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WORLD BANK TECHNICAL PAPER NO. 406

*Fisheries Series*

# Subsidies in World Fisheries

*A Reexamination*



*Matteo Milazzo*

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*Matteo Milazzo*

*The World Bank  
Washington, D.C.*

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## FOREWORD

### Fisheries and the World Bank Group

With mounting evidence of non-sustainable levels of fishing effort being targeted at well over half of the world's main fishing populations, the traditional development paradigm of supporting development in areas with abundant fish resources is becoming increasingly irrelevant. Limiting fishing efforts to sustainable levels has become the most urgent sector objective for many Governments and Development Finance Institutions. Because the creation and operation of an effective fisheries management systems is complex and frequently requires careful institutional engineering and political leadership - notably when over-fishing has already wreaked havoc with the fish resources - the principles of fisheries management and their application have become the number one issue in fisheries.

New Zealand, Iceland, Namibia, Norway, Canada, Japan and the countries of the European Union have demonstrated the limitations and substantial potential of past and ongoing efforts to create more effective fisheries management systems. The Food and Agriculture Organization of the United Nations (FAO) has drafted a *Code of Conduct for Responsible Fishing*, which defines the principles of sustainable fisheries management; many countries have already adopted the code. All experiences agree on one point: effectively managing fisheries is impossible without removal of the key causes behind the excessive investment levels in fleets and infrastructure of the past. Of these, overt and hidden subsidies have played a major, and in some cases decisive, role.

This issue has received limited scholarly or analytical attention in the past, possibly because reliable data are often hard to come by, and some are sensitive. A clear framework for analysis was lacking. Mr. Milazzo has made the first, courageous effort, to estimate the order of magnitude of major subsidies to the fishing sector on a world wide basis. His findings support earlier assumptions that massive levels of subsidies have indeed been a major driving force behind much of the expansion of fishing effort in many parts of the world.

World Bank Group lending to the fishing sector has demonstrated considerable variation. While during 1969-1983 annual lending levels to the sector averaged some US\$ 25 million, sector lending declined during the remaining 1980s and early 1990s. Early projects mostly supported fishing ports, fisheries credit programs and rural marketing infrastructure, while in later years the share of lending for fish culture and fisheries research substantially increased, reflecting increasing concern about the state of exploitation of marine fish resources. The World Bank Group now gives the highest priority to assisting its clients in creating the institutional, policy and technical environment to exploit their marine sources and develop their aquaculture potential in a more sustainable way.



## **ABSTRACT**

Fisheries in the world is reaching a turning point. Many of the traditional most highly valued stocks are fully or overexploited in a biological sense; in economic terms most fisheries employ excessive fishing effort to reach current levels of production. Ineffective management is the fundamental cause for this over-fishing and excessive use of inputs. Weak and ineffective management systems still govern exploitation of most major fish stocks. Paradoxically, fisheries management effectiveness is being undermined by the very subsidies that are provided to maintain fisheries sector income. This study examines the role of subsidies in explaining the obvious and injurious mismatch between fishing effort and biological production capacity. It uses the definitions and methodology of the World Trade Organization on Subsidies and Countervailing Measures of 1994 in defining the nature and size of subsidies to the sector and their impact, based on case studies for Japan, the European Union, Norway, the United States, Russia and China. It covers the subsidies explicitly covered in the WTO agreement, including those that are part of public budgets covering operations in local and foreign waters, and unbudgeted subsidies, including subsidized sectoral lending, tax preferences, cross-sectoral subsidies and infrastructure. In addition subsidies that are implied by the WTO agreement, like resource rent subsidies and conservation subsidies are being assessed in some detail. The aggregate level of subsidies to fisheries in the World is estimated at \$14-20 billion annually, depending on the extrapolation method from the cases studied. Unbudgeted, cross-sectoral and resource rent subsidies account for close to 80% of all subsidies. Compared to other food products, total support levels for fish production (including global trade protection) are high, of the order of 30-35%; this compares with global support levels for beef (35%), pork (22%), poultry (14%) and lamb (45%). Subsidies are a significant factor in undermining the sustainable use of the wild fish resources in many parts of the world.



## ACKNOWLEDGMENTS

In the last half-dozen years, the view has emerged and won wide acceptance that something is fundamentally wrong with the ways in which governments manage and promote their fishery sectors. Numerous analysts and commentators have given ever closer scrutiny to the causes and cures of the emerging general crisis in world fisheries. Indeed, the widely accepted overall view of the fisheries sector's status is generally pessimistic.

