

*Taking Stock of Learning in Environmental Governance:
Opportunities for Translating Theory to Practice*

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Abstract: Environmental governance decision-making is characterized by complex dynamic issues where new knowledge is constantly emerging that can inform or shape how we understand the system and what kinds of policies, institutions, and strategies are most effective. As a result, targeted mechanisms to acquire, translate and disseminate knowledge into new policies is critical for adaptive environmental governance. The environmental scholarship around learning can help to inform decision-making in these settings. This scholarship has exploded in the past two decades leading to new theoretical insights and frameworks. We ask: *What practical lessons can we draw from the scholarship studying learning in environmental governance?* We draw empirical insights from the learning in environmental governance scholarship to inform practitioners who engage in and manage environmental planning and decision-making processes. Three key findings are drawn from the literature: the importance of face-to-face dialogue that is open and ongoing; the need for cross-scale linkages that support learning; and investments in institutional rules, norms and shared strategies for intentional learning. We will then translate these findings into strategies for environmental governance practitioners and explore how to mitigate some of the factors that tend to constrain learning across many governance contexts.

I. Introduction

Research on learning in environmental and natural resource governance has grown rapidly in the past two decades (Gerlak et al., 2019). Researchers have empirically studied learning in environmental governance every continent, multiple levels of governance (from individual to organization), and diverse environmental and natural resource settings including water, forestry, fisheries, urban areas, agricultural communities, energy, and biodiversity (Gerlak et al., 2017). Learning in environmental governance refers to both a process of acquiring, translating and disseminating new information among policymakers, managers and key stakeholders (Heikkila & Gerlak, 2013) and also outcomes, like changes in beliefs and behaviors among governance actors (Leach et al., 2014) and the adoption of new policies or programs (Heikkila & Gerlak, 2013).

Researchers draw from diverse theoretical frameworks and approaches to study learning in environmental governance, most notably including policy learning (e.g., Dunlop & Radelli, 2018; Moyson et al., 2017; Grin & Loeber, 2007; Bennett & Howlett, 1992), social learning (e.g., Armitage et al., 2008; Muro & Jeffrey, 2012; Schusler et al., 2003) and learning for adaptive governance (e.g., Folke et al., 2005; Pahl-Wostl, 2009). Recent scholars as well have applied or compared insights from these different theoretical streams (Feindt, 2010) to inform analyses of cases of learning in environmental governance. Heikkila and Gerlak (2013) developed a collective learning framework directed for the research audience, focusing on operationalizing key concepts and identifying the potential categories of factors that one should consider when trying to understanding learning.

Learning is not automatic, straightforward or linear (Diduck et al., 2012). It can occur through different modes (e.g., sequentially versus simultaneously) (Newig et al., 2016) and at different depths (Pahl-Wostl, 2009). Further, there are significant cognitive and capacity constraints that make it challenging to know when learning is actually occurring and to connect it to measurable learning outcomes. Therefore, we need mechanisms to institutionalize learning in environmental governance. It's not just about adapting strategies to new information (e.g., changing irrigation practices in response to climate change), but changing fundamental world views and shared norms, as well as governance processes that can hinder learning. At the levels of individuals and collectives alike, scholars see opportunities to develop more effective and robust environmental management and governance, or more informed decision making under complexity (Bodin and Crona, 2011; Huntjens et al., 2011; Bos et al., 2013).

The literature on learning in environmental governance scholarship can offer valuable lessons for how we design institutions, manage intergovernmental relations and engage the public, among other policy practices. In this paper, we ask: *What practical lessons can we draw from the scholarship studying learning in environmental governance?* We draw empirical insights from the learning in environmental governance scholarship across the different theoretical literatures and approaches to inform practitioners who engage in and manage environmental planning and decision-making processes. Although many researchers have offered policy

recommendations and advice to practitioners in their individual publications, we have not seen a synthesis across the environmental governance literature that draws such insights together.

Specifically, we highlight key lessons and innovations that can be distilled to better inform how we design, manage and implement environmental governance. This may help offer strategies for policymakers, regulators, natural resource managers who implement environmental policies programs, along with staff or leaders who devise or coordinate cross-jurisdictional programs. We also recognize that various governance actors outside of government – ranging from non-profits to think-tanks to donors and funders also can play a critical role in devising processes that support learning, and the translation of learning to more sustainable governance. We recognize that some kinds of practitioners might benefit the most or might have the most capacity to implement these types of ideas. We also identify some key mitigating constraints on learning that might trip us up along the way and could serve to hinder learning processes and outcomes.

