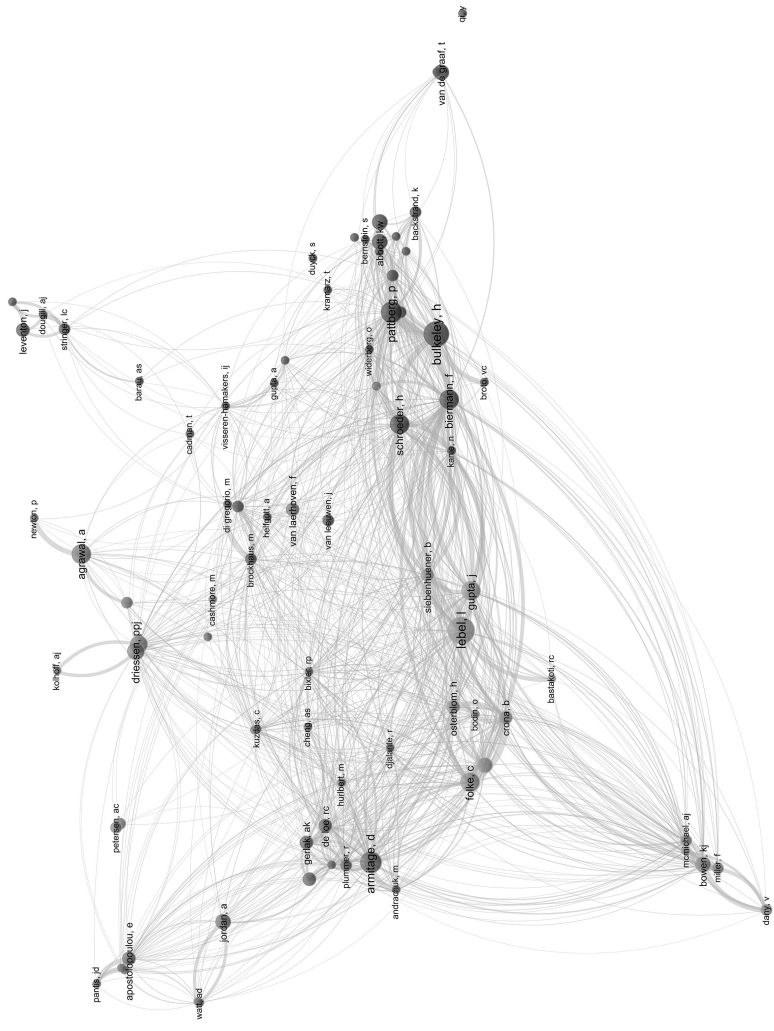
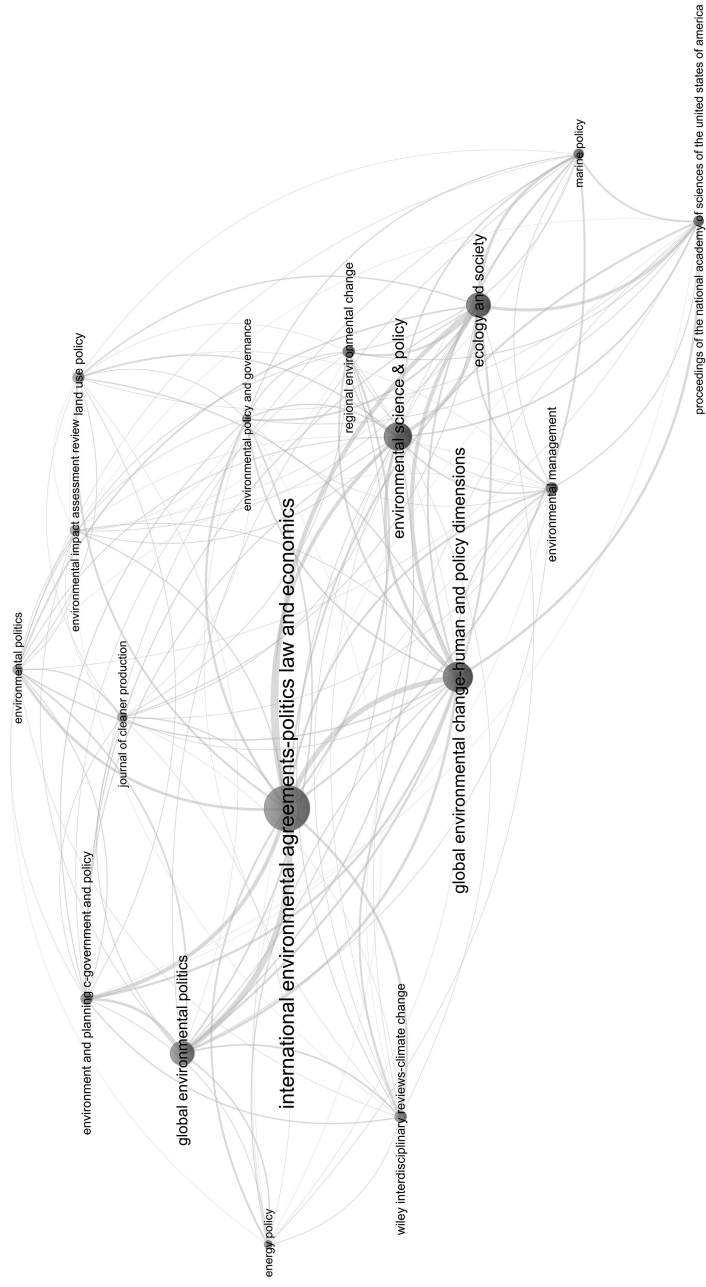Figure 1.4 Bibliographic coupling of ESG authors.