Presently, just two decades after the worldwide move to 200-mile fisheries zones in the late 1970s, the major elements of this picture include widespread overfishing and overcapitalization, ineffective management, deteriorating resource health, decline or flat global harvests of most traditional species from capture fisheries, and economic and trade policies in the fisheries sector whose impact on conservation can most politely be described as perverse. Much of the credit for calling attention to this crisis belongs to the Food and Agriculture Organization's (FAO) Fisheries Department staff, who prepared a number of reports on the worsening state of the world's fisheries resources.

I began to pay more attention to these concerns in late 1995, shortly after the completion of the United Nations' fisheries agreements, when officials from FAO and some governments identified "overcapacity" as the most fundamental problem. Simultaneously, it became clear that most specialists considered "overcapacity" and the related (and broader) phenomenon "overfishing" to be somehow derived from

both faulty management, and excessive and poorly designed subsidies.

In the spring of 1996, I started to examine more systematically the aspect of subsidies and decided to prepare a paper on its role in the general resource crisis. In particular, I noted the resistance to efforts to discipline subsidies in recent multilateral trade and shipbuilding negotiations. Accordingly, I began to suspect that subsidies in the fisheries sector must play some important role that transcends the sphere of trade.

As I probed more, I soon realized that the topic is highly complicated, rapidly changing, and seriously encumbered by a woeful lack of up-to-date and reliable information. To give some measure of order and structure to this enterprise, I then began to look for definitions and, more generally, an analytical framework. The result of this search was a decision to use, as much as possible, the definitions, concepts, and thresholds of the World Trade Organization's (WTO) 1994 agreement on subsidies.

However, the 1994 WTO agreement is a trade agreement and, as such, was negotiated to respond to trade-related economic injury, and not to environmental harm. To use a trade agreement to elucidate conservation issues, I created my own categories of "effort- and capacity-enhancing" and "effort- and capacity-reducing" subsidies, and applied them to a wide range of government measures in fisheries. The rest is given in the pages that follow.

During the research and drafting of this study, I was able to take advantage of my position in the International Fisheries

Division, Office of Sustainable Fisheries, of the National Marine Fisheries Service (NMFS) and I received considerable help and encouragement from a number of my National Oceanic and Atmospheric Administration (NOAA) colleagues. Among others, special thanks go to Will Martin and Pamela Mace for encouraging this project, to Dean Swanson for giving me the time to work on it, and to Mark Wildman for help in sorting out and interpreting materials on Japanese and Chinese fisheries.

I also benefited from excellent advice and information from a number of fisheries and trade specialists in other U.S. government agencies, including subsidies experts in the Office of the U.S. Trade Representative and the Department of Commerce's Import Administration, and fisheries investigators with the International Trade Commission. Fisheries experts in international organizations other than FAO, such as the World Bank, were also helpful and supportive. Special thanks go to Gert Van Santen and Marea Hatzios at the Bank for reading the manuscript, suggesting changes, and encouraging me to press forward.

In addition, I have to thank the many foreign service officers and others employed in a number of U.S. missions abroad whose reporting cables provided valuable information that I could not obtain from any other source.

I am also deeply obligated to certain individuals outside of government: Professor Christopher D. Stone of the University of Southern California's School of Law, who tried to steer me through the

minefields of trade law and conducted an electronic correspondence course in the basics of subsidies law; Gareth Porter, whose work has shed valuable light on the mechanics and impacts of distant-water fisheries subsidies, especially resource access payments; and Scott Nance, a Washington-based trade attorney, who urged that I look at user fees in fisheries in the context of subsidies and pointed out the relevance of the U.S.-Canadian softwood lumber case.

All of the above individuals deserve my gratitude for helping in various ways with this project; none of them is responsible for the shortcomings and errors that doubtlessly will appear on the pages that follow. For those mistakes, I am solely to blame.

Finally, I also have to take exclusive responsibility for the views and interpretations expressed here, especially with respect to certain poorly defined and contentious issues, such as environmental, infrastructure, and resource rent (user fee) subsidies in fisheries. I have sought to deal with these and other issues as well as I could with limited information and, to a degree, with a tentative analytical framework. These issues all need to be studied more carefully than I was able to in this sectoral study. Moreover, the General Agreement on Tariffs and Trade (GATT) consistency of practices with respect to these issues is, to put it mildly, ill defined. In short, much remains to be done both analytically and in the policy sphere. Hence, the conclusions that I suggest regarding these matters are my own, and do not necessarily reflect the positions and views of the U.S. government.

