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Seagrass meadows globally as a coupled social–ecological system: Implications for human wellbeing

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ABSTRACT

Seagrass ecosystems are diminishing worldwide and repeated studies confirm a lack of appreciation for the value of these systems. In order to highlight their value we provide the first discussion of seagrass meadows as a coupled social–ecological system on a global scale. We consider the impact of a declining resource on people, including those for whom seagrass meadows are utilised for income generation and a source of food security through fisheries support. Case studies from across the globe are used to demonstrate the intricate relationship between seagrass meadows and people that highlight the multi-functional role of seagrasses in human wellbeing. While each case underscores unique issues, these examples simultaneously reveal social–ecological coupling that transcends cultural and geographical boundaries. We conclude that understanding seagrass meadows as a coupled social–ecological system is crucial in carving pathways for social and ecological resilience in light of current patterns of local to global environmental change.

1. Introduction

There is growing understanding of the links between ecological systems and social processes. The dynamics of these intrinsically linked, 'coupled' systems are seen to be determined by the feedback loops operating among them (e.g. Holling, 1973; Folke et al., 2010). While there are different understandings of how the term 'coupled' can be understood, the term can, in the first instance, be used to refer to the links between natural and social systems. This is where the properties of social systems are in some sense linked to the properties of natural systems *on which the social system depends* (Adger, 2000). This understanding has been used to explore social systems that depend on a single ecosystem or a single natural resource, such as a mining or fishing community. Research has explored vulnerabilities in resource dependent economies and societies and exposed the links between natural resource depletion over time and economic decline within communities. This has highlighted the link between community decline and unsustainable methods of natural resource management (Adger et al., 2005; Baker, 2006; Liu et al., 2007).

Policy makers have also taken note of the relationship between ecological systems and social processes. The UN Millennium Ecosystem Assessment (MEA, 2005) and the more recent UK National Ecosystem Assessment (NEA, 2011), for example, have highlighted human dependence on ecosystems for life support, wellbeing and socio-economic development. Such reports have also stressed how vulnerable these systems are to change and degradation caused by certain human activities. The more recent focus on ecosystem services and their accompanying ecosystem assessments resonate with the perspective that society depends on natural systems, providing a way of looking at this relationship in economic terms. Despite advances in the understanding of the links between social processes and ecological systems, more in-depth, theoretical and empirical investigation is required.

It is well known that coastal and island communities provide a clear example of the interactions between societies and nature, where people both depend on the marine environment to provide their basic life needs and where the marine environment is proving to be highly vulnerable in the face of social pressures. However, less is known about seagrass meadows as examples of this coupled relationship. In addition, seagrasses are valuable ecosystem service

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