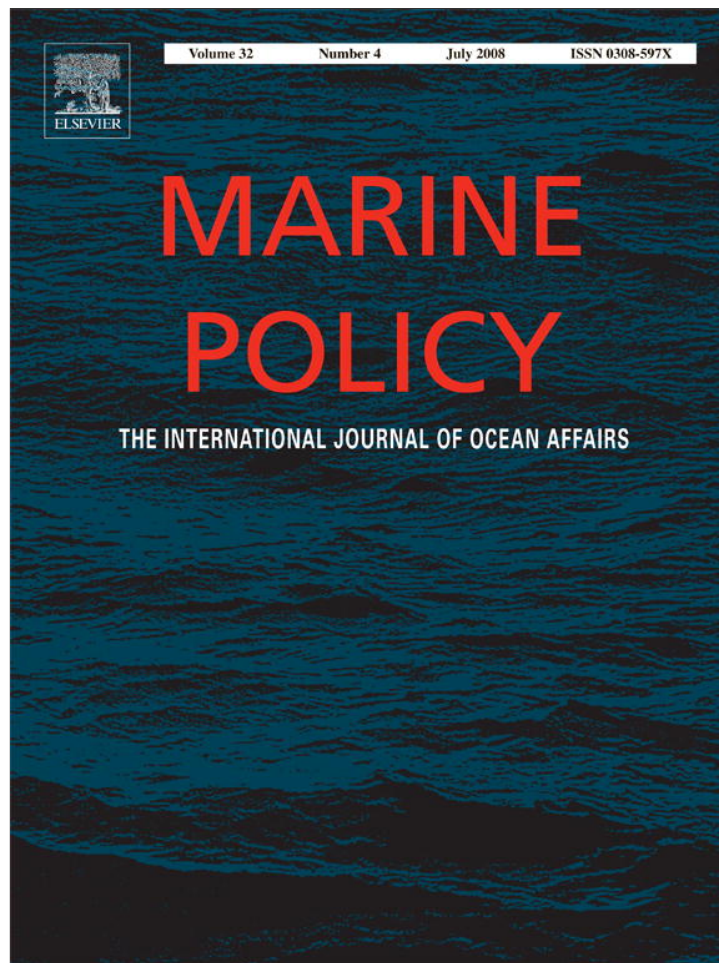


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Positioning fisheries in a changing world[☆]

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Abstract

Marine capture fisheries face major and complex challenges: habitat degradation, poor economic returns, social hardships from depleted stocks, illegal fishing, and climate change, among others. The key factors that prevent the transition to sustainable fisheries are information failures, transition costs, use and non-use conflicts and capacity constraints. Using the experiences of fisheries successes and failures it is argued only through better governance and institutional change that encompasses the public good of the oceans (biodiversity, ecosystem integrity, sustainability) and societal values (existence, aesthetic and amenity) will fisheries be made sustainable. © 2007 Elsevier Ltd. All rights reserved.

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1. Introduction

Marine capture fisheries face major and complex challenges: habitat degradation [1], poor economic returns [2,3], social hardships from depleted stocks [4], illegal fishing, and climate change [5], among others. Many fisheries are in a poor state [6], but some are managed successfully [7]. The key determinant of sustainability is governance—the ‘sum of the legal, social, economic and political arrangements used to manage fisheries ...’ [8]—including the incentives that promote marine conservation.

Positioning fisheries to conserve ecosystems and livelihoods requires much more than preventing overfishing. It involves institutional change that encompasses the public good of the oceans (biodiversity, ecosystem integrity, and sustainability) and societal values (existence, esthetic and, amenity). Insights from fisheries experiences, an understanding of factors that contribute to governance successes and failures, and incentive-based approaches [8–10] provide pathways towards enhanced public and private benefits. Collectively, they can stop overfishing, halt biodiversity loss, protect critical habitat, as much as double the global revenues from fishing [11], and if extended to developing countries that account for half of the total world exports [12]—can decrease food security risks and promote poverty alleviation.

2. Better governance

Sustainable fisheries need enforceable limits on exploitation, effective systems of decision-making, operations and management, and incentives and interaction among stakeholders to maximize the long-term contribution of fisheries to society. Some of these requirements (Table 1) are identified in the FAO [13] Code of Conduct for Responsible Fisheries (CCRF), and elsewhere [14].

Positioning fisheries in a changing world requires strong bridges of communication between the public sector and civil society, effective vertical and horizontal connections among stakeholders and coherent linkages across priorities. It also demands continuous adaptation to change: to ecosystem shifts, fluctuations in trade, and a growing awareness in society of the public benefits and other uses of marine ecosystems.

3. Impediments to change

Some fisheries have made successful transformations from overfishing to sustainability [15], but many have not.

