

## GLOBALIZATION – HAS IT HELPED OR HINDERED IN MANAGING FISH STOCKS SUSTAINABLY?

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### ABSTRACT

While there have been substantial benefits to fish trade and the fishing industry from the opening up of markets, deregulation and greater flexibility in how and where companies can operate, this may have come at a significant cost when it comes to managing fish stocks sustainably. Globalization has facilitated the catching, processing and marketing of fish however we frequently have little or no idea where the fish was caught, how sustainable the catch is, and where it has been before it enters the final market. Fisheries management by its very nature requires significant regulation. Regulation is aimed at addressing market failure. Well-resourced domestic fisheries management will result in sustainable fisheries and agreed environmental outcomes. Catches from the high seas present a vastly more complex picture. Despite attempts over many years to manage high seas stocks the record is not good. Globalization has in many cases facilitated the development and use of loopholes in international arrangements providing access to flag States who are not party to key agreements and allowing companies to set up in these countries often with little or no transparency. This environment presents a significant policy challenge for fisheries managers and the international community. How do we get economics to reinforce the fisheries management arrangements we need? There are significant policy gaps which need to be explored and responses developed. It may be time for a significant shift in thinking about the rights and responsibilities of those who access fishery resources.

**Keywords:** Globalization; sustainability; fisheries management; trade; illegal; unreported and unregulated fishing

### INTRODUCTION

Globalization is not new. Effectively it is a gradual evolution in technology and the way we interact with each other that has characterized human development. What is new and, what has generated the term ‘globalization’ is the increase in the speed of that evolution over the last 40 years and the ‘effective reach’ of the changes. In relation to fishing, over that time, the way we catch, process, transport, market and manage fish has changed dramatically.

The literature on globalization and fisheries shows that globalization means different things to different people. For many, it appears that every characteristic of fisheries production, management and trade is a result of globalization, while others define the concept much more narrowly. In addition to the definitional issue, it is quite difficult to unravel the current and emerging developments and trends in the fisheries sector to determine which are in fact attributable to globalization. For the purposes of discussing the net impact of globalization on the sector it is useful, therefore, to outline the key elements of globalization that have affected the fisheries sector and in particular, those elements that have affected, or have the potential to affect, the sustainability of fisheries. The first section of the paper discusses those elements. That is followed by a discussion of how these impacts have manifested themselves and an analysis of the implications for future management of an increasingly vulnerable, common property, renewable resource.

## **ASPECTS OF GLOBALIZATION**

The last forty years have seen dramatic and substantial changes in our concept of the oceans as an inexhaustible source of protein, in the laws which govern the use and exploitation of the oceans, in the technology available to the fishing industry to harvest fish resources, in the catch and trade of wild caught fish and in the demand for and consumption of seafood resources.

With the development of the United Nations Convention on the Law of the Sea (UNCLOS) coastal States commenced the process of declaring Exclusive Economic Zones (EEZs) which, where possible, extended their jurisdiction out to 200 nautical miles and allowed them, in many cases to exclude or significantly limit distant water fishing fleets from accessing the resources within these zones. This combined with improvements in fishing technology and fishing power, and encouraged by perverse economic signals (in many cases significant subsidies for shipbuilding and fishing), led to an explosion of fishing capacity and effort.

Rapid advances in fishing technology have allowed fishing operations in areas and at depths not previously possible. The widespread availability of global satellite navigation systems (such as GPS) have enabled fishers to repeatedly return to high catch areas and real time sensing information now enables them to more accurately and successfully target fish stocks. Modern day vessels are able to spend prolonged periods at sea, transferring their catch to reefers or accessing resupply vessels and thus minimizing the downtime and costs for the vessel.

