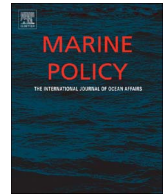




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Assessing the implementation of marine ecosystem based management into national policies: Insights from agenda setting and policy responses

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ABSTRACT

During the past decade, global environmental policy discussions have encouraged countries to engage in an ecosystem approach to managing the oceans. An ecosystem approach involves the integrated management of species, other natural services, and the multiple uses of the coast. Improving ecosystem based management efforts requires a better understanding of how it is included within national level policies that influence marine resource management. Chile has committed to implement international recommendations to include ecosystem based management. This study operationalizes an approach to assess the extent to which ecosystem based management is being implemented at national scales through the synthesis of agenda setting documents and national level policy/regulatory responses. The study specifically searches for ecosystem based management principles, as defined by the Convention of Biological Diversity in State of the Nation presidential speeches, national sectorial policies, national decrees and national programs issued between 1990 and 2014 (n = 1335 documents). Results show that although national level policies in Chile increasingly share common grounds with ecosystem based management principles, the overall approach is poorly mainstreamed into agenda setting speeches and reports. Working with existing institutional settings and institutional capacity are key features to maintain trajectories for the implementation of ecosystem based management in national policies. The approach presented complements research on marine policy implementation by effectively informing how national level policies can be analyzed under the lens of ecosystem based management.

1. Introduction

Humans increasing use of the oceans poses a number of challenges, including the formulation of equitable and sound governance mechanisms for the sustainable use of multiple marine resources [1–4]. In addition, the need to address competing uses has prompted numerous international efforts to consider options for managing multiple ecosystem services. Foremost among these is the concept of ecosystem based management (EBM, sensu [5]). The United Nations Convention on Biological Diversity (CBD) integrates ecological, social and governance objectives and describes EBM as: “a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way” [6]. While there is no single definition for EBM [see [7] for different definitions], most definitions stress that EBM is an integrated approach that considers links among living and non-living resources, involving the management of species,

other natural commodities/services, and humans as components of the ecosystem [8]. Despite variability on the terminology and specific emphasis used (i.e. Ecosystem based management, Ecosystem approach to fisheries, Ecosystem management, Ecosystem based ocean planning) the general merit of EBM approaches is that they include the interactions among ecosystem components, humans and the cumulative impacts of multiple activities, promoting conservation and sustainable use of resources [9].

During the past decade, environmental policy discussions around the world have increasingly encouraged an ecosystem approach to managing the oceans. EBM is currently dominating policy debates, global organizations such as the United Nations and FAO have established a series of recommendations which has made EBM an internationally recognized best practice for ocean governance [10,11]. The Convention on Biological Diversity developed 12 key guiding principles for EBM implementation which are considered critical to define

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Table 1
EBM principles developed by the Convention of Biological Diversity (CBD).

CBD Principle	Short Hand	Definition	Example of studies which use the principle ^a
1	Social choices	The objectives of management of land, water and living resources are a matter of societal choices	1,2,3,5
2	Decentralization	Management should be decentralized to the lowest appropriate level	1,2,3,4,5
3	Adjacent effects	Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems	1,2,3,4,5
4	Economic context	Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context	1,2,5
5	Conservation of functioning	Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach	1,2,3,4,5
6	Appropriate limits	Ecosystem must be managed within the limits of their functioning	1,2,3,4,5
7	Appropriate scale	The ecosystem approach should be undertaken at the appropriate spatial and temporal scales	1,2,3,4,5
8	Long term	Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term	1,2,3,4,5
9	Inevitable change	Management must recognize the change is inevitable	1,2,3,4,5
10	Balance use/ conservation	The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity	1,2,3,4,5
11	All relevant information	The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices	1,2,3,4,5
12	Multidisciplinary	The ecosystem approach should involve all relevant sectors of society and scientific disciplines	1,2,3,4,5

