

Linking governance to social-ecological performance

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Abstract

A pertinent question inadequately addressed in research on ecological systems and their societal management is "What is the role of environmental impact assessment in the governance of social-ecological systems?" More particularly, "How do the different EIA procedures relate to governance functions?" The conceptual framework developed in this paper addresses the linkage between social and ecological systems and their governance functions. It is developed in a stepwise fashion and includes: an explanation of the link from ecosystem goods and services via the human value system to the social system. The link between the social system and the ecosystem is also explored and the position of traditional environmental impact assessment therein is established. The lack of EIA procedures for assessing the impacts of institutional interventions is highlighted.

Keywords

Governance functions, ecosystem goods and services, stewardship, institutions

Introduction

The core functions of governance, namely security, the rule of law, meeting basic human needs, guiding (steering) and economic development are mutually dependent (USIP 2010) and aim at both restraining and enabling social behaviors/practices (Vatn 2009). Whereas the exercise of political, economic and administrative authority was formerly considered the domain of the government, trends like globalisation, privatisation, market formation and increased citizen involvement have caused a shift from (management by the) government to governance aimed at guiding social-ecological systems (Delmas and Young 2009; Eggertsson 2001). Indeed, community-based policy networks are currently considered important forms of governance (Janssen et al. 2006). A broader concept of governance, namely the ability of people to share, access, or compete for power through political processes and to enjoy the collective benefits and services of the state (USIP 2010) is embraced in this paper. Indeed, we articulate the governance functions of stable administration, mediation, regulation, service provision, and economic development in terms of social-ecological process interactions. We address the question "What is the role of environmental impact assessment in the governance of social-ecological systems?" by first describing the social system and the ecosystem from a systems thinking or meta-

viewpoint (Schwaninger 2006). Next, we present a conceptual framework in which the social and ecological systems are coupled and their governance is described generically. Finally, the position of environmental impact assessment procedures within social-ecological governance is portrayed within the conceptual framework.

This research lies at the interface between the social and natural sciences, yet is grounded in the practice of social-ecological management.

Conceptual framework

The ecosystem

Components of the ecosystem and their interrelationships form the contents of the ecosystem box (Figure 1). As environmental scientists, we are accustomed to viewing these components in detail and using bio-physical process knowledge to predict the impacts of human interventions on the ecosystem. These are expressed as alterations in biodiversity and ecosystem health via suites of ecological indicators. From a systems perspective, we can zoom out and can view the ecosystem as a transfer function, converting human interventions into ecological indicators of ecosystem health and associated goods and services (including biodiversity). This view is in line with the conceptual framework of the Millennium Ecosystem Assessment (Ranganathan et al 2008). More specifically, this view means that theoretically in the purely natural state (i.e. without any human intervention) the ecosystem transfer function converts only external effects such as climatic variability into indicators of ecosystem health. Human interventions in ecosystems begin with the harvesting, hunting and gathering of subsistence peoples and grows in scale to the attempts at total control and over-exploitation exemplified by the dikes (and water control) of the Netherlands and the over-fishing of the world seas.

The social system

Components of the social system and their interrelationships form the contents of the social system box (Figure 1). As environmental scientists we may not be accustomed to viewing these components in detail, nor familiar with the non process-based assessment tools of social scientists. From social impact assessment and health impact assessment studies, we are aware of the connections between ecosystem goods and services and the households and communities they affect. We are also aware of the role that human value systems play in determining the value to society of the ecosystem goods and services. More specifically, perceptions of actors, interests, culture are the determinants of the informal institutions that partially frame social practices and behaviors (Seidl and Tisdell 1999; Imenson and van den Berg 2006). Social capital in the form of labour, knowledge and human resources are also considered parts of the social system that play an important role in the realization of governance functions of social-ecological systems (see also Pretty and Ward 2001). By considering the social system as a transfer function between changing environmental conditions, shifting value systems, and the system of permissions, regulations, allocation and mediation that govern who, when and how people can intervene in the bio-physical system, we are able to portray the link that different social configurations and institutions form within the social-ecological system. We consistently adopt the stance of Young et al (2006) in viewing institutions as long term social adaptations (manifested in systems of rules) representing the accumulated human knowledge of how to cope with particular bio-physical conditions and

evolving in response to growing knowledge of these conditions and coping mechanisms.

The coupled social-ecological system

The interconnections between the social system and the ecosystem are then given by the inputs and outputs of the transfer functions. So, the access to, and the use and valuation of, ecosystem goods and services by the current social configuration as well as the mechanisms for coping with environmental variability (e.g. droughts, floods) form the connections between the ecosystem and the social system. Similarly, the activities of strategic planning, distribution of or exclusion from resources, regulation of transactions and regulatory limits to resource use, and the implementation of interventions, form the connections between the social system and the ecosystem. In each case, the connections may be considered to be the manifestation of social-ecological governance functions. These connections occur at multiple levels and in numerous ways.