These developments coincided with a dramatic freeing up of world trade. Trade barriers were substantially reduced or dismantled and fish and fish products became widely traded commodities. With not only fish production but also processing and packaging increasingly spread around the world and connected via transborder supply and delivery networks, the international seafood business has become extremely complex. Rising trade values and volumes for fish commodities reflect the increasing globalization of the fisheries value chain in which production and processing is being outsourced to Asia (China, Thailand and Viet Nam) and to a lesser extent Central and Eastern Europe (Poland and the Baltic countries).

The link between producers and processors in exporting countries and the wholesalers and retailers in importing and consuming countries, has in the past frequently been served by intermediaries such as brokers and agents. Improved communication technology has facilitated contact between producers and end-users, thereby limiting the role of the intermediary. During the same period we have witnessed a dramatic increase in the quantity of information and the speed with which it can be exchanged. The market for fish and fish products operates around the clock and is dynamic, reflecting the nature of the global fisheries industry (information flows quickly both up and down the value chain).

Along with these changes, we have seen a substantial freeing up of financial markets and, in many countries deregulation relating to who can invest in fishing operations and joint ventures and, more generally, who can establish business. This has allowed operators seeking to maximize profits and to minimize the regulatory environment within which they operate to move to countries offering such environments. It has also facilitated the establishment of companies which obscure links to their beneficial owners.

However, experience has shown that as a common property resource, fisheries require regulation if they are to be sustainable in the longer term. While some aspects of the financial environment in which fishing operates were being de-regulated, there has been increasing regulation of fishing itself in order to rebuild or prevent overfishing of fish stocks. This in itself has provided an incentive for fishers to take advantage of poorly regulated fish stocks and to flag their operations to countries which have not ratified and

implemented key international laws and agreements and pay little heed to their responsibilities for managing vessels flying their flag. Globalization has facilitated access to such flags and the ease with which the flag can be changed as well as increasing the difficulty of identifying and tracking product taken in contravention of management measures.

## **A GLOBALIZED SEAFOOD INDUSTRY**

Total trade in fish products has continued to expand, mainly as a result of increased aquaculture as wild catches have remained more or less static over recent years. In 2007, the contribution of aquaculture to the supply of fish and fishery products for human consumption (excluding fish meal) is estimated to have reached 46 percent of total production. The value of world exports of fish and fish products grew by nearly 7 percent in 2007 to US\$92 billion. The proportion of world fish production (145 million tonnes) that is traded internationally now represents 38 percent of the total, or 55 million tonnes. Developing countries provide about 50 percent of all fish exports. Their net export revenues from this trade have reached US\$25 billion. Imports are mostly by developed countries, now responsible for 80 percent of all imports in value terms (US\$96 billion) [1].

Demand for fish and fish products continues to grow with the increasing awareness of the health benefits associated with eating fish in developed countries and rising per capita income in some key developing countries. According to figures from the Food and Agriculture Organization of the United Nations (FAO), world per capita consumption of fish and fishery products has risen steadily from an average of 11.5 kg during the 1970s, to approximately 16.8 kg today. There are however large regional differences in fish consumption per capita. In China, domestic consumption of fish and fishery products per capita has risen from less than 5 kg in the 1970s to the present 26 kg., while Asia, excluding China, consumes 14.3 kg per capita, Europe 19.9 kg, North and Central America 18.6 kg, South America 8.7 kg and Africa 8 kg.

However, the reality of world fish stock status sits uncomfortably with a growing world population, increasing affluence in developing countries and increasing demand in developed countries. Although the proportion of the world's marine fish stocks rated by the FAO as overexploited or depleted has remained relatively stable over the past 15 years, the FAO states that the status of certain highly migratory and high seas species "is cause for serious concern". The information available in the most recent FAO State of World Fisheries and Aquaculture (SOFIA) [2] report indicates that the capture potential of the world's oceans has most likely reached its ceiling.

The SOFIA Report states that of the stocks monitored by the FAO, 25 percent are overexploited, 17 percent depleted, but the picture is bleaker for straddling and high seas stocks where the report finds that between one half and two-thirds of these stocks are overexploited or depleted. These figures may well underestimate the problem as the report notes that the monitoring of fish captures in high seas areas is inadequate. Those catch figures that are reported, come from fisheries covering very large areas, this makes accurately assessing the state of specific high seas stocks difficult.

