Complexity, Governance & Networks – Vol. 5, No 1 (2019) Special Issue: Adaptive Governance of Coupled Social-Ecological Systems, p. 1-4
DOI: http://dx.doi.org/10.20377/cgn-92

Adaptive Governance of Coupled Social-Ecological Systems: Introduction to the Special Issue Themes

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Stockholm Resilience Alliance (SRA) defines adaptive governance as an evolving research framework for analyzing the social, institutional, economical, and ecological foundations of multilevel governance modes that are successful in building resilience for the vast challenges posed by multiscale drivers of change, such as global climate change, rapid technological change, terrorism, socio-economic disruptions, and political coups. The social-ecological systems (SES) framework is an advanced version of Elinor Ostrom's (1990, 2005) institutional analysis and development framework. Folk and his colleagues (2005) laid out the theoretical foundations for a deeper study of adaptive governance of social-ecological systems. They argue that adaptive governance systems often self-organize as social networks with teams and actor groups that draw on various knowledge systems and experiences for the development of a common understanding and policies, in particular during periods of abrupt change (crisis) in social-ecological systems. Folk and his colleagues conclude that "the emergence of bridging organizations seem to lower the costs of collaboration and conflict resolution, and enabling legislation and governmental policies can support self-organization while framing creativity for adaptive co-management efforts" (p. 41). In this context, the SRA group laid out two grand challenges for the study of adaptive governance: -

1. What are the important multiscale processes in social-ecological systems governance that lead to more or less resilient outcomes on the ground?
2. What are the tradeoffs between management priorities and social-ecological systems for long-term sustainable futures and how do these play out over different scales?

Some national and international agencies, such as the United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS), and a group of scholars are increasingly interested in finding answers to these questions and ask for more applied research on adaptive governance. UNU-IAS considers Gunderson and Holling (2002); Dietz et al. (2003); Folk et al. (2005) and Olsson et al. (2006) as key theoretical contributions to establishing adaptive governance as a research field. Drawing on five case studies from the American West, Brunner and Lynch (2006), explored how to expedite a transition toward adaptive governance and break the deadlock in natural resource policymaking. Brunner and Lynch argue that adaptive governance integrates various types of knowledge and organizations and it relies on open decision-making processes recognizing multiple interests, community-based initiatives, and an integrative science, in addition to traditional science. Scholz and Stiftel (2005) apply the adaptive governance framework to study water governance issues across multiple spatial and temporal scales.

As theoretical and empirical contributions to understanding adaptive governance are growing in volume under multiple research initiatives, this special issue of Complexity, Governance & Networks also aimed to focus on the study of adaptive governance through the parallel theoretical frameworks that have emerged in the fields of public policy, public management and public

administration to study collaborative and network governance approaches in the face of complex public policy problems. The broader shift from government to governance and the hollowing out of the government in this age of contracting out public services to third party vendors further necessitates the need to study the evolving and dynamic nature of governance networks from a complex systems perspective (Koliba et al. 2010; Zia et al. 2014). A broad call for papers was issued inviting submissions covering the following topics and approaches:

- Theoretical perspectives on adaptive governance, including but not limited to complexity sciences, complex adaptive systems, governance networks, network governance, collaborative governance, and/or multi-level collaborative governance.

- Methodological applications to understand and model adaptive governance of social ecological systems, such as governance of food, energy & water systems, governance of natural resources, governance of socio-technical ecological systems (e.g. smart sustainable cities)

- Social and/or policy learning derived from different governance design experiments

- Longitudinal and/or panel studies across different geographical and administrative regions

The special issue includes five papers that span the broad theoretical and methodological topics included in the call for papers. The first paper by Hammond-Wagner (2019) advances Ostrom's SES framework by digging deeper into the linkages between institutions and human behaviors. Hammond-Wagner (2019) argues that the SES framework has struggled to facilitate analysis of environmental challenges beyond common-pool resource (CPR) regimes and the emergence of community-based governance institutions. Hammond-Wagner (2019) examines attributes of environmental public goods dilemmas that differentiate them from CPR regimes. These include the lack of a behavior-reinforcing link, multi-actor and multi-resource system dynamics, higher levels of uncertainty and complexity, and lack of built-in social capital.

