Sustainability Science • Sustainability Science: A guide for researchers

Capacity for Governance

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Governance, as we noted in [Section 1 of the Chapter on a Framework for Research](#), consists of the arrangements by which any collectivity, from the local to the global, seeks to manage its common affairs. Governance is thus about both process (who gets what say in defining what is desirable and in doing the managing) and results (whether the managing gets us where we want to go). Governance is the product of efforts by actors to either stabilize or change existing institutional structures (including norms, rules, and practices) to meet specific goals. Those actors include governments but also a variety of other public and private actors.

Some treatments of governance for sustainable development view the role of governance as primarily one of fixing market failures. That is not the approach we take here. Rather, we echo the arguments of Mazzucato and others, who see the task of governance in general as one of creating public value—in the case of sustainable development, value denominated as inclusive well-being ([Mazzucato 2018](#)). Governance for sustainable development thus pays specific attention to the resources (both natural and anthropogenic) that society draws on to meet its goals. It involves all the key elements of the Anthropocene System summarized in the Framework for Research in Sustainability Science of [Figure 1](#): actors, institutions, goals, and resources. Power differentials among actors mediate the relationships among those elements. Different action situations are governed by different arrangements of these elements and relationships. Interactions among action situations include interactions among their respective governance arrangements. Politically engaged agitators are necessarily the frontline change agents in the pursuit of sustainability. But research can help to inform agitation by identifying governance arrangements that strengthen the capacity of people to work together—not least in exercising the other capacities we have identified in this Research Guide—in the collective pursuit of sustainability.

A growing number of scholars are pursuing research to help build governance capacity for sustainability. That work is now being systematically advanced through a vigorous international program on Earth System Governance ([Burch et al. 2019](#)). We summarize here some of the most important findings to emerge from their research. We refer the reader interested in more extended coverage to several excellent books from a variety of perspectives ([Adger and Jordan 2009](#); [Young 2017](#)); ([Dryzek and Pickering 2018, 152](#)).

1 Findings: Rescaling, expanding the tool kit, fit

Today's governance arrangements are the path dependent product of efforts to solve the problems and seize the opportunities of previous centuries. That said, several trends in governance have emerged over the past several decades that are shifting its foundations in ways that are particularly relevant for the pursuit of sustainability.

Rescaling of governance: The most general of these governance trends is the rescaling of governance arrangements beyond the historical focus on national governments ([Hale 2020](#)). Three dimensions of this rescaling have received the greatest attention. The first involves spatial extent and hierarchical level: governance today increasingly operates not just at single levels of organization but rather at multiple, interacting levels spanning the local through the national to the global ([Brondizio, Ostrom, and Young 2009](#)). A second dimension involves actors: governance increasingly involves not just governments but also firms and other private sector organizations, a blossoming array of non-governmental organizations and active participation by civil society ([Pattberg and Widerberg 2015](#); [Andonova 2017](#); [Henderson 2020](#)). A third dimension has been the increasing linkage among action situations: governance initiatives in particular places and sectors increasingly find themselves intertwined ([Bleischwitz et al. 2018](#)). These three dimensions of rescaling interact with one another. The result has been new varieties of polycentric systems in which multiple sources of partial authority interact to create multi-level governance arrangements that may or may not guide collective behavior toward shared goals. Polycentric governance has been argued to hold multiple potential advantages over more traditional monocentric arrangements ([Jordan et al. 2018](#)). But empirical research shows that it, too, has its limitations ([Morrison et al. 2019](#)).

Expanding the tool kit: Another broad trend in governance has been the expansion of the tool kit of interventions it employs. Formal rules and regulations will almost certainly remain important components of efforts to guide collective behavior toward more sustainable outcomes ([Heilmayr and Lambin 2016](#)). But efforts to shape governance arrangements for sustainability are increasingly exploring complementary tools. These include generative tasks such as identifying emergent issues and pushing them on public agendas ([Romsdahl, Blue, and Kirilenko 2018](#)); behavioral nudges ([Bornemann 2019](#)); the promotion of norms ([Mitchell and Carpenter 2019](#), including both responsibilities and rights of actors ([Sikkink 2020](#)); and governing through goals ([Kanie and Biermann 2017](#)). This expanded array of governance tools is increasingly being deployed in novel combinations to address the challenges of sustainable development ([Ruggie 2014](#); [Young 2017](#)).