This situation points to a growing disparity between the long term demand for seafood and the capacity to supply that demand. There are a number of reasons for that imbalance but most reflect a failure to manage stocks effectively.

First and foremost these stocks are a global common property resource and one which with changes in international law over time has resulted in coastal States having custodianship of stocks within large areas, by virtue of the declaration of EEZs. In theory this should have improved the management of these stocks, yet the above assessment of the status of fish stocks suggests otherwise.

In addition, there are many stocks which are either discrete high seas stocks (e.g. toothfish, orange roughy) or which migrate the world's seas (e.g. tunas). Increasingly, the international community has demanded that more be done to sustainably manage these stocks on an ecosystem basis and to adopt a precautionary approach to harvest limits. Many treaties, agreements and processes have been developed to pursue these outcomes. However, while a plethora of multilateral arrangements have been developed and implemented over time to safeguard migratory and high seas stocks their application has been at best variable and has resulted in few examples of sustainably managed stocks. This in part reflects the right to fish on the high seas which is firmly established in Article 116 of UNCLOS. International law has underlined the status of the high seas as a global commons to which individual sovereign states have been universally assigned access together with national responsibility for management and enforcement.

With demand increasing and supply of wild caught fish unable to match demand, the price of sustainably caught fish is continuing to rise. However, consumers are being offered a range of cheaper but potentially unsustainable wild caught and aquaculture products. The main reason for the price differential appears to be the difference in the environmental and sustainability standards being set and in some cases the availability of cheap inputs, particularly labour.

While there is a growing range of eco-labels which provide guidance to consumers as to the management and sustainability of fish products these do not currently represent a significant proportion of the overall fish market. In addition, eco-labelling imposes a range of additional costs which are passed up the value chain to the consumer. This further highlights the price differential between sustainably managed fisheries and those which might have much lower standards and/or little or no management. A further additional pressure on the supply side, linked to more stringent management, is the rebuilding of currently overexploited and depleted fished stocks. Reviewing all these factors suggests that in the production of these cheaper fish products the market is failing to reflect the full (environmental and other) cost of production. For example, the 'aquaculture solution' to the demand/supply imbalance may not prove to be sustainable if all the environmental cost associated with the impact on wild fish taken for aquaculture feed and the impacts of aquaculture operations on the local environment are taken into account.

It is also worth reflecting briefly on the input costs associated with the take of wild caught fish. Capital and labour are two significant input costs in harvesting fish resources. Subsidised fishing vessel construction and operations have provided perverse economic incentives to operators resulting in far greater fishing capacity than is required to sustainably harvest fish stocks. In a globalized world this capacity has moved freely, and together with an abundant supply of cheap labour from developing countries, has facilitated access to fish stocks at costs well below what might otherwise be expected. With limited and reducing access to formally managed fisheries these operators and vessels have looked for other fishing opportunities and having little or no other options many have found themselves involved in illegal, unreported and unregulated (IUU) fishing activity.

## **HAS GLOBALIZATION HELPED OR HINDERED**

The literature relating to globalization in fisheries identifies a wide range of benefits and costs. Associated with these are questions related to their distribution and to whether the benefits, in particular, can be sustained in the longer term. The benefits and costs include:

### Benefits

- the development of international laws and protocols and best practice principles in support of sustainable fisheries management
- the development of regional governance frameworks for shared fish stocks
- the transfer of skills and expertise in fisheries science and management
- the development and transfer of new technologies for the monitoring of fisheries and for the mitigation of adverse environmental impacts
- increased consumer choice of seafood products, particularly in developed economies
- access to cheaper, imported fish supplies, particularly in developed economies
- the development of globally recognized eco-labelling schemes for fish products
- increased export income and employment and income generation opportunities in developing countries from wild harvest fisheries, aquaculture and processing activities
- pressure for removal of barriers to free trade
- pressure for removal of price-distortionary practices such as subsidies
- the exercise of comparative advantage, e.g. those economies with ample supplies of low-cost labour have a comparative advantage in processing and packaging fish products
- improvements in the quality and value of fish landed due to health, hygiene and quality standards