This research should be relevant for practitioners for several reasons. First, many environmental governance challenges are so severe, or complex, that they demand learning (Weible et al., 2010: 527). Moreover, scholars and practitioners of environmental governance have widely recognized that learning is critical for adaptive environmental and natural resource governance (Folke et al., 2005; Pahl-Wostl, 2009; Huitema et al., 2009; Armitage et al., 2008). Second, environmental governance practitioners are the agents of learning in environmental governance globally and learning is a necessary complement to the hard transfer of policy tools, structures and practices (Stone, 2004). Third, the research on environmental governance has drawn together decades of evidence from real-world experiments and decision-making processes that can serve as evidence not only scholars, but also practitioners, on how we can improve the design of environmental governance (e.g., (Chu, 2016; Kivimaa et al., 2017; van der Heijden, 2017; Wolfram, 2019). Ultimately, these lessons may then improve governance outcomes, such as sustainability transitions (Bos et al., 2013; Bodin & Crona, 2011), or bridging cultural divides (Pietri et., al. 2015).

II. Lessons on Institutionalizing Learning in Environmental Governance

Although learning is innate to humans, we also know that we are constrained in our learning. In the context of environmental governance, we can wait for learning to happen following a crisis (Newig & Derwort, 2019), or hope that it arises organically, but our chances of learning might be improved if we build governance systems that are design intentionally to foster learning. In fact, scholars studying learning have recognized that there is a need for policies and programs that create the “structure” for learning and for embracing and recognizing the value of shared learning (Brummel et al., 2010).

(1) Face-to-face dialogue that is open and ongoing

One of the most consistent themes across studies of learning in environmental governance is the importance of face-to-face interactions and dialogue, which is foundational to the idea of

social learning (Pahl-Wostl et al., 2007; Reed et al., 2010; Muro & Jeffrey, 2008; Gerlak et al., 2017). Active dialogue or deliberation across participants with diverse kinds of knowledge can help facilitate the acquisition of information that is necessary for learning to occur (Dyck et al., 2005; Nonaka, 1994; Sabatier, 1987, 1988; Sabatier & Jenkins-Smith, 1999; Weber, 2009). Group dialogue allows participants to be exposed to different knowledge sets and values that may produce ideas that are distinct from those of individual members of the groups (Lejano and Ingram, 2009). Dialogue provides opportunities for re-framing, where participants can question their assumptions and underlying frames by recognizing and building on frames of reference of others (Innes & Booher, 1999; Mostert et al., 2008). Through dialogue, participants not only build awareness of different perspectives and an understanding of mutual interdependence but it also builds social capital and trust among participants (Mostert et al., 2007; Kumler & Lemos, 2008).

Another key theme that is consistent across the environmental governance literature is that learning is enhanced when dialogue is structured to ensure openness, and when it is ongoing. Engaging a diverse set of actors in governance can offer new and diverse sources of information and knowledge and opportunities for learning (Bodin, Crona, & Ernstron, 2006; Olsson, Folke, & Berkes, 2004; Wolfram, 2019). Governance arrangements that are more open will also facilitate more interactions and collaboration that is needed to foster learning and inform governance outcomes (Bos et al., 2013). Openness also requires a process of dialogue that is procedurally fair, or one that disrupts unequal power relationships, and allows for investments in trust-building over the long-term (Siddiki et al., 2017; Leach et al., 2014; Sol et al., 2013; Davidson-Hunt & O'Flaherty, 2007).

Strategies for Practitioners:

Across the research on learning and environmental governance, we find numerous examples of decision-making and management processes that illustrate how practitioners have developed and implemented dialogue processes that can support learning. Below we illustrate a few of these examples, unpacking the distinct elements of face-to-face, open and ongoing dialogue processes to illustrate some of these lessons.

Face-to-face: In addition to being open and ongoing, dialogue must be face-to-face. This may include more formalized processes like workshops or committees (Siebenhüner, 2008) but it can also simulation gaming approaches that facilitate learning through dialogue and engagement (Haug et al., 2011), allowing participants the space for informal dialogue and relations (Sinclair et al., 2011). Some research indicates that more interactive and dialogical types of processes seem to be more promising in facilitating learning than engagement activities only allowing for two-way communication between stakeholders and responsible authorities (Muro & Jeffrey, 2012). Others call attention to site visits or field trips (Shefer, 2018; Gerlak & Heikkila, 2011). Brainstorming and scenario building, or scenario-based modeling, among participants to support learning in environmental governance (Innes & Booher, 1999). Participatory modeling and cognitive mapping is one approach where participants can better understand their beliefs in relation to others, reflect in their beliefs, and better learn about the

dynamics of social-ecological systems to help support better environmental planning efforts (Glykas, 2010; Ozesmi & Ozesmi, 2004). For instance, community workshops in Hawaii have been used to conduct shared mental modeling exercises among community members involved in natural disaster planning (Henly-Shepard et al., 2014). The mental modeling workshops allowed participants to not only learn about each other's understanding of the community system, but also provided a way to build shared strategies to reduce hazard risks to the community.

