

Food for thought

Economics, fisheries, and the marine environment

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Introduction

The importance of economics in explaining fisher behaviour and the overexploitation of fisheries resources has been well established. Fishing in anything other than a subsistence-based economy is an economic activity. The species that fishers target, the level of exploitation, and the gear that they use are all influenced by the benefits they receive (i.e. the revenue) and the costs they incur.

Fisheries management changes the set of incentives facing fishers, and in doing so changes their behaviour. In some cases, management imposes additional costs on their operation directly (e.g. limiting output, or inefficient technology mixes arising from input controls), while in other cases, costs are imposed indirectly through a new set of incentives created (e.g. displacement of fishers from one area has an impact on other fishers already operating in the areas to which they move). Changes in fisher behaviour not only influence the costs to the industry, but also may reduce the effectiveness of management itself when the expected outcomes are not achieved. As a result, assessment of the economic consequences of changes in fisheries management is becoming commonplace internationally.

However, the policy environment in which fisheries management operates is changing. The ecosystem approach to management by necessity requires consideration of all activities that take place in the marine environment. New policies are evolving that are broader in their consideration than just fisheries management. In such a policy environment, there is an even greater need for economic input.

The evolving marine policy environment

There is a growing policy shift internationally away from sectoral management of fisheries to more integrated

management of the marine environment. The rationale for this shift is the need to recognize the interdependencies between the multiple activities that compete for ocean space (capture fisheries, aquaculture, shipping, offshore exploration, etc.), and the need to account for the impact one sector may be having on another. For example, commercial fishing affects the catch of recreational fishers, and offshore windfarms displace fishing activity. In practical terms, the move from a sectoral to an integrated policy puts a much greater emphasis on marine spatial planning.

Such policies have already been developed in Canada (the Oceans Act 1997) and Australia (the Ocean Policy 1998), and have been proposed for the USA by the US Commission on Ocean Policy. In the United Kingdom, the proposed Marine Bill will introduce a streamlined system for planning and managing activities and developments in coastal and marine waters, and will extend the scope for protecting and restoring marine species and habitats ([Office of the Leader of the House of Commons, 2005](#)).

The development of integrated management of the marine environment is also being driven by several international conventions. For example, the 2002 Johannesburg World Summit for Sustainable Development and the 2004 European Habitat Directive both require the development of a network of marine protected areas to ensure biodiversity ([Barange, 2005](#)).

The role of economics in the management of the marine environment

The move to integrated management of the marine environment requires the involvement of a broad range of stakeholders. They include fishers, conservation groups, recreational users of the marine environment (e.g. divers and anglers), the energy sector, and coastal regional development agencies.

These groups have different objectives, and place different values on the components of the marine environment.

Economics provides an important framework for the management of the marine environment by potentially providing a common numeraire for the different stakeholder groups. Spatial marine planning is essentially involved in the process of resource allocation between competing users. The benefits to an area in maintaining or enhancing biodiversity need to be compared with the cost of forgone previous activities in the area. These costs and benefits may be direct or indirect. For example, excluding marine aggregate dredgers from an area for conservation purposes will result in economic impacts both directly (e.g. the potential loss of revenue for the marine aggregate businesses excluded from the area, and the non-market benefits of improved biodiversity) and indirectly (from potential improved fishing income if the protected area improves commercial stocks that spill-over out of the protected area). Where similar environmental benefits can be realized from differing approaches, then the economic impact of such differing approaches on the other users of the resource becomes a crucial factor.

Coastal development results in potential externalities for the offshore users of a resource that also need to be taken into consideration. In particular, coastal development will result in changes in the demand for coastal and marine environmental services, particularly through recreation. This is likely to result in increased conflict with current users of resources. In the USA, several states have banned in-shore commercial fishing activity in response to a growing recreational demand accompanying coastal development.

Valuing the different uses of the marine environment is essential in order to ensure optimal allocation of the resources between competing sectors. Valuation of non-market environmental services (e.g. the conservation value of biodiversity) is an area well established in the terrestrial environment, but it has had little attention to date in the marine environment.

The role of economics extends beyond the valuation of different activities. As with fisheries management, management of the marine environment will change the incentives facing different stakeholder groups, so changing their behaviour. Economics can play a role in assessing the likely outcomes of different management options on the varying groups, based on the incentives they create. Further, economic instruments (e.g. rights-based management, user charges) may provide an appropriate means of ensuring efficient allocation of the resources between such competing groups.

Finally, the need for economic analyses in fisheries will also increase as a result of the changing policy environment.

Implications for economic analyses in fisheries

A key element of integrated management of the marine environment is spatial planning. As a result, there will be

increased emphasis on spatial management within fisheries. Fisher behaviour, particularly spatial effort allocation, will become an increasingly important consideration when assessing potential area closures for other uses. This is an area of research that is already drawing considerable interest, largely driven by the increasing use of marine protected areas as conservation and management tools.

Other areas of economic input into fisheries management currently being provided will still be required in the integrated system, but the assessment of the impacts of management changes may need to be extended to other sectors as well as to the fishing industry. As a result, fisheries bio-economic models that contain both a spatial component and issues relating to other sectors that potentially interact with the fishery will need to be developed.

The need to compare directly the value of fisheries with that of other marine activities will also have implications for the role of economists in fisheries management. Much of the potential value of fisheries is dissipated through ineffective (from an economic perspective) management. Managers largely justify lower levels of economic profit as a consequence of achieving other objectives (e.g. maintaining employment). However, there may be increased pressure to move to more economic levels of harvest (e.g. closer to the maximum economic yield, or to a level of exploitation that maximizes economic profit in the fishery), because sub-optimal managed fisheries will not compare well with a potentially valuable recreational fishery or even a marine reserve for biodiversity purposes. Further, as alternative uses of the marine environment may also contribute to employment either directly (e.g. development of wind-farms) or indirectly (e.g. through associated recreational activities), maintaining employment in fisheries becomes a less relevant justification for excessive effort levels. Consequently, determining economically optimal effort levels and yields, and mechanisms through which they can be achieved efficiently, will become increasingly important in fisheries management.

Concluding comments

The impact of fisheries economists on fisheries management to date has been highly variable. In the past, many fisheries were managed primarily on a stock conservation basis, and the economic impact of management measures was at best a consideration, but rarely a driver of policy decisions. Fortunately, this has changed in recent years, with economics playing a much greater role in fisheries management in many countries.

With the move to integrated management of the marine environment, the involvement of economists is unavoidable. Marine spatial planning is concerned with the optimal allocation of marine resources for the benefit of society. Economics provide a framework for such an optimal allocation of resources. It provides an approach to valuing the

different activities, allowing trade-offs between activities to be assessed and impacts to be measured in a consistent manner.

The change in the policy environment will also require a change in the focus of fisheries economists. As with policy, fisheries economists will need to evolve into marine environmental economists. Research will be needed on ways to adapt terrestrial environmental economics methodologies to the marine environment, and on developing new methodologies where necessary. New economic models for fisheries management within a broader marine environment will also need to be developed. Economists will need to learn to work effectively not only with fisheries scientists, but also with other biological and physical scientists involved in

the marine environment. I have no doubt that there are exciting times ahead!

References

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