Rejecting panaceas, striving for fit: A further trend in governance is the growing (if still incomplete) rejection of panaceas claiming to be the one right way to guide collective behavior independent of particular action situations ([Ostrom, Janssen, and Anderies 2007](#)). Panaceas that have been advocated for pursuing sustainability include strong states, private ownership, market solutions,

participatory management, polycentric governance, and a variety of other enthusiasms. Each of these governance arrangements has demonstrated value in particular situations and contexts. Each has also failed dramatically when applied to action situations where it does not fit. Indeed, the importance of **fit**¹ has emerged as a central preoccupation of contemporary governance scholarship ([Epstein et al. 2015](#)), a finding consistent with what we know about the central role of persistent heterogeneity in the Anthropocene (see [Chapter on a Framework for Research](#)). A remaining challenge is to sort out how diverse, polycentric governance arrangements can fit their interventions to the particular mixes of heterogeneous actors found in particular action situations. And to figure out how the resulting mix can be sufficiently integrated to be mutually supportive in guiding collective action ([Brown 2009](#))—a particularly urgent challenge given the diversity of the UN Sustainable Development Goals ([Le Blanc 2015](#)).

2 Building Capacity: Nurturing resources, promoting equity, confronting uncertainty

The unsurprising conclusion of most scholars, and of this Research Guide, is that present governance arrangements are woefully inadequate to guide the accelerating and complex dynamics of the Anthropocene toward more sustainable pathways of development ([Dryzek and Pickering 2018, 152](#)). Better governance capacity is needed in general to support collective action for sustainable development. In particular, it is needed to support the five other capacities we have already discussed in this Research Guide: the capacity to measure sustainable development; to promote equity; to adapt to shocks and surprises; to transform the system onto more sustainable development pathways; and to link knowledge with action. Building and maintaining governance capacity, however, is always expensive—not least in the time and bandwidth it demands from all of the actors involved. Moreover evidence from efforts to build and implement specific capacities often comes at the cost of ignoring the others ([Marshall et al. 2012](#)); ([Reyers et al. 2018](#)). The temptation to tailor-make unique governance arrangements for each of the capacities named above should therefore be resisted, and the search for multi-purpose governance arrangements should be prioritized. This will be hard, given the pitfalls of panaceas and the need for fit noted in Section 1. Fortunately, however, our reading of the evidence suggests that many of the same governance reforms could help strengthen multiple capacities. We have therefore structured our discussion of building governance capacity around three cross-cutting themes: nurturing resources, enhancing equity, and embracing uncertainty ([Anderies 2015](#)). We argue that progress on each of these governance themes would provide important support for the collective capacities society needs to build for the successful pursuit of sustainability.

Nurturing shared resources: A central challenge of governance for sustainable development is to guide the use of shared resources (capital assets) today down pathways that do not degrade the ability of those resources to nurture well-being elsewhere or tomorrow. The research we reviewed in the

[Chapter on Capacity to Measure](#) has established that the resources in question include all of those—both natural and anthropogenic—that form the productive base on which society relies for the goods and services that are the constituents of well-being. Scholarship on enhancing governance capacity for sustainability has focused on two dimensions of this challenge: preventing overconsumption of shared natural resources and preventing underproduction of shared anthropogenic resources.