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## INTRODUCTION

In the last half-dozen years, the realization has emerged that the world fisheries sector has reached a turning point. Around 1990, it became apparent that global fish production had plateaued at about 100 million tons annually. To be precise, while aquaculture output continued to grow, yields from capture fisheries - the traditional and largest sector - were uneven and showed increasing signs of stagnation. Fisheries analysts at FAO identified and publicized these apparent trends in preparation for the 1992 international conference on responsible fishing at Cancun, Mexico,<sup>1</sup> and, in the next few years, 1993 and 1994, their assessments of trends in world fisheries continued to highlight this problem.

The marine fisheries sector, by far the most important, attained an apparent peak in 1989, with an estimated 85 million tons of harvests.<sup>2</sup> Of this total, many of the traditional, most highly valued stocks are fully harvested or overexploited, and most experts would agree that effort in these

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<sup>1</sup> The most concise statement of FAO's emerging pessimistic view of overall trends in world fisheries may be found in: FAO, Fisheries Department, *World Fisheries Situation, 1992*, prepared for the International Conference on Responsible Fishing, Cancun, Mexico, May 6-8, 1992.

<sup>2</sup> Global marine capture harvests in 1994 and 1995 have exceeded the 1989 peak, according to preliminary FAO estimates, but practically the entire recent uptick in production reflects a jump in harvests of relatively low-value pelagic species, especially by a few Latin American nations in their Pacific fisheries. In fact, the latest increase in harvests may even be discouraging because it may suggest that the traditional pattern of developing and overusing one resource after another remains unbroken.

fisheries should be somehow reduced or, at a minimum, not increased.

In fact, specialists had predicted before the general move to 200-mile zones in the mid- and late 1970s that the global maximum sustainable yield was probably not much more than about 100 million tons and that, given the unpredictable variations and unknown status of many resources, prudence should limit actual harvests to about 80 million tons annually.<sup>3</sup>

More recently, FAO has completed its latest global review of status and trends in world fisheries resources, and the major conclusions are, if anything, even more pessimistic.<sup>4</sup> This last global assessment covers trends over a period of more than four decades (1950-94) and, most interestingly, proposes a developmental fisheries model. With this approach, FAO has identified four sequential phases: (1) undeveloped, (2) developing, (3) mature, and (4) senescent.

Applying this model to 200 of the most important fish resources, FAO determined that 35 percent are senescent (declining landings); 25 percent mature (high exploitation levels); 40 percent still developing; and, strikingly, none in the undeveloped phase. In other words, 60

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<sup>3</sup> J. Gulland had made these estimates for FAO in the early 1970s. FAO, Fisheries Department (S.M. Garcia and C. Newton), *Current Situation, Trends, and Prospects in World Capture Fisheries* (Rome: FAO, 1995).

<sup>4</sup> FAO, Fisheries Department (R.J.R. Grainger and S.M. Garcia), *Chronicles of Marine Fishery Landings (1950-1994): Trend Analysis and Fisheries Potential* (Rome: FAO Fisheries Technical Paper No. 359, 1996).

percent of the world's major fisheries resources are overexploited or already exploited at maximum rates, and the potential for future increases in output is modest at best.

Practically all fisheries experts point to ineffective management as a fundamental cause of the overfishing and overcapacity that are so common throughout the world. In this view, ineffective management or, more specifically, the absence of adequate and meaningful controls on access, inevitably induces participation at excessive levels. Further, until and unless such controls are implemented, economically viable fisheries will continue to attract new entrants, eroding both the fisheries' profitability and the sustainability of the resource. And as long as fishing effort and harvesting capacity are at excessive levels, profitability will tend to decline and fishermen will press for subsidies. Unfortunately, subsidies, once provided, tend to make the effort and capacity problems worse, and the final result is an even more intractable management dilemma.

The basic question posed in this study may be stated as follows: How do subsidies help to explain the increasingly obvious and injurious mismatch between effort/capacity and available resources? To answer that question or, more modestly, to initiate a dialogue on this issue, this study will review a wide range of direct and implicit assistance programs that encourage and promote the building, repair, modernization, and operations of the world's fishing fleets. In so doing, this study will hazard some admittedly rough estimates of their overall impact, both nationally and globally.

