How the DPSIR framework can be used for structuring problems and facilitating empirical research in coastal systems

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Author:
Rebecca L. Lewison, Murray A. Rudd, Wissam Al-Hayek, et al.

Abstract

As pressures on coastal zones mount, there is a growing need for frameworks that can be used to conceptualize complex sustainability challenges and help organize research that increases understanding about interacting ecological and societal processes, predicts change, and supports the management, persistence, and resilience of coastal systems. The Driver–Pressure–State–Impact–Response (DPSIR) framework is one such approach that has been adopted in some coastal zones around the world. Although the application of the DPSIR framework has considerable potential to bridge the gap between scientific disciplines and link science to coastal policy and management, current applications of DPSIR in coastal environments have been limited and new innovations in the application of the DPSIR model are needed. We conducted a structured review of literature on the DPSIR framework as applied to the function, process and components of complex coastal systems. Our specific focus was on how the DPSIR framework has been used as a tool to organize sophisticated empirical scientific research, support transdisciplinary knowledge at a level appropriate for building understanding about coastal systems, and how adopting a DPSIR approach can help stakeholders to articulate and structure challenges in coastal systems and use the framework to support policy and management outcomes. The review revealed that DPSIR models of coastal systems have been largely used to support and develop conceptual understanding of coastal social–ecological systems and to identify drivers and pressures in the coastal realm. A limited number of studies have used DPSIR as a starting point for semi-quantitative or quantitative analyses, although our review highlights the continued need for, and potential of, transformative quantitative analyses and transdisciplinary applications of the DPSIR framework. The DPSIR models we reviewed were predominantly single sector, encompassing ecological or biophysical factors or focusing primarily on socio-cultural dimensions rather than full integration of both types of information. Only in eight of 24 shortlisted articles did researchers actively engage decision-makers or citizens in their research: given the potential opportunity for using DPSIR as a tool to successfully engage policy-makers and stakeholders, it appears that the DPSIR framework has been under-utilized in this regard.


Associated Project:
Tropical Coastal Resilience [9]

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