Devising governance arrangements to avoid tragedies of the commons—overconsumption of natural resources to the detriment of social well-being—has always been a central concern for sustainable development and continues to be an area of active scholarship ([Dasgupta, Mitra, and Sorger 2018](#)). The most extensive contribution of scholarship to this challenge has been that of Elinor Ostrom and her colleagues on common pool resources ([McGinnis and Ostrom 2014](#)). Their vigorous, diverse, multidisciplinary research program has demolished the claim that only central direction by an all-powerful state can provide such governance. In its place, research has identified conditions under which and ways in which self-interested actors can work together to achieve common goals for the sustainable use of natural resources ([Boyd et al. 2018](#); [Moritz et al. 2018](#)). The core finding is the importance of arrangements that build trust among actors, encourage reciprocity in what is asked of them, and facilitate communication among them ([Agrawal 2014](#)). These arrangements interact: a failure of one can lead to a failure of all and the consequent degradation of the resource system. Finally, the general trend toward polycentric governance arrangements we noted earlier also turns out to be a useful strategy for the particular case of collective action to manage natural resource commons ([Hajjar and Oldekop 2018](#); [Österblom et al. 2017](#); [Miteva, Loucks, and Pattanayak 2015](#)). Difficulties, of course, remain ([Quintana and Campbell 2019](#)). The highest profile of these involve questions regarding the extent to which governance arrangements that have been shown to work for managing local commons can be applied at higher organizational levels, e.g., to regional or even global problems. Researchers and practitioners have made substantial headway in advancing such a polycentric approach to create governance arrangements for nurturing larger scale natural resource commons (e.g., [Keohane and Victor 2016](#); [Morrison 2017](#)). These arrangements currently include patchworks making use of the entire expanding tool kit of governance instruments we noted earlier. A substantial body of research evaluating the determinants of effectiveness for these varied governance arrangements has also begun to emerge ([Young 2018](#); [Mitchell et al. 2020](#); [Lambin and Thorlakson 2018](#)). This research shows clearly that progress has been made. But shortfalls persist and outright governance failures remain the rule rather than the exception.

Governance arrangements for sustainability are also needed because individual actors underproduce certain resources that, if once provided, would enhance overall social well-being. The resources in question are potentially all of those included in the anthropogenic component of the productive base characterized in the [Chapter on Capacity to Measure](#), i.e., those involved in the production of publicly accessible security and social insurance, physical infrastructure, education, health services,

knowledge, technological innovation, and various forms of social capital. The character of such resources and the challenges of governance arrangements to provide them have been well-studied under the general heading of public sector economics and public goods for development (e.g., [Ocampo 2016](#)). Sustainability researchers have been slow to acknowledge that governance arrangements to encourage production of such anthropogenic resources can ultimately be as important for advancing sustainable development as are arrangements to discourage the overuse of natural resource commons. That is now beginning to change, with focused analysis on governance arrangements for promoting the innovations most needed for sustainable development ([Anadon et al. 2016](#)), including prizes ([Galasso, Mitchell, and Virag 2018](#)) and other financing measures ([Griffiths 2018](#)). A second approach has been through analysis of what forms of treaties and other cooperative agreements have been effective in advancing the production of neglected anthropogenic resources ([T. Liu and Kahn 2017](#)). In general, the merits of the polycentric approaches and attention to local fit we noted earlier as general trends in governance have turned out to be especially important for nurturing underproduced resources for sustainable development ([Estevadeordal and Goodman 2017](#)).

Looking forward, numerous opportunities exist for research that would almost certainly be useful in improving the governance of resources for sustainability:

- creating more and better data bases that capture the relevant governance arrangements that are actually in place around the world and how they are actually doing at nurturing resources for the pursuit of sustainability (e.g., [Jabbour and Flachsland 2017](#); [T. Liu and Kahn 2017](#));
- further operationalizing the inclusive wealth metrics of resource stocks we discussed in the [Chapter on Capacity to Measure](#) to provide objective functions for the design of integrative governance arrangements in lieu of those that focus only on individual sectors and resources (e.g., [R. D. Collins et al. 2017](#)); and
- encouraging network analysis ([Sayles et al. 2019](#); [Bodin, García, and Robins 2020](#)) and complex adaptive systems modelling ([Moritz et al. 2018](#); [Schlüter et al. 2019](#)) approaches for use in evaluating proposed governance arrangements.