### Costs

- increased pressure on fish stocks that are not subject to sustainable management
- increased aquaculture production with attendant issues associated with environmental impacts, high inputs of wild caught fish as fish food etc
- reduction in the bargaining power of smaller producers as a result of increased concentration of retail power
- increased carbon footprint associated with transport of fish products
- reduction in food security in developing countries as fish stocks become overfished and as high protein fish products are diverted from domestic markets to higher priced export markets and as the price of fish domestically rises, it is put out of reach of sectors of the local population
- facilitation of IUU fishing through increased access to flags of convenience, access to ports, opportunities for transshipment, capacity to stay at sea for longer periods etc
- obscuring of beneficial ownership of companies and vessels
- changes in the distribution of the economic and social benefits available from fisheries production and trade reflecting concentration of ownership of fleets, processing capacity and retail outlets
- increased risks of transfer of foreign, invasive marine species, disease as a result of mobile fishing fleets and imports
- development and adoption of new fishing technologies which increase pressure on fish stocks and the broader ecosystems which support them
- increased use of subsidies to facilitate the participation of fleets in servicing global demand for product leading to distortion in the prices at which fish can be caught and sold, inequities in access to both fish and markets and increased pressure on fish stocks.
- greater uncertainty about the source of products, the sustainability of the fisheries from which they are sourced and the route that products have taken before they reach the final

- consumer
- increasing costs and challenges associated with meeting the quality and sanitation standards required by foreign markets

This paper is concerned predominantly with the net impact that globalization has had on the sustainability of fish stocks. While benefits associated with consumer values such as quality, price and hygiene standards, are obviously significant they are not the focus of this paper. Likewise, the costs associated with meeting those standards and the redistribution of wealth arising from globalization are not central to this discussion. Costs associated with the carbon footprint of fisheries processing and trade flows have not been discussed in detail here although they are the subject of a specific paper to this forum.

### **The benefits of globalization**

From the list above, those with the potential to have a direct, positive impact on sustainability are:

- the development of international laws and protocols and best practice principles
- the development of regional governance frameworks
- the transfer of skills and expertise
- development and transfer of new technologies
- the development of eco-labelling schemes
- removal of subsidies

There is little doubt that there has been a substantial increase in the guidance available on sustainable management of fisheries over the last 15 years. The United Nations Fish Stocks Agreement was central to the development of a myriad of internationally agreed standards and protocols to manage fish stocks and, more broadly, marine ecosystems, sustainably. The messages and requirements of international laws and protocols have been disseminated widely through global institutions such as the FAO and through the development of regional fisheries bodies. Access to this information, and discussion on these issues, have been facilitated through the global uptake of communications technology such as the internet and the increasing ease of international travel. There remain however, severe impediments to the implementation of sustainable fisheries management in both domestic and regional fishery settings. The full benefits of this aspect of globalization are yet to be fully realized.

Regional governance frameworks, namely regional fisheries management organizations, reflect the need to manage highly migratory fish stocks for the benefit of those coastal States through which these stocks migrate and for those high seas fishing States whose fleets rely on these resources. While these bodies have the legal foundation to support effective and sustainable management, they have in large part failed to deliver this.

Regionally, lack of political will reflecting narrow national interests, a failure to implement precautionary and ecosystem-based management, IUU fishing and a decreasing supply of resources to sustain the available fishing capacity have combined to prevent the full benefits of RFMOs being realized. At the domestic level these same factors together, in some cases, with poor governance frameworks and a lack of human and financial capacity to implement and enforce effective fisheries management regimes are largely responsible for the failure to manage fish stocks sustainably.