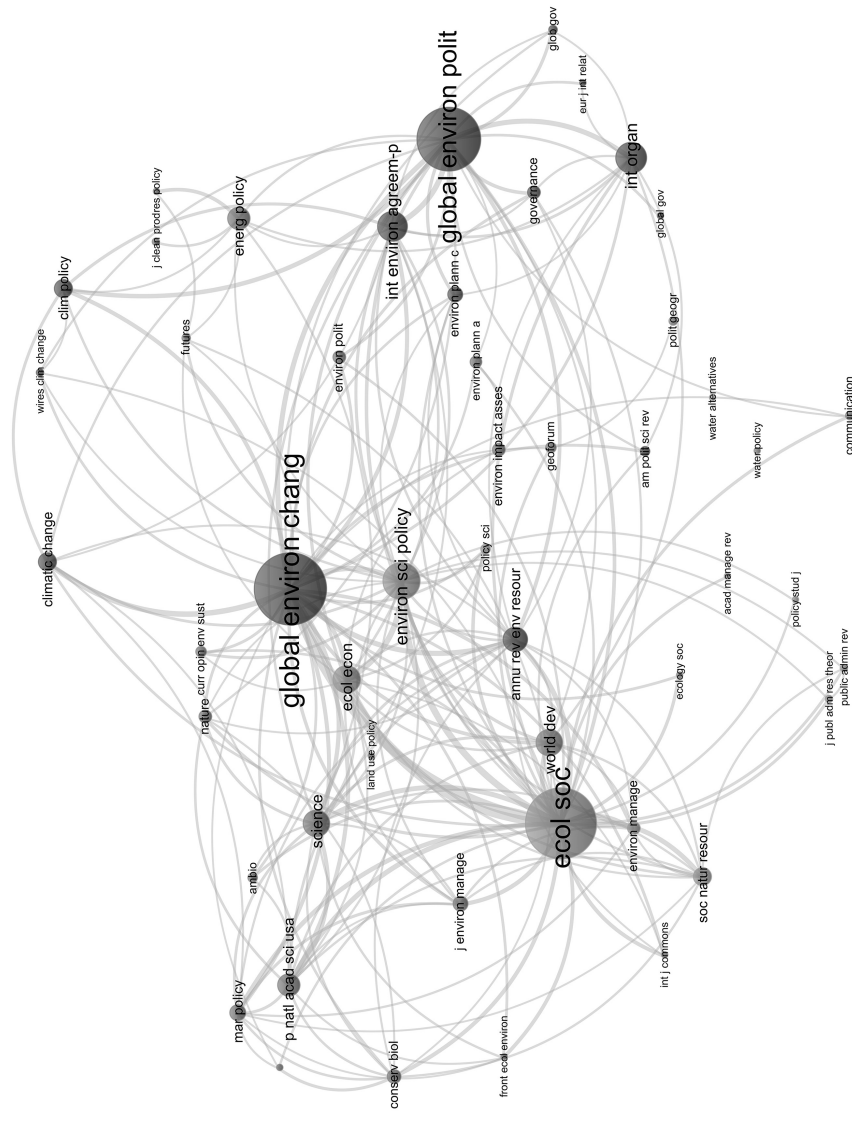Figure 1.5 Bibliographic coupling of ESG-related journals.