Promoting equity: We noted in the [Chapter on Capacity for Equity](#) that conserving the resource base is not the same as assuring equity in the distribution of the goods and services that flow from it. There is a voluminous scholarly literature relevant to governance arrangements for advancing equity, e.g., on human rights, social security, and environmental justice. We do not address that literature here. Unfortunately, the general scarcity of research on equity in sustainability that we noted in the [Chapter on Capacity for Equity](#) is reflected in a scarcity of research on governance arrangements to promote the specific dimensions of equity most central to the pursuit of sustainability. Practice is therefore often ahead of scholarship in this area, with researchers mostly cataloging and analyzing governance

arrangements to promote equity that frontline change agents are inventing and implementing. We summarize here some highlights of their findings.

Virtually every tool in the expanded kit of governance interventions that we summarized earlier in this chapter has been deployed by agitators pursuing equity in sustainable development. Scholarship is beginning to catch up. Values supporting intra- and intergenerational equity for sustainable development are being spread through a variety of mechanisms ([Leiserowitz, Kates, and Parris 2006](#)), with the importance of empathy ([Brown et al. 2019](#)) and efforts to enhance it ([Venkataraman 2019](#)) receiving particular attention. A value-behavior gap nonetheless persists here as in other fields ([Peattie 2010](#)). Norm-building efforts grounded in new **logics of appropriateness**² are enhancing governance capacity to guide international action in the pursuit of intragenerational equity for sustainable development ([Mitchell and Carpenter 2019](#); [March and Olsen 2011](#)), emulating their modest success in other issue areas, such as human rights ([Ruggie 2013](#)) and access to medicines ([Moon 2019](#)). The logics of appropriateness are also behind a growing number of goals-based governance initiatives through which local governments and private firms have declared their intentions to reduce emissions of greenhouse gases that pose inequities for future generations ([Henderson 2020](#)). These commitments are almost certainly a good thing. But the risk of cheap talk or greenwashing remains ([Marquis, Toffel, and Zhou 2016](#)), and the efficacy of these declarations has yet to be assessed.

Novel state-backed arrangements to enhance governance capacity to promote equity are also being explored ([Sitaraman, Ricks, and Serkin 2020](#)). Internationally, the Paris Climate Change Agreement represents a significant evolution in governance approaches to governance agreements for promoting intergenerational equity accords, but its durability remains to be seen ([Chan, Stavins, and Ji 2018](#)). Nationally, sovereign wealth funds have been introduced around the world as a means for protecting the value of natural resources for future use ([Barbier 2019](#)). Experiments in the state appointment of public guardians for future generations are increasingly being undertaken and their impacts are beginning to be analyzed ([Pearce 2019](#)). The legal arena is the site of some of the most exciting developments in both theory and practice to empower future generations, with a resurgent interest in creative application to climate change issues of the **public trust doctrine**³, which argues that governments have a legal duty to hold certain natural resources in trust on behalf of present and future citizens ([Sagarin and Turnipseed 2012](#); [Blumm and Wood 2017](#)). Other proposed mechanisms for empowering future generations include mandating discount rates for calculating the benefits of climate change policies that place greater weight on the well-being of future generations, designing and embedding strategic foresight capabilities into governance bodies, and insulating decision-making from short-term political pressure ([Boston 2017](#)). Rigorous evaluation of the effectiveness of these measures is, unsurprisingly, not yet available.