Globalization has facilitated the spread of skills, expertise and new technologies that support sustainable fisheries. Access to developments in scientific assessment and monitoring processes, in effective and

innovative fisheries management practices and in the development of technologies that mitigate ecosystem impacts of fishing has increased markedly in recent years. Cost-effective transport and communication technologies now enable the speedy dissemination of skills, expertise and technology. However, there appears to be reluctance, at both the regional and domestic level, to learn from experience and to adopt proven techniques. Rather, there is tendency to use research and development of management approaches as delaying tactic to implementation of effective management. This approach usually results in management action being taken only after stocks are overfished.

Eco-labelling schemes can be viewed as a response to globalization. Increasing concern for the status of domestic fish stocks and the increased uncertainty about the sustainability of the fisheries from which the increasing proportion of imported products are sourced, has prompted the development of a number of eco-labelling schemes. Such schemes have also been embraced by retailers who wish to improve their environmental credentials. Eco-labelling schemes are intended to provide consumers with the ability to choose products that are from sustainable fisheries as well as provide a market incentive for fisheries to improve their sustainability. There is little doubt that this is a positive development. However these schemes still apply to a relatively small proportion of internationally traded seafood, do not apply to aquaculture products which are an increasing proportion of traded seafood, and are outside the reach of many of the less-well managed fisheries from which imports are sourced. As noted above, such schemes impose costs on the fisheries seeking certification and require the capacity to implement and enforce effective management.

At the same time there is a trend, with a view to promoting sustainable fisheries management, to implement measures at the national level to prevent catch from IUU fishing operations and from fisheries that have, for example, unacceptable impacts on non-target stocks, from reaching domestic markets. These responses highlight the role that trade and access to markets play in encouraging and facilitating overfishing and the potential role for market States in addressing this issue. Globalization has enabled the diversification of the players involved in fisheries management to include port and market States in addition to the traditional role played by flag and coastal States.

Globalization has been accompanied by increasing calls for a fair and equitable trading environment for many food products, including seafood. The removal of tariff barriers and the removal of subsidies that provide some fleets with an unfair advantage and which provide the incentive for increased fishing capacity, when the opposite is required, have been an important part of the ongoing World Trade Organisation discussions in relation to fisheries. There is some way to go before these discussions are likely to result in a discernible reduction in global fishing subsidies. In addition, there is pressure from developing countries to be allowed to use subsidies on the grounds that developed countries have used them and 'now it's our turn'.

### **The costs of globalization**

It is clear that globalization has provided opportunities to improve the sustainable management of fisheries. To date those opportunities have not been fully exploited. In addition, the costs associated with globalization are not being adequately contained. From the list of costs identified above, those which have a potentially direct, negative impact on the sustainability of fish stocks include:

- increased pressure on fish stocks that are not subject to sustainable management
- environmental impacts and impacts on wild caught fish arising from increased aquaculture production
- increasing uncertainty about the original source, the sustainability of that source and the nature of the value adding chain of products offered to consumers
- facilitation of IUU fishing

- development and adoption of new fishing technologies
- increased use of subsidies

As discussed above, global demand for seafood is increasing as a result of population growth, increasing incomes in some major economies and an increased focus on the health benefits of seafood in developed economies. At the same time supply of fish from many of the world's major fisheries has declined due to unsustainable management. Developing countries now provide around 50% of fish exports. Yet these countries are least well-placed to implement and enforce sustainable fishing and aquaculture regimes.

As noted above, consumers in developed economies, are purportedly concerned about the sustainability of their seafood and this has led to the use of eco-labelling as a means of informing consumers and giving them confidence in their seafood choices. Yet demand for imported seafood, either from wild harvest or aquaculture, for which there is little or no information on sustainability, continues to grow. In reality, it appears that most consumers base their purchasing decisions predominantly on price. In Australia, for example, domestic prawns from sustainably managed fisheries, are struggling to compete with imported prawns from fisheries with little or no environmental safeguards in place or from aquaculture enterprises which have little or no regulation of their management practices.