Table 1
Requirements for good governance of marine fisheries

1.	Provide necessary information
2.	Deal with conflict
3.	Induce compliance with rules
4.	Provide physical, technical and institutional infrastructure
5.	Encourage adaptation and change to achieve sustainability

Successful transitions require addressing the following problems.

3.1. Information failures

Decision-makers—fisheries managers, politicians, and the fishing industry—often lack the understanding or the data to assess the trade-offs between the current and the better states. Change imposes risk and the possibility of losers, but too often the benefits of transitions and the costs of unsustainability are overlooked. For instance, the desire to protect fishing industry arrangements in Canada’s northern cod fishery hindered consideration of the social and biological consequences of maintaining excessive harvests that contributed to its collapse [16].

Mobilization of consumer preferences for sustainably produced seafood may also be susceptible to information failures in the form of mislabeling, lack of eco-labeling and/or disinformation. Moreover, without accurate source and chain-of-custody information [17], buyers and/or consumers cannot exert a positive influence on the fish supply chain.

3.2. Transition costs

Stakeholders can impede change that reduces catches, especially if the potential losers are powerful and if there are inadequate mechanisms to compensate losers. For example, the Philippines Fisheries Code took years to develop because of conflicts over the designation of inshore zones for small-scale fishers. In the North Sea cod fishery—shared by European Union countries—the spawning biomass has spiraled downwards because the total allowable catch has been set much higher than recommended by scientists. High-risk harvest decisions have occurred because decision-makers have found it difficult to allocate the costs of stock rebuilding among fishers and because management decisions are frequently based on political expediency [18] and timescales.

3.3. Use and non-use conflicts

Successful transition to higher public and private benefits must account for human–ecosystem interactions. Calculation of these gains, especially the non-market values of marine environments, requires ecosystem approaches within [19] and beyond fisheries [20]. Without integrated assessments and planning, the risk is that decisions over use and non-use—such as the establishment of marine protected areas or the location of oil and gas facilities—will be dominated by special interests.

3.4. Capacity constraints

Fisheries and their communities are nested within broader economic and social systems. Frequently, governance structures, especially in developing countries, do not have

the capacity to manage the economic and social transitions to new regimes or the ability to coordinate across sectors. For instance, structural adjustment to reduce fishing pressure may be impossible without economic diversification, financial intermediation, or social safety nets.

4. Greater public and private benefits

Institutional reform for the marine environment can grow both public and private wealth. Three examples described below demonstrate that there is no unique transition path to sustainability, pathways encounter obstacles, and that individual and/or community incentives are critical to success.

The exploitation of loco, a predatory snail, in Chile was initially regulated by a limited fishing season, but over-fishing eventually led to a harvesting moratorium. Territorial user rights in fisheries (TURFs) were introduced in 1997 [21] and have encouraged fishers to harvest locos at larger and more valuable sizes. Both public (proxied by

catch per unit of effort) and private benefits (proxied by catch) have also increased (Fig. 1a) following the establishment of TURFs.

In the Italian clam industry in 1997, the creation of ‘clam fish consortia’ gave fishers the authority to decide about management activities, and, coupled with a buyback of vessels and financing of clam restocking, has increased both public and private benefits. As a result, the number of vessels declined from 818 to 673 and income per vessel more than doubled from 1996 to 2002 [22].

In the Canadian Pacific halibut fishery (Fig. 1b), the creation of individual catch quotas in 1991 allowed fishers to harvest throughout most of the year and triggered a transition to greater public (proxied by the season length that is inversely related to ghost fishing from lost gear and accidents at sea) and private benefits (proxied by the landed value of the catch) [23]. These gains were a consequence of the individual quotas that allowed fish to be marketed fresh rather than frozen, raised net returns and increased safety at sea.