Social movements and political mobilization are important components of enhanced governance capacity to promote equity because of the mutually reinforcing relationship between inequity and maldistributions of power discussed in the [Chapter on Capacity for Equity](#) ([Sovacool and Brisbois 2019](#); [Stirling, 2019](#)). Social movements are “sustained and organized collective action to effect change in institutions by citizens...who are excluded from routine decision-making” ([Amenta and Polletta 2019, 281](#)). Social movements work by spreading the values forged in communities of micro-level activists and agitators to the institutions including the rules, norms, values, and beliefs that undergird incumbent regimes. Successful strategies for such mobilization usually involve enhanced citizen participation and other forms of collective resistance ([Veltmeyer 2020](#); [Kashwan, MacLean, and García-López 2019](#); [Scoones, Leach, and Newell 2015](#)). These are often bottom-up affairs, as is perhaps most evident in the growing global youth climate movement that consistently highlights the unfairness of present development pathways to the children and grandchildren of today’s leaders in business and government ([Farmer et al. 2019](#)). Recent work, however, questions blanket calls for participation which comes at significant cost to participants in terms of energy, effort, and time ([Bobbio 2018](#)). So while promoting participation and other forms of mobilization almost certainly should remain one strategy for building governance capacity to promote equity, care must be taken that it is deployed efficiently ([Grillos 2019](#); [Casey 2018](#)) and that it resists government attempts to use nominal participation as symbolic cover for continued business as usual ([Dryzek et al. 2019](#)).

Researchers have multiple opportunities to contribute to the enhancement of governance capacity to promote equity in sustainable development ([Biermann and Kalfagianni 2020](#)). Among the most important are:

- articulating equity or fairness as a multidimensional construct but pushing for mutual recognition of a limited range of scientifically credible and politically legitimate norm interpretations ([Underdal and Wei 2015](#));
- producing and highlighting equality metrics in the valuation of current development pathways and the evaluation of possible sustainability interventions (see [Chapter on Capacity to Measure](#)); and
- conducting comparative research on the effectiveness of various kinds of social movements and institutional arrangements for promoting equity in pursuit of sustainable development over long historical periods and across different kinds of action situations.

Confronting uncertainty: The Anthropocene is characterized by deep uncertainty, posing extraordinary challenges to governance ([Polasky et al. 2011](#)). Research has made several modest contributions to clarifying the challenges and providing some guidance on what would constitute better governance capacity to address it. Here are some of the highlights.

Scholars have certainly made significant advances in understanding and modeling uncertainty in the Anthropocene System using a variety of methods that take seriously the complex and adaptive

dynamics of the Anthropocene ([Schlüter et al. 2019](#); [Johnson and Geldner 2019](#); [Moritz et al. 2018](#); [Wiebe et al. 2018](#); [National Academies of Science, Engineering and Medicine 2018](#); [Mach and Field 2017](#)). Despite these advances, sustainability science still has only a modest ability to predict future shocks and surprises, let alone recommend optimal development pathways over the multi-generational timescales relevant to sustainability ([Young 2017](#)). Moreover, such predictions are not in the offing. Public disclosure of asset risks ([Caldecott 2018](#)), wide-spread provision of asset insurance ([Kousky 2019](#); [Chantararat et al. 2017](#)), and precautionary policies ([Read and O’Riordan 2017](#)) more generally can help, but their utility remains limited in the face of deep uncertainty. This is the fundamental reason behind our focus in this Research Guide on capacities for continuing guidance, rather than on recommendations for one-time decisions or hard-wired strategies.

