

# When it comes to the Sustainability of Marine Resources, Institutions Matter

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Humanity has had a substantial impact on marine resources, especially in the past two hundred years. In the nineteenth century, increased demand for oil (for lighting and lubrication) led to a dramatic expansion of whaling fleets around the world. Competition drove the development of more effective whaling technologies. Under normal circumstances such improvements would bring social benefits. But because the whales were for the most part in an open access commons, whalers were competing to capture the same whales, so the increase in the whaling fleet and increased expenditure on technology led to rising levels of waste, declining total factor productivity – and a decline in the number of whales (Davis et al., 1997). Had it not been for the development of substitutes, especially mineral oil, the plight of the whales might have been even worse.

During the twentieth century, fish stocks, which were once seen as inexhaustible, began to suffer the same fate as the whales. Indeed, as De Alessi (this issue) observes “The issue is not whether depletion [of fish stocks] is a widespread problem, but just how bad things have become, and what might be done to fix the problem.” To the latter, De Alessi points out that “It is now well established that most fishers who depleted resources were simply responding rationally to the rules of the game presented to them.”

Yet as Hannesson (this issue) notes, it is 97 years since the publication of Jens Warming’s “Om Grudrente av Fiskegrunte” (“on Rent of Fishing Grounds”) and 54 years since the publication of H. Scott Gordon’s “The economic theory of a common property resource: the fishery.” These and the many subsequent papers they inspired show that, in the absence of appropriate “rules of the game”, or “institutions” as economists call them, there is a tendency for fishers to over-invest in gear and thereby to dissipate the rents that otherwise would be available from fishing. In other words, although we have known for a very long time that the institutions

governing use of marine resources are in most cases inadequate, if not counterproductive, the shift towards better institutional structures has been slow.

Why might this be? Gary Libecap (1989) analysed various historical examples of changes in institutional structure, from which he derived the following list of factors that affect the “intensity of political conflict over distribution issues and the likelihood of agreement on institutional change” at any particular time. These included: “The size of the aggregate expected gains from institutional change.” “The number and heterogeneity of the bargaining parties.” “Information problems.” And “The skewness or concentration of the current and proposed share distribution.”

Most likely all these factors have to a greater or lesser extent affected whether or not nations shifted to superior institutions for the management of marine resources. It is noteworthy that the two countries which have arguably most dramatically improved the institutions governing their fisheries, Iceland and New Zealand, also derive a relatively large proportion of national income from fisheries. This suggests that it may not be just the absolute size of the expected gains from institutional change that matters, but also the size of those gains relative to other political changes.

Michael De Alessi (this issue) offers a complementary explanation for the failure to adopt better institutions: the lack of acceptance by many of those with influence, especially in the realms of fisheries science, of the important role played by the institutions governing marine resources, combined with a bias on the part of government officials in favour of ‘scientific’ management of fisheries.

While some nations seem to have adopted better institutional structures for managing marine resources than have others, none can be said to be perfectly “sustainable”. Part of the problem is that because of inadequate data and imperfect models it is difficult to define

even what a biologically “sustainable” fishery would look like (De Alessi, this issue). The acquisition of better data is clearly a high priority (Ausubel, this issue). But what data one seeks to acquire and whether one has the incentive to acquire that data in reliable ways will likely be significantly affected by one’s goals and the resources available – and hence by the structure of the institutions governing the marine resources.

Rögnvaldur Hannesson (this issue) compares and contrasts several instances of fisheries collapse and shows that both exogenous factors (such as El Niño/La Niña) and the way in which the fishery is governed are important. One important lesson is that fisheries that allow more adaptive management tend to suffer less in response to exogenous changes; and fisheries that do collapse as a result of such exogenous changes rebound far more quickly. In part this may be because the data upon which decisions are based are less subject to political manipulation. Likely more important is the degree to which decision-making is carried out by individuals with a strong interest in conserving the fishery.

A plausible explanation as to why the majority of fisheries in Iceland and New Zealand have not collapsed is that boat owners now have very strong incentives to ensure that total catch levels are kept low enough to ensure the continued health of the fishery into the future. These incentives come from the fact that they own quota, which represents a share of the total catch, and these quota are tradable; as a result, the value of the quota is dependant on the value of future catches (Gibbs, this issue; Arnason, this issue; De Alessi, this issue; Hannesson, this issue). By contrast, in the EU, Canada and many other places where major fisheries have collapsed, boat owners do not have the same incentives because they have no guarantee that their share of the catch will remain the same in the future: so, perversely, each boat owner has an incentive to demand catches be as high as possible each year, regardless of the impact on future catch levels.

While tradable share quota systems have done much to improve management of fisheries in many places, they remain far from perfect. Mark Gibbs (this issue) highlights both the benefits and some of the problems with the existing quota system in New Zealand – and more generally. In particular, he emphasises the problems that can result from the fact that quota apply to individual species and so do not necessarily represent an ideal way to manage ecosystems. He also raises the possibility that if the rights created by the establishment of the quota system inhibit the development of superior rights systems –for example the establishment of clearly

defined property rights in the ocean itself – then they might ultimately be seen as counterproductive.

Ragnar Arnason (this issue) shows that when individuals are allowed to own the rights to a share of the total allowable catch, not only do they have greater incentives to conserve those fish, but their shares can act as collateral for other investments, leading to a virtuous circle of economic development. That this happens in the context of land and other forms of ‘real’ property has been long established (e.g. de Soto, 2000) but it is of great interest that it appears also to be true for share quota in fisheries.

The several contributions to this issue provide important insights into what might lead to greater sustainability of marine resources. The conclusion? Institutions matter – as do the incentives for institutional change.

## References

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