Figure 1.6 Co-citations.

well as their capacity to deliver effective, legitimate, and equitable earth system governance. Drawing on a systematic analysis of 322 journal articles published in the period 2008–2016, the chapters offer an accessible synthesis of this multi-disciplinary research literature and a valuable orientation to some of the field's major questions and debates. Our 30 contributors represent the face of scholars in the ESG Project's research network with its diversity in terms of gender, discipline, geography, and career stage.

We begin with more detailed overviews and reflections on the publications in the ESG–Agency Harvesting Database in terms of how agents and agency are conceptualized (Chapter 2), the theories and methods deployed (Chapter 3), and the issues and geographies incorporated in the literature (Chapter 4). In Chapter 2, Michelle Scobie, Tabitha Benney, Calum Brown, and Oscar Widerberg note that ESG–Agency scholarship is largely empirical and focussed on agency in practice. This research highlights the fragmented, expanding, and complex forms of authority that proscribe, steer, and govern behaviour related to human–environment interactions, but often without reflecting on how agency is conceptualized. The authors note ESG–Agency research engages with four broad interdisciplinary debates about (1) the types of agents involved in earth system governance; (2) the ways in which agents exercise authority; (3) how agents influence governance processes and outcomes; and (4) the varieties of structures and architectures in which agents operate. Although scholars examine a variety of actors, they find that the state continues to be at the centre of ESG–Agency scholarship.

Chapter 3, by Tabitha Benney, Amandine Orsini, Devon Cantwell, and Laura Iozelli, reviews the articles in the ESG–Agency Harvesting Database from the perspective of the theoretical and methodological approaches used. They observe that most of the scholarship falls into one of three broad theoretical categories. Social and system dynamics approaches, which explore the complex interactions between agents and structures in earth system governance, are the most prominent. Agent-based approaches, which place greater emphasis on the autonomy of agents as they engage with earth system governance, are also central to this area of research. Critical theoretical approaches that emphasize asymmetric relationships related to power, class, race, gender, and human–nature relations are surprisingly less common within this body of scholarship. The authors find that despite earlier calls for methodological pluralism, ESG–Agency scholarship is dominated by qualitative research approaches, although they note that scholars increasingly apply multimethod qualitative approaches to their analyses of agency in earth system governance. They see great promise in the use of cross-disciplinary and complex integrative methodological approaches in future research.

In Chapter 4, Andrea Gerlak, Megan Mills-Novoa, Alison Elder, Okechukwu Enichi, Pritee Sharma, and Kanak Singh catalogue the geographical and issue focus

of publications in the ESG–Agency Harvesting Database. ESG–Agency research can be found in all regions of the world, but it has analysed earth system governance primarily in the global arena as well as in Asia and Europe. There are a diverse set of issues addressed in ESG–Agency research, from climate change and fisheries to water, energy, and biodiversity. Climate change, at multiple scales and across geographical contexts, is the dominant issue studied. In looking across geography and issues, the scalar nature of the environmental issue is an important factor in determining the scale and regional focus of research. They argue that we still simply don't know enough about earth system governance in many parts of the Global South. To address this imbalance in the geographical focus of the ESG network, they call for ESG scholars to develop research projects and collaborations in understudied regions while also recruiting and supporting local scholars to become members of the ESG Project's research network.