In the second paper, Webster and Pavlovich (2019) present a novel agent based model (ABM) that simulates institutional and human behavioral linkages in a coupled natural and human systems framework. Webster and Pavlovich (2019) argue that decision makers tend to respond to problems rather than prevent them. In political science, this process of responsive governance is associated with complex dynamics such as availability cascades and punctuated equilibrium. However, most authors treat problems as one-time events, like oil spills or political scandals. In the second paper, Webster and Pavlovich (2019) present an agent based model loosely based on the Lake Erie watershed to explore how responsive governance evolves along with an on-going but noisy environmental problem: harmful microbial blooms. Their conceptual model features a two-level decision process based on Jones and Baumgartner (2005). Meta-agents representing the individual level of analysis "perceive" blooms either directly via observation if they are near a bloom or indirectly through the media. As a meta-agent observes more blooms, their concern increases until it crosses an action threshold, at which point they use simple cost-benefit analysis to select from a range of options. Webster and Pavlovich (2019) examine two major scenarios, one in which there is a single policy maker managing the entire region (e.g. the national government) and one where there are 5 policy makers, each separately regulating a demographically and geographically distinct region. Webster and Pavlovich (2019) use the ABM generated simulation experiments to explore how variability in risk perception and responsive governance shape the functioning of the entire coupled human and natural system, including biophysical feedbacks. Novel theoretical concept of governance treadmill -- that captures systemic fluctuation between effective and ineffective governance responses -- is introduced and operationalized in the ABM.

Spett (2019), in the third paper, addresses the transboundary management of water bodies that cross political, cultural, and ecological boundaries. The transboundary governance issues entail working with a level of complexity that requires creative, adaptive management strategies to build resilience and increase social capacity in the face of social ecological disturbances. To asses the extent to which such complexity can be managed, Spett (2019) explores the application of the social-ecological systems framework, proposed by Walker and Salt (2012), for assessing and managing resilience. Elements of this framework are applied on the transboundary Lake Champlain Richelieu River Basin, which is a freshwater basin that exists between the United States and Canada.

Mumtaz and Ali (2019), in the fourth paper, employ the Institutional Analysis and Development (IAD) framework (Ostrom 2005) to understand the adaptive polycentric governance challenges emanating from risks posed by climate change in two provinces (sub-national entities) of Pakistan. After the 18th constitutional amendment in 2010, the responsibility of implementing climate change policies rests with respective provinces/subnational governments in Pakistan. Mumtaz and Ali (2019) argue that, to manage the complexity of SESs, the field of environmental governance emerged as a means of understanding sustainable natural resource use patterns. They further argue that one of the influential approaches to reconciling social and ecological aspects of environmental governance emerged in the form of adaptive governance to deal with uncertainty and complexity of SESs. For Mumtaz and Ali (2019), the adaptive governance literature is an emergent form of environmental governance research that demands to coordinate various dynamic forms of resource management regimes and IAD framework is particularly well suited to confront the complexity and uncertainty associated with rapid environmental change.

Finally, in the fifth paper of this special issue, Panikkar et al. (2019) examine the participatory social learning process of localized non-state actors –community and scientific stakeholders – and their efforts at adaptive co-management of the Kabul River basin between Afghanistan and Pakistan, one of the most conflict ridden areas in the world, to enhance trust building, information sharing, collaboration, and capacity building across the basin. Panikkar et al. (2019) present action research based approach and deploy novel track-2 and track-3 environmental diplomacy framework to seed ecological cooperation and environmental peacebuilding. For Panikkar et al. (2019), the lack of trust among upstream and downstream riparian partners and persistent failures of Track 1 diplomacy initiatives has led to an absence of governance mechanisms for mitigating the water security concerns in the Kabul river basin. Their research shows that science and public diplomacy, democratic participation, and social learning may pave a way to clear local misconceptions, improve transboundary water cooperation, and increase ecological stewardship in the Kabul River Basin. Water cooperation and management is thus a political process which is an emergent phenomena in complex adaptive systems (Pahl-Wostl, 2009).

Overall, these five papers present inter-twined themes of adaptive governance in social ecological systems to cope with uncertainty and complexity, risk and insecurity, distrust and competition. While Hammond-Wagner (2019) and Mumtaz and Ali (2019) advance Ostrom's polycentric governance theory to tackle complex SES challenges, Webster and Pavlovich (2019) present a novel theoretical approach of treadmill governance to simulate the emergence of bottlenecks and cooperation in complex non-point source water pollution management contexts. Two other papers apply very different theoretical frameworks to analyze transboundary governance issues in two different continents of the world. While Spett (2019) applies the well-established adaptive governance based SES framework emanating from Resilience Alliance in US-Canada context, Panikkar et al. (2019) break new ground by pitching an action-oriented, and dare I say, a novel reflexive governance approach to bring about ecological cooperation and resolve persistent conflict across Afghanistan and Pakistan in Hindukush mountains. Ultimately, I hope that this special issue will ignite new avenues of research and practice to address complex challenges

pertaining to the governance of SES, and enable an interdisciplinary dialogue towards convergence of the emerging theories of polycentric governance, treadmill governance, adaptive governance and reflexive governance of SES.