We do not pretend to deal with all the complexities. Instead, we adopt a meta-view and focus generically on governance functions, exploring the relations between social-ecological systems' governance and environmental impact assessment in general. In particular, we are interested in the role of project-based environmental impact assessment (EIA), mitigation and EIA follow-up, social impact assessment (SIA) and strategic environmental assessment (SEA) in the governance of a coupled social-ecological system.

Placing environmental impact assessment within social-ecological governance

An environmental impact assessment occurs in the planning phase of a human intervention such as road construction or water resource development. Originally, EIA's took place only at project scale and were confined to an assessment of the potential effects of the intervention and measures to mitigate these. In terms of social-ecological governance an EIA acts as a mediation tool between developer and interested and affected parties and as a regulatory instrument. In all cases it acts to filter and constrain human interventions in the ecological system. However, EIA can also influence the human valuation of ecosystem goods and services by the provision of information on biodiversity issues for instance. EIA follow-up, in particular, is designed to learn from monitoring and ecosystem surprises, so that learning about the ecosystem can occur in the social system. So, the effects of an EIA and EIA-follow-up extend from the planning phase through the ecosystem to the connection between ecosystem and social system. Indeed, if we include mitigation as a component of EIA, the effects can extend into the social system, requiring people to alter their behaviour in order to ameliorate negative impacts. In considering SIA, we see that its focus lies at the connection between the ecological and social systems and extends into the social system itself. Although SIA examines the effects of human interventions in the ecosystem on the associated social system, it stops short of assessing the impacts of institutions themselves. SEA focuses at the strategic planning level taking the prevailing institutional arrangements as the background context. In doing so, it too falls short of assessing the effects of current and alternative institutional arrangements on the suite of human interventions under consideration.

This means that the cumulative effects of interventions on the ecosystem, the outputs to the social system and even the societal response can be predicted, but the impacts of existing institutions and institutional adaptation are not addressed.

Conclusion

By viewing ecosystems and their associated societies through a systems lens, we could distinguish governance functions in the interface zones connecting the social and ecological systems. This facilitated the placement of project-based environmental impact assessment, social impact assessment, mitigation, follow-up and strategic environmental assessment within a social-ecological governance framework. The absence of a capability to assess the impact of institutional change or reform on the social-ecological system is identified as an omission in the current EIA tool set.

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Figure 1 A systems view of interactions in a social-ecological system

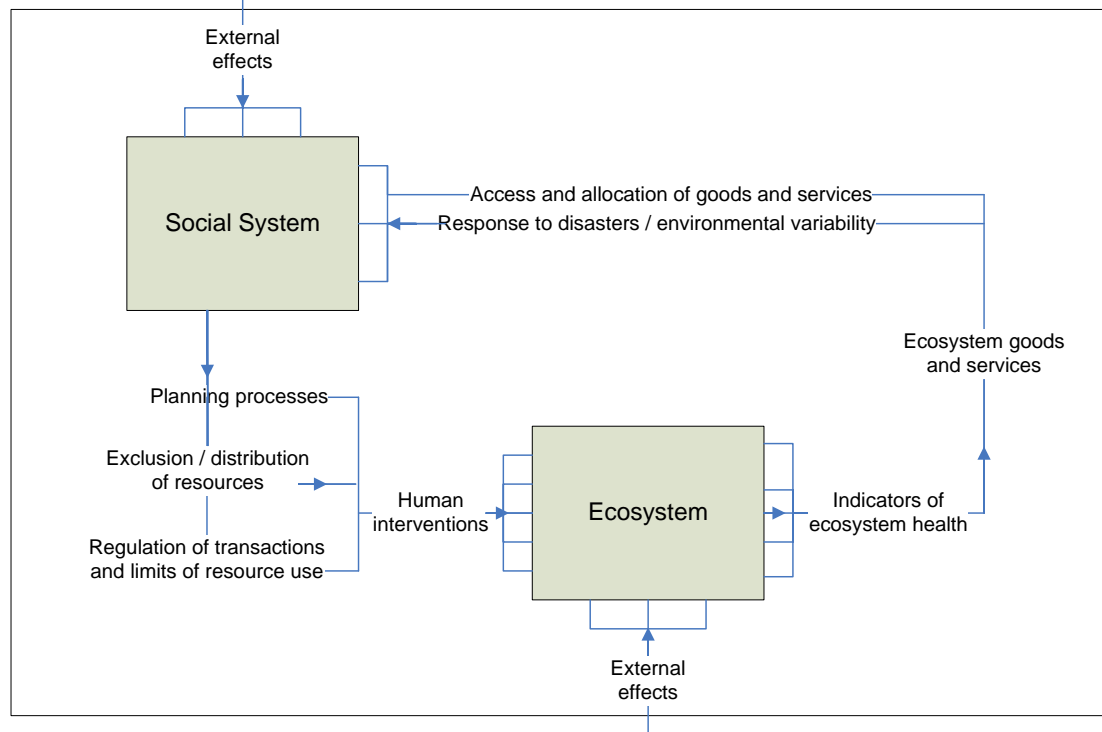


Figure 2 A systems view of the role of environmental impact assessment in social-ecological systems' governance