Consumers generally appear to believe that aquaculture products are a sustainable alternative to wild harvest product. There is little recognition of the heavy cost that aquaculture places on wild harvest fish for feed or of the environmental impact of unregulated aquaculture enterprises. Thus, global demand, whether because it is uninformed or because it simply prioritises price over sustainability, continues to drive unsustainable fishing practices.

Globalization has facilitated the development of IUU fishing and the marketing of IUU catch. Ready, electronic access to flags of convenience has facilitated IUU fishing by allowing the switching of flags at will. Technology and communications have allowed vessels to stay at sea longer, to transship at sea and to coordinate and take advantage of opportunities to land IUU product. The practice is driven by failure to address overcapacity, strong demand and high prices for seafood and lax governance and port control. In addition, the capacity to track traded fish products remains difficult apart from the relatively small proportion of products subject to chain of custody certification. Lack of specificity in trade codes to accurately identify fish species and product forms make it virtually impossible to trace the flow of fish products, legal or otherwise.

While globalization is driving demands for reduction in subsidies it has at the same time provided an incentive for the provision of subsidies. As long as demand continues to be strong, and fails to discriminate positively in favour of sustainable fish products, there will be an incentive for fleets to continue to fish. For many countries, a reduction in fleet size with the attendant economic, social and regional implications, is politically unpalatable. The alternative is to keep these uneconomic fleets afloat through the provision of subsidies. This disguises the true economic costs of their operations, allows them to compete unfairly on world markets and discourages attempts by others to impose additional costs on their fleets by way of environmental safeguards, recovery of management costs or the extraction of a resource rent.

## **CONCLUSIONS**

The generally poor status of global fish stocks is not, fundamentally, a result of globalization. It is, in the main, a result of too little or poor management. Globalization has however, facilitated exploitation of management deficiencies and increased the management challenge. At the same time globalization provides opportunities to meet that challenge more effectively. At this point in time it is probably true to



say that the negative impacts of globalization have outweighed the positive impact in the fisheries sector. Realization of the potential benefits to sustainability of fish stocks from globalization has been relatively slow. Those charged with managing fisheries, mainly governments or multilateral institutions, have not taken up the opportunities offered by globalization at the same rate as those seeking to maximize short-term profits from the industry. This may in part reflect the more entrepreneurial bent of the private sector compared to government.

Even if the pace of integration of economies and of productive enterprises and technological change slows it is unlikely to be reversed. In the fisheries context, the policy and governance challenge is therefore to ensure that the potential benefits from globalization are maximized while minimizing the risks and the costs associated with it. This challenge must be met in a dynamic environment. Global impacts such as climate change and increasing fuel prices will impose new and different pressures on stocks. These pressures will affect stocks directly through environmental influences and indirectly through changing fishing patterns. They will affect the economics of fishing operations and markets by way of changes in the total supply or composition of that supply, and resultant price effects. It is unclear whether, as a result of globalization, fish catching and processing sectors are in a better position than it otherwise would have been to withstand the economic and environmental shocks associated with such changes.

At present many of the pre-requisites for ensuring that the net impact of globalization on fisheries is positive, are not being met. These include:

- Good governance
- Political will (getting fisheries on to the political agenda and providing the resources necessary to meet the international community's expectations)
- Capacity to develop and implement sustainable fisheries management policy
- Capacity to enforce fisheries management measures
- Mechanisms that enable traceability of product
- Mechanisms to effectively prevent IUU fishing

The short-term political imperative in many developed economies, where human and financial capacity is otherwise adequate, precludes the implementation of effective management of domestic fisheries that would otherwise result in constraints on fishing activities. In addition, national self interest, affects the support for strong management of high seas fisheries through RFMOs and effective control of high seas fishing vessels.