Chapters 5, 6, and 7 explore how the articles in the ESG–Agency Harvesting Database engage with questions about the operation of agency in earth system governance. In Chapter 5, Andrea Gerlak, Thomas Eimer, Marie-Claire Brisbois, Megan Mills-Novoa, Luuk Schmitz, Jorrit Luimers, and Paivi Abernethy reflect on how power is used as an explanatory variable in research on agency in earth system governance. They note that while power is a frequent consideration, it often remains undefined and/or under-theorized. The authors differentiate between agency-centred notions of power (power to) and structural perspectives (power over), noting how these conceptions of power are connected to broader literatures and debates in the social sciences. They call for more comprehensive conceptualizations of power to strengthen the persuasiveness of normative arguments in ESG–Agency scholarship.

In Chapter 6, Michele Betsill and Manjana Milkoreit identify 20 distinct governance functions performed by agents in earth system governance, and note that the articles in the ESG–Agency Harvesting Database have focused most heavily on rule-making and regulation; convening and facilitating participation; and knowledge generation, provision, and sharing. They observe that while the state has remained a central agent in ESG–Agency scholarship, the functions performed by state agents have diversified, particularly as they engage in partnerships and networks with other types of agents. Betsill and Milkoreit argue that the performance of governance functions is enabled or constrained by structural factors, especially the forms of governance in operation (hierarchies, markets, or networks) as well as the multilevel or multiscalar dynamics of a particular governance context.

Following on this idea of governance functions, in Chapter 7 Manjana Milkoreit, Jennifer Bansard, and Sandra van der Hel look more closely at the relationship between knowledge and agency in earth system governance. They elaborate on the ways in which knowledge acts as a source of authority for a diversity of agents,

underlying their ability to influence environmental decision-making processes. They identify three prominent themes in the articles in the ESG–Agency Harvesting Database with a central focus on knowledge: (1) the knowledge-based agency of scientists and local or indigenous communities, (2) learning, and (3) the link between knowledge and power. They connect ESG–Agency research on knowledge to broader social science debates and governance practices to emphasize the participatory processes of knowledge co-production and agency of non-scientific knowledge holders.

Chapters 8, 9, and 10 discuss the ways in which ESG–Agency scholarship engages with agent–structure debates in the social sciences. In Chapter 8, James Patterson contends that ESG–Agency scholars are at the forefront of exploring novel forms of earth system governance that have transformed the global govern-ance architecture, especially through their work on transnational and private governance. His chapter highlights the interactive linkages between agency and governance architectures to better understand how this affects institutional change and environmental politics. Patterson calls for greater focus on the causal mechan-isms linking agency and architecture in earth system governance and the need for more reflexive and transformational institutional change to address the challenges of the Anthropocene.

Chapter 9, by Michelle Scobie, Michele Betsill, and Hyeyoon Park, examines the articles in the ESG–Agency Harvesting Database through the lens of scale, which they define as 'the spatial, temporal, quantitative, or analytical dimensions used to measure or rank any phenomenon' (Gibson et al., 2000, p. 218). Noting the existence of multiple scales in earth system governance, they find that ESG–Agency scholars have focused most heavily on the institutional and geographical scales, often in conjunction with one another. Their review reveals that agents deploy many different strategies, such as bridging organizations, networks, and orchestration, to navigate the multilevel and multiscalar dynamics of earth system governance. Whether these dynamics enable or constrain the exercise of agency depends on the power relations between different actors as well as whether agents have sufficient resources and capacities to engage with earth system governance. The authors encourage ESG–Agency scholars to look to literatures in geography and political ecology to strengthen understandings of how agents shape the social construction of levels and scales in earth system governance.