Open: When governance processes develop approaches or projects that draw in a wide variety of stakeholders, particularly where new or independent actors can participate, this can stimulate social interaction and openness to new ideas (Siebenhüner, 2008; Bos et al., 2013). Conversely, more top-down or closed structures can stifle learning (Munaretto & Huitema; 2012). Of course, it may be necessary to have boundaries on participation, especially early in governance processes to allow time for trust building among diverse actors. In those cases, however, openness to ideas and new information remain important for learning. Openness is not only about inclusiveness, but also transparency and knowledge diversity (Wolfram et al., 2019).

Ongoing: There is a growing recognition to create learning spaces iteratively through continuous interaction, deliberation and reframing embedded in a cultural, historical and institutional context (Pahl-Wostl and Schulz, 2019). Time is needed to effectively engage participants and to allow for sufficient dialogue between participants (Rist et al., 2007; Brummel et al., 2010). Muro and Jeffrey's (2012) study comparing water management groups in Germany and Ireland found that both groups show some cognitive learning, but more opportunities and time for the working groups in Germany to connect may explain why those groups exhibited stronger relational learning than the Irish cases.

(2) Cross-scale linkages that foster learning

Learning can emerge at multiple geographic and spatial scales, and these scales interact. As such, linkages across scales of interactions and decision-making presents another challenge and opportunity learning. No environmental issue can escape the question of scale. Environmental issues never exist in isolation but rather are affected by issues occurring at other scales. A diverse set of actors from government officials to NGOs and from private sector actors to citizens and academia engage in multi-level interactions that are both formal and informal in nature (Lumosi et al., 2019; Wolfram et al., 2019).

One element of the scale question is associated with the scale of how people learn, from the individual to collective (Heikkila and Gerlak, 2013). Learning among a collective group engaged in environmental governance decisions is related to, and often dependent upon, individual learning, which is why researchers have begun to pay closer attention to both individual and collective levels, and their interrelationships (Moyson et al., 2017; Rietig, 2019; Diduck et al., 2012).

Strategies for Practitioners:

Given the challenges of scale in learning for environmental governance, and because learning occurs across multiple jurisdictional or spatial scales (e.g., Gerlak & Heikkila, 2011), environmental researchers are thinking more about learning at a multi-level scale (Diduck, 2010; Vinke-de Kruijf & Pahl-Wostl, 2016), and potential strategies to link or build across scales through networks, informal connections, and cross-organizational peer groups and exchanges.

Building strong networks: Governance networks improve interplay between different levels of governance, by supporting information transmission, deliberation, and resilience (Newig et al. 2010), thus fostering learning at both individual and collective levels (Schusler et al., 2003). While there is no single “ideal” network structure according to the literature for learning (McNutt & Rayner, 2018), it can be helpful to diagnosing whether networks may be overly centralized or overly decentralized. While highly centralized networks might facilitate information flows, they can also constrain new ideas and diversity of input, or constrain deeper levels of learning (Bodin et al., 2006). Conversely, less centrality in networks may facilitate broader engagement and shared learning (Henry, 2009), but may increase the transaction costs of the learning process (Gerlak & Heikkila, 2011). Polycentric network structures might help mitigate both dilemmas by allowing for diverse decentralized networks to be connected through a set of shared goals, rules, or actors. For instance, research on governance processes in the Canadian Arctic found that building multi-level networks that connect governmental and local actors can support learning across diverse stakeholders (Armitage, et al., 2011). What may be critical is to have communication pathways through actors or venues that allow for feed-forward and feedback loops across the various levels from individual to organizations (Crossan et al., 1999).