In the short term many developing countries are, at least superficially, reaping the benefits associated with the increasing globalization of fish processing and trade. Yet many of the above pre-requisites are lacking in these countries. Under these circumstances, it is likely that extra pressure will be placed on their fisheries resources and marine ecosystems in order to satisfy the demand of consumers in developed countries. This will result in overfishing which potentially compromises their own food security and, in the long term, reduces their capacity to benefit from global demand for seafood. Any benefits arising from globalization may be short lived.

It is inevitable that, pursuit of global sustainability of fisheries will involve some trade-offs. For example:

- sustainability may have to be prioritized over further simplification of trade monitoring e.g. greater specification of fisheries trade codes, rather than less may be required to support traceability

- consumers may have to bear increased fish prices in order to ensure that the full costs of production are reflected in delivering sustainable wild-caught and aquaculture products
- food security in developing economies may need to take precedence over consumer choice in developed economies
- consumers may have to change their preference for carnivorous fish products, such as tunas, to herbivorous products such as tilapia

At present there is little indication that producers or consumers of seafood are prepared to make such tradeoffs and the economic signals and incentives are weak. While fishing operations are subsidised, while sustainable fisheries operate at a competitive disadvantage to unregulated or poorly regulated fisheries, while flag and coastal States are unable or unwilling to implement effective management measures, while IUU product can be caught and processed and marketed in competition with legitimate products, and while consumers remain uninformed or unwilling to make sustainable seafood choices there is little chance that the status of the world's fish stocks will improve.

Many of these issues arise from a failure to value the long-term benefits of sustainable fisheries appropriately. Short-term socio-political outcomes are driving decisions that deliver short term gains while compromising the ability to extract a long-term return from this renewable resource. Fisheries contribute to personal income and employment in catching, transport and processing sectors. They are an important source of protein and the mainstay of subsistence livelihoods in some parts of the world. At the national level, they contribute to GDP and provide valuable foreign exchange. Yet the capacity of fisheries to sustain this contribution to economies and livelihoods is seriously jeopardised by poor management.

How can economics help address these policy challenges?

Market failure is an underlying reality in relation to management of fisheries resources. In most cases it has not been fully addressed at the national level and becomes even more complex when dealing with high seas fisheries where not only are fishers competing against each other but nations are seeking to maximize their opportunities and returns.

One of the primary economic responses to market failure in fisheries has been the assignment of 'property rights' by way of allocation of shares of either catch or fishing effort. Where the quantum of catch or effort has been set so as to constrain catch to precautionary levels or to allow for stock rebuilding, the allocation of individual transferable quota or individual transferable effort units can be an effective means of promoting both sustainable and economically efficient fisheries. However, even in national settings, the allocation of quota between fishers, for example, is fraught with difficulty and unconstrained trading of quota is often claimed to result in undesirable social consequences with quota accumulating in the hands of a limited number of operators and resulting in the demise of some fishing communities. Despite these issues, rights-based fisheries management is increasingly regarded as an effective management tool in domestic fisheries.

In international fisheries, such as those managed by RFMOs, however, rights-based management has been slow to be introduced. There are examples of where national allocations have been made but none where those rights are tradeable. This is a result largely of the additional complexities associated with their introduction in high seas fisheries. Key issues, as in the domestic setting, lie with the determination of allocation of fishing opportunities across the participants in the fishery. This is further complicated by the fact that, given the legal right to fish the high seas, any allocation must provide for the participation of new entrants or find a legal basis for precluding access of new entrants. These issues are particularly problematic where stocks are already overexploited or fully fished, as many of the stocks managed by

RFMOs are. In addition, the capacity of participants to manage and enforce a national allocation across their fleets is variable. While these issues are not insurmountable their resolution takes time and good will. Unfortunately time is something that many stocks do not have and a lack of goodwill characterizes many RFMOs.

It seems inevitable that rights-based management will be introduced more broadly in RFMOs and in domestic fisheries. But this will not happen quickly. Are there other economic tools that could be applied to encourage ecologically and economically sustainable fisheries?

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