

# Explaining through causal mechanisms: resilience and governance of social–ecological systems

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This paper synthesizes and builds on recent critiques of the resilience literature; namely that the field has largely been unsuccessful in capturing the complexity of governance processes, in particular cause–effects relationships. We demonstrate that absence of a causal model is reflected in the black-boxing of governance processes which is problematic for resilience studies with explanatory ambitions. We introduce mechanism-based thinking as alternative research perspective that offers more analytical rigour and elaborate the key principles of this approach. Mechanism-based approaches are aligned to the ways of thinking in systems theory and complexity sciences and can be used to advance scientific inquiry and policy practice to govern complex sustainability issues.

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## Introduction

Originally coined by ecology scholars [1], the goal of building resilience in social–ecological systems has gained considerable traction over the past decade, particularly from environmental scientists and interdisciplinary scholars. Moreover, resilience thinking has entered the public and political arenas as a popular mantra for dealing with many of the contemporary complex or ‘wicked’ problems such as food (in)security, climate change impacts, incurable pollution, natural resource (mis)management, or species exploitation. Resilience is often seen

as boundary object as it remains sufficiently vague, ambiguous and malleable to unite different scientific disciplines in inter and transdisciplinary research on complex societal issues [2]. However, critiques have emerged from other fields of study such as sociology and political science about what resilience actually means and its utility as an explanatory concept, specifically when it comes to understanding the governance of these complex sustainability issues [3\*,4\*\*].

The complexity and nonlinearity of socio-ecological systems has led resilience scholars to question traditional modes of governance as they are deemed ill-equipped to result in better and more resilient outcomes. Consequently, a plethora of conceptualisations and frameworks to analyse the governance of social–ecological systems have emerged in this literature, including adaptive governance [5\*], co-productive governance [6] and, more recently, transformative environmental governance [7\*]. These frameworks and approaches each emphasize specific principles that are considered necessary to improve the state of socio-ecological systems and make them more resilient and withstand disruptions, including principles of adaptive management such as active monitoring and policy experimentations, polycentric institutions, participation and co-production of collective decisions, individual and social learning, flexibility and robustness, and use of local knowledge [1,4\*\*,5\*,8]. Although advocating for a comprehensive, science based approach to explain the governance of resilience, emphasis in most of this literature is placed on the normative question of how things *ought to be*, rather than explaining *how things are* and why things *are the way they are*.

This paper aims to advance scientific scholarship on the governance of resilience by proposing a mechanism-based approach. We argue that a different research perspective is needed, in line with Karl Popper’s argument that the essence of (social) sciences is about ‘putting forward and testing theories’ [9]. Resilience literature in general and specifically when it comes to the role of governance is under-theorized and suffers from the ‘problem of induction’. This means that crude generalizations to universal statements of particular observations are made based on a limited number of cases. To take social science research seriously, studies with explanatory ambitions must have an underlying causal model that allows to theorize cause–effect relationships and distil or test the operative causal mechanisms.

This has been too rarely the case in the existing resilience literature.

After synthesizing the major critiques of the resilience literature's conceptualization of governance, we introduce mechanism-based approaches in order to look into the black-box of governance processes and discuss causal mechanisms as a way to capture the processes through which certain effects are produced. We conclude by reflecting on the value of mechanism-based thinking for furthering the scientific inquiry in the resilience literature and support policy practice in making more informed decisions about governing socio-ecological systems.

### Key critiques on the resilience literature

Throughout the governance-orientated resilience literature, the concept of resilience has been employed in two ways [4<sup>\*\*</sup>]. First, it is used to describe the state of an existing social-ecological system responding to system perturbations. For example, McGreavy *et al.* [10] apply resilience concepts in order to examine the role of citizen science and program design of vernal pool policy innovation in Maine. Second, much of the literature starts from the normative principles that resiliency of a system is improved by implementing principles of adaptive governance. For instance, Gunderson and Light [11] analyse the exemplary case of the Everglades, a unique wetland ecosystem in Florida which, according to the authors, was deteriorated by years of top-down control of public agencies over water supply and flood risks. While they recognize to some extent the merits of restoration policy, the authors criticize its overly planned and scientific management, and advocate for transitions to adaptive governance, which would imply amongst others, an experimental approach to continuously increase the response capacity to the next crises, as well as fostering cooperation by improving the links between individuals, stakeholders, social organizations, and public agencies at all levels [11].

These normative aspects underlying resilience literature are problematic as they usually remain implicitly implied nor justified ethically or politically [2]. For example, democratic theory questions the underlying principles of adaptive governance to challenge existing institutions and public procedures. It might not always be beneficial to the ecosystem to adopt adaptive governance, and may very well increase the risks of unaccountability of decision-makers, inefficiencies, unequal access to the decision arenas, and political power play as result of vested interests, certainly in cases where economic interests in ecosystem exploitation dominate local politics [12]. Arguably, resilience is an ecological concept that has been stretched to such extent that it clearly no longer captures the original meaning when applied in a social science context [3<sup>\*</sup>]. Resilient societies are those that are able to undergo external shocks and maintain the same identity,

structure and ways of functioning. As several scholars have argued, the concept of resilience by ignoring ethics and power relations cannot be meaningfully applied as a framework to assess societies and governance systems, but only to ecosystems [13].

Most of the literature asserts that to increase the resiliency of an ecological system, the governance system needs to approximate the ideal of adaptive governance, or at least conform to some of its principles. However, it hardly theorizes about the underlying cause-effects when it comes to governance processes. Both the theoretical foundations as well as empirical evidence supporting this presumed causal relationship remain unclear. Consequently, the pathways through which existing governance structures and processes could be made adaptive is hardly explained. To illustrate, we reviewed over 100 recent scientific papers with explanatory ambitions that addressed explicitly the governance of socio-ecological systems and resilience,<sup>a</sup> focussing particularly on how adaptive governance contributes to resilient ecosystems. We found surprisingly few papers with a clear causal model. Most of the recent work is referencing to Olsson *et al.* [14,15] who analyze ten case studies of transitions towards adaptive governance in the USA, in Sweden, Thailand, Australia and Canada. Borrowing heavily from political scientist Kingdon, Olsson and colleagues conclude that successful transformations towards adaptive governance is the result of a social mechanism that is contrived of key leadership by a policy entrepreneur, seizing of a window of opportunity opened due to an external shock, and building resilience based on adaptive governance principles. This explanation is, however, deceiving for social scientists and policy scholars as Kingdon's framework is known to be a descriptive heuristic, and not a theoretical model developed to formulate hypothesis on the causes and effects of governance changes [16].

The resilience literature is therefore characterized by a mismatch between recognizing the social-political dynamics and the ways through which these are studied. Much of the resilience literature emphasizes that processes of governance have to navigate deep system uncertainties, a plurality of interdependent actors that crosscut traditional boundaries of sectors, levels and types, and take part in a highly erratic, chaotic, and politicized decision making processes over socio-ecological systems [14,17<sup>\*</sup>], a governance paradigm shared with contemporary public policy theories [18<sup>\*</sup>]. However, when studying these processes, the existing theories, concepts and

<sup>a</sup> From the Scopus database, the following text search was conducted: [(Resilience) AND (Adaptive Governance) AND (Mechanism)]. The initial search yielded 102 articles of which 42 were relevant and explored in detail.

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