Informal connections: Informal networks play a critical role in providing learning opportunities for environmental governance practitioners, particularly in cross-scale environments (Pelling et al., 2008; Pahl-Wostl, 2009). Informal activities and interactions in a network to help improve participants understandings of each other and find ways to share ideas, build relationships and work together (Lee, 2018; Imperial, 2005: 296; Nooteboom, 2000). For instance, Pattison (2018) found that people involved in sub-national climate policy coalitions in Colorado, US who interact more with people they disagree with were less likely to reinforce their existing climate policy beliefs. Thus, in governance processes managers and policymakers can look for opportunities to enhance informal connections outside of formal decision-making processes. This could include establishing opportunities for visiting resource management sites together, hosting coffee hours, or other events that offer unstructured time to share ideas and communicate outside of a decision-making process.

Cross-organizational peer groups and exchanges: Multi-functional learning platforms represent another learning innovation where multi-organisational peer groups participate in on-going exchange of diverse perspectives and sharing of experiences through their engagement in shared projects (Bos et al., 2013). Peer evaluation and exchange of good practices have also been seen as key strategies to support multi-level learning through networks (Sabel & Zeitlin,

2010). Learning processes in international climate negotiations were facilitated by roundtables and side events at the UNFCCC meetings where leaders from different countries were able to get together and share lessons on accomplishments (Reitig, 2019).

(3) Formalized venues, rules and shared routines that foster intentional learning

It can be difficult to sustain learning over time (e.g., Schusler, Decker, and Pfeffer 2003). Research on organizational learning, group learning, and other forms of collective learning, recognize that formalized rules, venues, and systems are needed that intentionally facilitate learning. Without this, learning is ad hoc and opportunistic, rather than intentional. It also allows for deeper levels of learning – that is learning about how to improve governance processes.

Relatedly, many scholars studying learning in the field of environmental governance have acknowledged the importance of differentiating between “single-loop” learning, which is often about changing a particular management strategy (e.g., reorienting traffic patterns to reduce pollution) and deeper forms of learning (e.g., double-loop and triple-loop learning) as a more sustainable pathway toward improving collective outcomes (Argyris & Schön, 1996; Armitage et al., 2011). To do so may require developing systems, rules and processes that facilitate learning how to learn, and even changing fundamental assumptions and world views (Ison & Drennan, 2007; King & Jiggins, 2002; Pahl-Wostl, 2009; Diduck et al., 2012; Bos et al., 2013). These deeper forms of learning align with the idea of transformative learning, where learning is institutionalized within a governance process (Wolfram, 2019).

Strategies for Practitioners:

If sustained, intentional learning demands formalized venues, rules, and shared routines that build collective memory, what strategies can practitioners employ to shore up their institutional structures and processes to support learning? Below are three key lessons, based on some of the consistent examples across the literature.

Venues matter: Collaborative venues can build a structure that facilitates open and ongoing dialogue and opportunities for network building that are more open to learning (Weible et al., 2010; Koebele, 2019). Conversely, more bureaucratic systems that also limit access to information can constrain learning (Mostert et al., 2007; Pahl-Wostl, 2009). But formal collaborative governance processes are not simple to design or build. Ad hoc collaborative mechanisms may help provide ways to semi-institutionalize, bringing stakeholders together less often, but for intentional learning, like a dialogue series or planning meeting. It is important that venues are depoliticized arenas to better foster the growth of social networks and increase interaction among stakeholders (Crona & Parker, 2012). For example, in governance processes where diverse actors lack shared understanding or approaches to governance, bridging organizations, can serve as venues for shared knowledge building and information sharing (Berkes, 2009). Bridging organizations may be non-profits, task forces, special committees, or

other organizational forms that offer forums for cross-organizational and cross-institutional participation.

Check your rules of the game: Learning in environmental governance can also be impeded by institutional rules that constrain diversity in participation or decision-making processes, by rules that limit access to information, or by rules that impede an open discussion about the governance choices available (Heikkila & Gerlak, 2018). Participation and authority rules can create and mitigate power structures and power differentials that can sometimes inhibit learning. Keeping in mind the idea of triple-loop learning, it is possible to develop new power structures that facilitate transformational learning (Diduck et al., 2012). Formal rules differ from the “rules in use” that may be more important in social settings, and rules in use can be regulative or normative, or can include shared mental models and boundaries (Pahl-Wostl, 2009). Delineating first how or whether people have shared conceptions of the different rules can be critical. Building boundary objects, for instance, when cognitive institutions or mental models diverge may improve learning (Ingram & Lejano, 2009).