^a Numbers represent other studies where these principles have been considered as EBM elements: 1) [36] Grumble 1994; 2) [7] Arkema et al. 2006; 3) [37] Ruckelshaus et al. 2008; 4) [38] Ward et al. 2002; 5) Studies within a review performed by [39] Curtin & Prelezo 2010.

different elements that should be included in an EBM approach [12] [Table 1]. Concomitantly, EBM has become part of international conventions, has been supported by scientific consensus statements [13] and is becoming target of many national level policies [14]. In addition, EBM guiding principles are present in the majority of the 20 Aichi biodiversity targets subscribed by the CBD conference of the parties. In fact, target 6 explicitly states that “by 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided” [15] (<https://www.cbd.int/sp/targets/default.shtm>). Thus, EBM is internationally recognized as a best practice for ocean governance, acknowledged by multiple stakeholders, and to which 198 countries have formally committed.

Public policies and programs play an essential role in human–environmental interaction by providing guidance on priorities and practices of a country [16]. Therefore to be successful, EBM needs to be translated into concrete policies and actions at a country level [17]. Indeed, global policy discussions aimed at reducing marine impacts emphasize on the need to downscale international guidelines into national-level approaches [18]. In essence, there can be no EBM without partnership, ownership and inclusion of the concept in national policies [18,19].

A significant body of scholarship highlights the vital importance of examining consistency between international conventions guiding principles and national sectorial policies to draw lessons to support the implementation of emerging management strategies [20–23]. While much of this research relates to biodiversity, forestry and land use, there has been little research focusing on understanding consistency between international marine EBM guiding principles and policy implementation at a national scale [17,24,25]. This is unfortunate, as it is critical to synthesize the advances and ways in which EBM principles are being included into national agendas and the regulatory/policy response, in order to aid the effective implementation of the EBM governance challenge.

Chile has committed to implement international recommendations and agreements on the implementation of EBM [16,26]. In 1991, after returning to democracy, Chile implemented a new Fishery Law (Law No 18 892) which included definitions of industrial and artisanal fleets, five mile exclusive access to artisanal fisheries, individual quota systems, territorial user rights to artisanal fishers and the ability to create marine parks and reserves [27]. During the past 25 years fishery

management and conservation measures have been mainly implemented through National Decrees, Legal Regulations, International Treaties or Agreements, Conventions and Cooperation agreements and Public policy, plans and programs. In 2013, Chile passed a new Fisheries and Aquaculture Law (Law No. 20.657) which explicitly sets the objective of EBM (Articles 1b; 1c). In 2016 the Chilean government asked FAO to assess the Law, and their main recommendation was to pursue international recommendations and push for the further implementation of EBM [28] (FAO, 2016). Thus, it is particularly important to develop approaches which can help understand how Chile has internalized EBM, both in setting political agendas and in assessing regulatory responses which can allow to prioritize future policy development avenues which are consistent with international commitments to implement EBM.

The aim of this study was to systematically assess the presence of EBM principles in national fisheries and marine management policies by differentiating between their presence in agenda setting instances and in policy/regulatory responses [29]. The methodology is grounded by specifically exploring how EBM principles have become internalized in ocean governance in Chile. Results allow to identify progress, gaps and sources for further development of marine policy. The approach presented provides a more comprehensive understanding of how to address ways in which international commitments, regarding ocean governance, are being implemented. In this sense, while the study focuses on Chile, results are of significance for marine management and policy globally.

2. Methods

Data collection was conducted in the period running from December 2014 to July 2015 where a total of 1325 different types of documents concerning fisheries management and conservation were reviewed. Documents were analyzed using content analysis, which involved examining dominant themes within each document and identifying the presence or absence of each of the 12 EBM principles defined by the CBD [Table 1].

The publication period of documents ranged from March 11th, 1990 (return to democracy and re-writing of Chilean fisheries law) to December 31st, 2014 (approximately 2 years after an important reform to Chilean fisheries law during 2012–2013). Researchers who performed content analysis had prior training, experience and a systematic

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