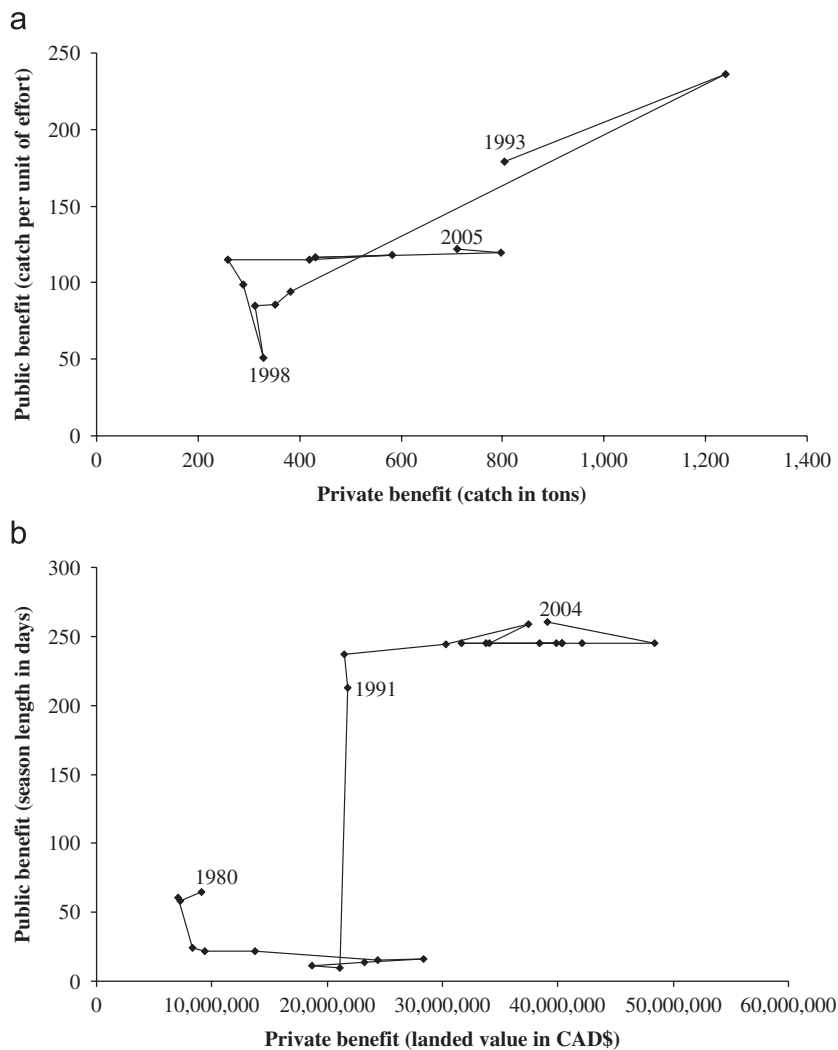


Fig. 1. Public and private benefits of the (a) Chilean loco fishery (Los Vilos region) and (b) Canadian Pacific halibut fishery.

5. Policy implications

Well-defined individual or community user rights that are accepted by stakeholders are necessary for better governance, but have failed to fully align private and societal incentives (especially for non-target species) to maximize public benefits. User rights have been allocated over species, e.g., through individual harvesting rights, or spatially, such as through TURFs, and allocated among individuals, communities or groups of fishers, but rarely defined in terms of explicit ecosystem outcomes.

Public benefits can be enhanced in many ways [24]: technical solutions to reduce by-catch (such as turtle excluder devices) fisher incentives (such as dolphin mortality limits used in the Eastern Tropical Pacific), and, wherever appropriate, enforcement of bans on gear (drift nets) or practices. Innovative approaches to achieve a balanced mix of public and private benefits can also be created from the 'bottom up' such as the Fiordland Marine Guardians in New Zealand, an alliance of conservation groups, commercial and recreational fishers, and native interests that developed management plans and reserves to protect the environment and harvest fish stocks [25]. Managers and fishers could also adopt successful conservation approaches from terrestrial environments, fishers could earn biodiversity payments by undertaking verifiable conservation actions or be assigned capped quantitative rights on habitat use [26] to generate measurable public benefits.

Successful transitions in Australia's Commonwealth fisheries stress the importance of clear lines of authority, transparency, stakeholder involvement, and full accountability by decision-makers and between government agencies and the industry [27]. Coherent management units, well-defined and accepted risk boundaries over operational decision-making, the legal authority to protect access controls, the capacity to implement conservation goals, and accountability are equally necessary.

Small-scale and mixed industrial/small-scale fisheries in developing countries have had more difficulty in promoting sustainability [28]. These fisheries make large [12] but ill-quantified contributions to food security and national economies, and require assessment tools to aid management. Governance also suffers from systematic failures in other sectors: building operational capacity, institutional change and the realigning of incentives within and beyond the fisheries sector are needed.

Governance problems are compounded when resources are shared across national boundaries or on the high seas. Regional fisheries management organizations (RFMOs) mandated to regulate such fisheries constrained by rigidities in decision-making, the unwillingness of states to assign them effective management responsibility, difficulties in assimilating new entrants, and the desire of coastal states to expand their fishing. Better governance requires entry limits to high-seas fisheries, effective monitoring, control and surveillance, improved implemen-

tation of conservation and management measures, and lower catches for over-harvested stocks. Consideration should also be given to allocation mechanisms that reduce the national and individual incentives to overfish, special allowances for developing coastal states, strategies to conserve biodiversity, and measures to reduce overcapacity.

6. Positioning fisheries

Marine capture fisheries are at a crossroad. Their governance must incorporate a broader vision that includes the creation of both public and private benefits and continuous adaptation to change within and beyond fisheries. Institutional change that aligns private with public interests and builds on the experiences of successful fisheries governance can position fisheries in a changing world to conserve marine ecosystems and sustain livelihoods. The potential gains include restored habitats, biodiversity conservation, larger fish stocks, greater returns to fishers and their communities, increased food security, and poverty alleviation.

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