Build collective memory: You can have great dialogues but if they are ad hoc, and there is no way to store knowledge or access information learning is hard to institutionalize for the next generation, especially when considering turnover and the time needed for learning to accumulate. Governance arrangements that promote learning in one setting and moment in time can be easily lost because of institutional change and complexity, or the loss of organisational memory (Wallis et al., 2013). Some of the mechanisms that can facilitate the transference and embedding of ideas are experientially based, via collective routines (Argote & Ingram, 2000; Feldman, 2000; Feldman & Rafaeli, 2002; Walsh & Ungson, 1991; Zollo & Winter, 2002). Shared routines that everyone in a group follows can allow a new approach for conducting a task to be shared quickly and potentially adopted across the group. Such routines and processes may therefore serve as the mechanism for collective “memory” or shared knowledge. We also need mechanisms for knowledge management for sharing, translation, and dissemination of information (Heikkila & Gerlak, 2013).

III. Mitigating Constraints and Harnessing Learning Opportunities

We know that learning is constrained by many factors, such as individual cognitive constraints (Kahan et al., 2012) and existing policy beliefs (Pattison, 2018), organizational capacity (Crow & Albright, 2019), and power differentials (Jiggins et al., 2007; McNutt and Rayner, 2018), as briefly noted in the introduction. No governance process is perfect and the problems of governance typically are problems for learning. Even when dialogue is well-structured, for instance, competing values, differing world views and goals will persist (Cundill, 2010). From a practical perspective, we therefore need to be attuned to the fact that not all people learn in environmental governance and many people when they do learn tend to just learn from information that reinforces their existing beliefs and world views (Pattison, 2018). At the same time, learning does not necessarily result in improved environmental governance outcomes (Muro & Jeffry, 2012; Newig et al., 2019). These constraints should not, however, imply that we should give up on learning in environmental governance. As numerous studies have illustrated,

learning is possible and learning is more likely when we establish certain practices that can mitigate the constraints on learning.

How then do we mitigate the constraints on learning, as well as the constraints that might prevent learning processes from leading to better outcomes? For cognitive constraints, we already argued for the importance of institutionalizing learning processes that may help, long-term, build capacity for deeper learning where individuals can change fundamental worldviews and assumptions, although not guaranteed. For capacity constraints, better utilizing networks is one alternative. For power constraints it is also important to recognize that actors in positions of power can also facilitate learning (Gerlak & Heikkila, 2011). Refocusing the power dynamics may be an option. This is also where facilitation may help. In their research reviewing cases of public environmental decision-making, Newig et al. (2019) highlight the importance of structured facilitation where methods are used to structure communication and knowledge exchange rather than simply giving participants opportunities for open exchange. Some researchers see facilitation as a necessary element of group interaction and dialogue as facilitators can help make people feel secure, manage divergent stakeholder interests and navigate power differentials among them to successfully catalyze learning in support of natural resource governance (Sol et al., 2013; Olsson et al., 2007). Understanding how to navigate constraints on learning will of course depend on the context. Wolfram (2019) illuminate how place-specific and interdependent capacity factors decisively enhance or constrain the depth of governance learning processes.

Of course, there are many additional challenges for learning in environmental governance that remain underexplored in the literature. For instance, we know little about how different levels of conflict might hinder or spark learning. Muro and Jeffrey (2008) believe the over-emphasis on learning through collaboration and consensus ignores the many instances in which learning occurs through disputes and opposition. At the same time, learning can produce the intensification of conflict (Steyaert & Jiggins, 2007) as people become more aware and more tuned to the differences in their worldviews around environmental governance problems or solutions.

IV. Conclusion

In this paper, we have drawn empirical insights from the learning in environmental governance scholarship to inform practitioners who engage in and manage environmental planning and decision-making processes. We argue that the learning in environmental governance scholarship is valuable to practitioners given the severity of environmental challenges, the important role practitioners play as agents of learning and growing evidence from real-world experiments and decision-making processes that can ultimately, help improve the design of environmental governance. We highlight three key findings from the literature: the importance of face-to-face dialogue that is open and ongoing; the need for cross-scale linkages that support learning; and investments in institutional rules, norms and shared strategies for intentional learning. We translate these findings into a set of strategies for environmental governance practitioners and explore how practitioners can mitigate some of the factors that may constrain

learning across many governance contexts. With the growth in scholarship on learning in environmental governance over the past couple decades, it is an appropriate time to step back and reflect on what we have learned collectively as a scholarly community and how these lessons might contribute to improving governance processes or outcomes. By exploring how the literature might inform practitioners, this paper takes a step toward helping translate the theoretical and empirical insights from this broad and diverse literature to distill strategies that can move these lessons from paper to practice.

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