Capacities for adaptation (see [Chapter on Capacity to Adapt](#)) and transformation (see [Chapter on Capacity to Transform](#)) are essential for the pursuit of sustainability in the face of deep uncertainty. These two capacities may often compete with or undermine one another for reasons we discussed in the [Chapter on Capacity to Transform](#) ([Reyers et al. 2018](#); [Marshall et al. 2012](#)). And various actors may have self-interested reasons for advancing or opposing one approach or the other ([Slate 2019](#); [Folke et al. 2019](#); [L. C. Stokes 2020](#)). Governance capacity is therefore needed to articulate and advance the public interest in adaptation and transformation as responses to uncertainty and help balance trade-offs among them. Sustainability science to date has conducted limited research on what such governance capacity might look like (e.g., [Hirsch and Long 2020](#)). The good news is that insights from studies of flexibility in systems design ([Asokan, Yarime, and Esteban 2017](#)) and of real options theory by management and operations scholars ([Trigeorgis and Reuer 2016](#)) are applicable to this challenge. Firms routinely face strategic trade-offs between exploiting their core competencies and investing in innovation to reconfigure their assets to exploit new opportunities and respond to threats. Indeed, the actors within a single firm who work on these separate issues often find themselves in conflict and competition with one another. To manage these competing visions, best practice suggests that senior management should assign these roles to separate teams within the organization. Senior management’s role is then to dispassionately weigh the evidence for and against stability and innovation and to develop a shared vision in the best interest of the overall organization ([O’Reilly and Tushman 2016](#); [Henderson 2015](#)). Efforts to balance adaptation and transformation for sustainability will likely require this kind of capacity for high-level strategic thinking. At the international level, this is one of the key roles envisioned for the UN’s High-Level Political Forum on Sustainable Development. Whether and how the Forum might accomplish this remain to be seen ([Abbott and Bernstein 2015](#)). And what analogous capacities would look like at other levels of governance is just beginning to be addressed by scholars.

Narratives and imagination are the focus of a second group of research results relevant to building governance capacity to pursue sustainability in the face of great uncertainty. We argued in the [Chapter](#)

on [Capacity to Transform](#) that actors' behavior and decisions, especially with respect to choices about the future, are motivated less by accurate anticipations of the future, than by collectively held narratives ([Beckert and Bronk 2018](#)). Current governance arrangements for sustainability have become increasingly proficient in conducting anticipatory assessments. But it is not clear that the dominant governance arrangements currently in place are particularly good at imagining more sustainable futures or embedding those futures into collectively held imaginaries with the ability to drive change. Governance capacity to support the crafting of narratives to help guide transformations toward sustainable development pathways remain at the fringes of sustainability efforts ([Pereira et al. 2020](#)).

A capacity for **reflexive governance**⁴ is the ultimate requirement that research suggests is necessary for pursuing sustainability in the face of deep uncertainty. That is, governance must be able to question its own core commitments—to evaluate whether the governance arrangements in use are part of the solution or, as is too often the case, part of the problem that just helps to confine development pathways to unsustainable trajectories ([Dryzek and Pickering 2018, 152](#)). This is a particular case of lessons offered by the history of development in the 20th century: governance systems must learn to live with uncertainty rather than trying to manage or avoid it through tools of optimization and control ([Hoekstra, Bredenhoff-Bijlsma, and Krol 2018](#); [Scott 1998](#)). Research shows that reflexive governance arrangements benefit from tools of participation and deliberative democracy that engage diverse viewpoints to widen frames, raise concerns about distribution and vulnerability, and ensure continual learning ([Dryzek et al. 2019](#)). A capacity for reflexive governance means balancing the flexibility for change with the stability and foresight capable of balancing the interests of current and future generations and governing sustainability over the long term. Participatory governance strategies are more likely to successfully balance flexibility and stability when they engage publics early and often ([Stirling 2009](#)), but no single model of reflexive governance will work in all action situations. Rather, efforts in sustainability science should strive to design governance capacity that is “flexible enough to respond to feedback from public deliberation and changing environmental conditions, while stable enough to provide a framework for collective, large-scale responses to risks” ([Dryzek and Pickering 2018, 152](#)). There are, once again, no panaceas. Reflexive governance arrangements will require a “fit” between these general insights and the specific conditions of particular action situations ([Young 2017](#)).

Footnotes

1. **Fit:** emphasizes the importance of matching governance arrangements to the characteristics of the action situation being governed [↪](#)
2. **Logics of appropriateness:** the idea that action is often driven by norms of behavior rather than by rules and regulations alone; asks “what does a person such as I do in a situation such as this?”

(March and Olsen 2011) [↵](#)

3. **Public Trust Doctrine (PTD)**: holds that governments have a legal duty to hold certain natural resources in trust on behalf of present and future citizens [↵](#)

4. **Reflexive governance**: governance arrangements that promote the ability to question one's own core commitments [↵](#)

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