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Adaptive institutions in social-ecological systems governance: A synthesis framework

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ARTICLE INFO

Keywords:

Adaptive governance
Adaptive institutions
Federalism
Polycentricity
Networks
Social-ecological systems

ABSTRACT

Adaptive governance of social-ecological systems depends on adaptive institutions. Efforts to understand the factors affecting adaptive institutions have identified many variables, but our understanding is constrained by multiple definitions of these concepts. In this article, we synthesize across two decades of studies relating to adaptive institutions. After clarifying some definitional confusion in the literature, we provide a theoretical framework to guide research on purposeful institutional change. While numerous scholars have identified a wide variety of important factors, we find that many of these factors can be traced back to (1) federalism and polycentricity and (2) networks and learning. Our synthesis suggests several avenues for future research centered on these factors. For example, how might the potential negative effects of key facilitating variables such as polycentricity (e.g., racial segregation and income sorting) and heterogeneous networks (e.g., increased coordination costs) hinder adaptive institutions? How can learning through both scientific and time-and-place knowledge promote adaptive institutions? More broadly, social science can play an important role in identifying factors that foster adaptability in different contexts, so that policy makers can promote such adaptability.

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1. Introduction

Longstanding approaches to solving ecological and social problems are often insufficient to address complex, highly interactive challenges facing our world today. Climate change, species loss, non-point source pollution, and technological and population pressures on scarce resources are all examples of problems that arise in social-ecological systems (SES). SES are systems that involve both natural/ecological and human/social components that interact to affect system dynamics. Such challenges have led to calls for increasing

attention to how societies organize governance and institutions. As an integral component of governance, institutions are of particular interest. Our ability to purposefully change institutions to enhance adaptive governance requires better understanding of how politics, science, and other factors affect institutional change, as addressed in this Special Issue. Our contribution is in the form of a synthesis and research agenda that broadens the concepts of politics and science to include political structures, e.g. federalism and polycentricity, and learning, where science and other factors can promote knowledge. We start by clarifying how institutions are conceptualized in SES studies and conclude with a

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<http://dx.doi.org/10.1016/j.envsci.2015.01.003>

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research agenda building on these prior studies and our new theoretical framework.

1.1. Adaptive governance

A leading approach to successfully meet the challenges of changes in social-ecological systems is adaptive governance. Adaptive governance has gained widespread support among scholars, who argue that it is responsive to emerging problems and knowledge surrounding complex ecological systems (Heikkila, 2010; Gunderson and Light, 2006). Some find that adaptive governance can foster effective management and use of shared assets such as common pool resources and environmental assets that provide ecosystem services (Hatfield-Dodds et al., 2007). Others emphasize the complementary government and community-based institutional arrangements that work together in adaptive governance to improve natural resource management (Nelson et al., 2008). At its core, adaptive governance aims to provide for collaborative, flexible, and learning-based approaches to managing ecosystems (Olsson et al., 2006).

From a practitioner perspective, adaptive governance has been described as a move from the conventional view of institutions as “static, rule-based, formal and fixed organizations with clear boundaries” to a view of institutions as “more dynamic, adaptive and flexible for coping with future climatic conditions” (IISD, 2006, p. 6). Adaptive governance is an approach that is expected to generate the desired end goal of adaptive capacity (Cook et al., 2011). As described by Folke et al. (2005, p. 452), “Systems with high adaptive capacity are able to reconfigure themselves when subject to change without significant declines in crucial functions of the socio-ecological system.”

Despite its popularity, conceptual clarity on the concept of adaptive governance and its precursors is lacking. Some scholars conflate adaptive governance with adaptive institutions. For example, Hatfield-Dodds et al. (2007, p. 4) define adaptive governance as the “evolution of rules and norms that promote the satisfaction of underlying human needs and preferences given changes in understanding objectives, and the social, environmental, and economic concepts.” Thus adaptive governance is defined as changing rules and norms (institutions, as defined by Ostrom (1990)). Others describe governance more broadly, such as “a range of institutions and relationships involved in the process of governing,” which “includes both formal institutions such as laws, policies, and organizational structures, and informal institutions: the power relations and practices that have developed and the rules that are followed in practice” (Huitema et al., 2009, p. 3). One of the likely reasons for this ambiguity in definitions of adaptive governance is that governance prominently includes aspects of rules, norms, and other institutional elements. However, since governance includes elements in addition to institutions (e.g., resources, leadership, etc.), and since governance includes several actions not included in institutions (production, provision, consumption, financing, coordination, dispute resolution, rule-making), the two concepts are distinct. Other scholars have treated the concept of polycentricity (multiple overlapping centers of authority)

as a component of adaptive governance, rather than as a precursor to it (e.g., Lee, 2003). Thus there is a need for greater conceptual clarity of key concepts such as adaptive governance, adaptive institutions, and polycentricity.

Considering the many interpretations of adaptive governance, we find clarity in two succinct elements. First, “adaptive” has been described as “recover[ing] or adjust[ing] to change through learning and flexibility, so as to maintain or improve to a desirable state” (Engle and Lemos, 2010, p. 1 drawing on Nelson 2007 and Folke et al., 2006). Similarly, Cook et al. (2011) refer to responding to or shaping variability or change. Second, “governance” has been defined as the “process by which the repertoire of rules, norms, and strategies that guide behavior within a given realm of policy interactions are formed, applied, interpreted, and reformed” (McGinnis, 2011b, p. 171). The generic tasks of governance include production, provision, consumption, financing, coordinating, dispute resolution, and rule-making (McGinnis, 2011a, p. 58). Combining these two elements, we define adaptive governance as steering policy interactions to guide management of resources in a manner that is able to recover or adjust to change so as to maintain or improve to a desirable state. The adaptive governance approach is especially relevant for social-ecological systems, whose dynamic nature is not well served by a static approach. These systems occur at a variety of scales and include a wide range of resources, from local fishing economies to global climate change (Ostrom, 2009).

If adaptive governance of social-ecological systems is a desired approach, then we should seek to understand what factors promote it. Several studies in the past two decades have identified a variety of such factors operating in different contexts, including polycentric systems, vertical coordination, informal networks, learning, leadership, evolving rules, information, conflict resolution, rule compliance, infrastructure, institutional preparedness for change, nested institutions, institutional variety, dialog, social capital, memory, knowledge, cross scale interaction, multi-level governance, and organizations. As described below, many of these factors influence adaptive governance through the promotion of adaptive institutions. Below we synthesize across studies to develop a theoretical framework of variables connected to adaptive institutions and adaptive governance. We start with adaptive institutions, then discuss important precursors of adaptive institutions: federalism and polycentricity; learning and networks; and other variables.

2. Methods

This study draws on a wide range of literature relating to adaptive governance, adaptive institutions, adaptable institutions, polycentricity, social learning, networks, and collaboration. Key word searches on these terms, via Google Scholar, provided the basis for identifying appropriate articles and books. Although the field of adaptive governance is broad, we focused on a narrower set of literature, those theoretical and empirical manuscripts describing factors related to adaptive institutions, and precursors to

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