References

Bizikova et al. (2013) The water-energy-food security nexus: towards a practical planning and decision-support framework for landscape investment and risk management. International Institute for Sustainable Development

Brunner, Ronald D., Toddi A. Steelman, Lindy Coe-Juell, Christina Cromley, and Christine Edwards. Adaptive governance: Integrating science, policy, and decision making. Columbia University Press, 2005.

Brunner, Ronald D., and Amanda H. Lynch. Adaptive governance and climate change. Boston: American Meteorological Society, 2010.

Dietz, Thomas., Elinor Ostrom, Paul C. Stern (2003). "The Struggle to Govern the Commons." Science. 302(5652):1907-1912.

Folke, Carl., Thomas Hahn, Per Olsson, Jon Norberg (2005). "Adaptive Governance of Social-Ecological Systems." Annual Review of Environmental Resources 30: 411-73.

Gunderson, L. H., CS Holling (ed) (2002). Panarchy: Understanding Transformations in Human and Natural Systems. Washington: Island Press.

Hammond Wagner, Courtney (2019). Strengthening The Institution-Behaviour Link In the SES Framework To Faciliate Analysis Of Environmental Public Goods Dilemmas. Bamberg: University of Bamberg Press, *Complexity, Governance & Networks – Vol. 5, No 1 (2019) Special Issue*, 5-23.

Jones, B. D., & Baumgartner, F. R. (2005). The politics of attention: how government prioritizes problems. Chicago: University of Chicago Press.

Koliba, C., Meek, J., and Zia, A (2010) Governance Networks in Public Administration and Public Policy. CRC Press, Boca Raton FL.

Mumtaz, Muhammad, & Salem H., Ali (2019). Adaptive Governance and Sub-national Climate Change Policy: A Comparative Analysis of Khyber Pukhtunkhawa and Punjab Provinces in Pakistan. Bamberg: University of Bamberg Press, *Complexity, Governance & Networks – Vol. 5, No 1 (2019) Special Issue*, 81-100.

Olsson, Pier., Lance H Gunderson, Steve R. Carpenter, Paul Ryan, Louis Lebel, Carl Folke, CS Holling (2006). "Shooting the Rapids: Navigating Transitions to Adaptive Governance of Socio-Ecological Systems." Ecology and Society 11(1): 1-18 [online].

Ostrom E. 1990: Governing the commons. Cambridge: Cambridge University Press.

Ostrom, E., 2005. Understanding institutional diversity (Vol. 241). Princeton, NJ: Princeton University Press.

Pahl-Wostl, C. (2009). A conceptual framework for analyzing adaptive capacity and multi-level learning processes in resource governance regimes. Global Environmental Change, 19(3), 354–365.

Pannikar, Bindu et al. (2019). Transboundary Water Governance in the Kabul River Basin: Implementing Environmental and Public Diplomacy Between Pakistan and Afghanistan. Bamberg: University of Bamberg Press, *Complexity, Governance & Networks – Vol. 5, No 1 (2019) Special Issue*, 101-120.

Spett, Emma (2019). Building Flood Resilience In Trans-Boundary Social-Ecological Systems: Adaptive Governance In The Lake Champlain Richelieu River Basin. Bamberg: University of Bamberg Press, *Complexity, Governance & Networks – Vol. 5, No 1 (2019) Special Issue*, 65-80.

Walker, B., & Salt, D. (2012). Resilience practice: building capacity to absorb disturbance and maintain function. Island Press.

Webster, D.G. & Pavolvich, Tyler (2019). Responsive Governance And Harmful Microbial Blooms On Lake Erie: An ABM Approach. Bamberg: University of Bamberg Press, *Complexity, Governance & Networks – Vol. 5, No 1 (2019) Special Issue*, 24-64.

Zia, A., Kauffman, S., Koliba, C., Beckage, B., Vattay, G. and Bomblies, A., 2014. From the habit of control to institutional enablement: Re-envisioning the governance of social-ecological systems from the perspective of complexity sciences. Complexity, Governance & Networks, 1(1), pp.79-88.