Mike Angstadt and Ina Möller examine the ideational dimension of structure in Chapter 10 through their review of norms in ESG–Agency scholarship. They find that this has not been an especially prominent area of research. They identify four distinct conceptualizations of norms: (1) as regulatory instruments, (2) as elements of the structural context, (3) as the outcome of a legitimation procedure, and (4) as expectations of the researcher. On this last point, they highlight the agency of

scholars who shape, interpret, and use norms in their research, thereby affecting how others interpret norms. Angstadt and Möller call for greater attention to the theoretical link between agency and norms, drawing on existing empirical work in diverse geographical contexts.

Chapters 11, 12, and 13 return to some of the core themes in the ESG Project's analytical framework and the environmental governance literature more broadly. The link between agency and issues of equity and justice is the focus of Chapter 11, by Pritee Sharma, Okechukwu Enichi, and Salla Nithyanth Kumar. This chapter reviews relevant articles within the ESG–Agency Harvesting Database through the lens of different natural resource systems: land and forests, water, and biodiversity. They note that research on the particular questions of allocation of and access to resources has focussed on developing countries in Africa, Asia, and South America. Throughout their review, they highlight the trade-offs and synergies between environmental conservation and socioeconomic development. The authors emphasize the importance of recognizing those stakeholders who are dependent on resources and providing opportunities for meaningful participation in decision-making.

In Chapter 12, James Patterson uses the concept of adaptiveness to guide his review of the ESG–Agency Harvesting Database. He concludes that diverse forms of agency are crucial to cultivating adaptive governance systems capable of dealing with the challenges of earth system transformation. He sees considerable potential for ESG–Agency scholars to contribute to broader social science and policy debates about the adaptiveness of political and governance systems across a range of social spheres. In the realm of earth system governance specifically, he calls for greater attention to the distinct material, normative, and temporal dimensions of adaptiveness.

The link between agency and accountability is Calum Brown and Michelle Scobie's focus in Chapter 13, where they highlight the connections between accountability research, agency theories, architecture, and power as raised in other chapters within *Agency in Earth System Governance*. They find that ESG–Agency scholars often treat accountability as an isolated and static normative property of earth system governance, with little regard for its broader and evolving role. Brown and Scobie call for greater attention to how accountability operates between different governance levels and scales.

Chapter 14, by Sander Chan and Ron Mitchell, addresses the question of how to evaluate agents and agency in earth system governance. Their review of the articles in the ESG–Agency Harvesting Database reveals that ESG–Agency scholars have embraced the notion that agent influence is complex, contingent, and context dependent, with the success of environmental governance depending considerably on propitious environmental and social conditions. They note a shift from

evaluating agent influence on behaviour and environmental outcomes to a focus on governance processes, with particular attention on democracy, participation, legitimacy, transparency, and accountability. Along with this more nuanced understanding of agency and its effects on earth system governance, they observe an increase in the diversity of methodological approaches and efforts to integrate findings from many different types of studies. At the same time, they see a need to return to evaluations of agency influence on behaviours and environmental quality through more interdisciplinary, multidisciplinary, and transdisciplinary approaches to meeting the governance challenges associated with the Anthropocene.

Finally, Chapter 15 by Andrea Gerlak, Michele Betsill, James Patterson, Sander Chan, Tabitha Benney, Marie-Claire Brisbois, Thomas Eimer, and Michelle Scobie, connects key findings from our analysis of the ESG–Agency Harvesting Database to broader debates in environmental governance scholarship and social sciences. They outline how ESG–Agency scholarship can inform decision-making across the policy process, while highlighting the complex, fragmented, and multi-scalar nature of environmental governance systems as well as the challenges of developing participatory processes that truly empower stakeholders and account for diverse interests. The authors also reflect on what the contributions to *Agency in Earth System Governance* reveal about the ESG research community. While ESG–Agency scholars have made exemplary advances in empirical research, many of the core analytical concepts, such as agency, power, authority, and accountability, remain under-theorized. In addition, some types of actors, including women, labour, non-human agents, those who work against earth system governance, and many voices from the global South, remain largely hidden in ESG–Agency scholarship. Gerlak et al. conclude by suggesting next steps for future research and connecting our findings from the past decade of ESG–Agency research to the ESG Project's new Science Plan (Earth System Governance Project, 2018a).