The importance of subsidies in this sector is increasingly attracting attention. In a dramatic piece of analysis, a 1993 publication prepared primarily by Francis T. Christy Jr. and FAO Fisheries Department staff argued pointedly that subsidies are a major causal factor in the creation and perpetuation of excess fishing capacity, and even offered a gross, inferred estimate of global assistance in fisheries.<sup>5</sup>

In recent years, this issue has also made its way to the negotiating table, although without much success. Attempts were made in the Organization for Economic Cooperation and Development (OECD) and WTO to fashion rules that would have applied to fisheries subsidies. In OECD, the context was the shipbuilding negotiations; in the WTO, it was the Uruguay Round Agreement on Agriculture. In both instances, the fisheries sector (boats in OECD; fish products in WTO) were explicitly excluded. Inevitably, one has to ask why governments are so reluctant to apply disciplines to subsidies in the fisheries sector.

Nor is the issue of subsidies in fisheries restricted to their trade implications. Increasingly, the impacts of subsidies in fisheries are seen more in terms of conservation than in the context of trade injury. And fisheries subsidies seem to fit

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<sup>5</sup> The starting point for this entire discussion is a special chapter to FAO, *The State of Food and Agriculture, 1992*. FAO's fisheries staff and Christy are to be credited for launching and shaping the terms of the debate on the extent and impacts of subsidies in the fisheries sector. FAO, Fisheries Department, *Marine Fisheries and the Law of the Sea: A Decade of Change* (hereinafter cited as FAO, *Special Chapter/Marine Fisheries*) (Rome: FAO, 1993).

logically in a broader context of environmentally harmful subsidies in all natural resource sectors. In various ways, the issue has been raised recently in a number of international forums and meetings, and a fundamental question is always: How can we determine and measure the environmental effects of subsidies in fisheries?

This study will seek to assess, however roughly, the implications and impacts of subsidies in the fisheries sector. From a methodological perspective, the categories and general analytical approach are taken from the recently concluded trade agreement on subsidies. However, in so doing, we will also apply our own subsidiary "categories" organized around the impacts of subsidies on the resource, as opposed to their effects on trade. Hence, the chapters that follow will categorize separately (1) subsidies that tend to promote additional or more intense fishing effort and added capacity, and (2) those other subsidies that are intended to reduce effort and capacity.

The first group is undesirable from a conservation standpoint; the second group may be environmentally desirable, and, according to some, can provide a means of dealing effectively with the general resource crisis in world fisheries. In other words, this study will examine fisheries sector subsidies within a trade-related conceptual framework but for conservation more than for trade ends.

Most fundamentally, it is our hope that this approach will help clarify the degree to which environmentally harmful subsidies are contributing to the obvious ongoing erosion of the world's wild fish stocks. One

outcome of this study should be a better understanding of whether and how the "bad" subsidies are effectively an important cause of the problem, as opposed to merely a symptom of ineffective management. More ambitiously, this method may provide a useful and enlightening analytical tool. Most optimistically, it is hoped that this assessment, in concert with the work of so many others, will prompt governments and international organizations to integrate subsidies reform into the broader efforts to support the sustainability of fish resources.

## MANAGEMENT AND SUBSIDIES IN FISHERIES

It is widely accepted by fisheries experts that inadequacies in most management regimes have almost inevitably resulted in overuse of the resource.<sup>6</sup> Accordingly, the most fundamental problem in fisheries is the fact that it is still by and large a common property resource that is managed on an open access basis.<sup>7</sup> As a result, management

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<sup>6</sup> This is a classic theme in fishery economics, going back to the "tragedy of the commons" of G. Hardin. As early as the mid-1960s, fishery specialists, like Francis Christy, were making this basic point about open access fisheries. See, Francis Christy Jr., *Efficiency in the Use of Marine Resources* (Washington, D.C.: Resources for the Future, 1964), pp. 1 - 2. For a good example of a current statement along the same lines, note the first sentence in Thoroflur Matthiasson, "Why Fishing Fleets Tend to Be Too Big," *Marine Resource Economics*, Vol. 11, No. 3, Fall 1996, pp. 173 - 9. "Economists have known for a long time that the implication of having the most economically viable fish stocks held in common is a tendency towards over-investment in fishing capacity."

<sup>7</sup> Christy even states that "open access" management regimes have not only caused overinvestment in the harvesting sector, but also



regimes are unable to control participation in the fishery, including both fishing effort and investments in harvesting capacity. Under these circumstances, effort and investments tend to exceed optimum levels, with unfortunate consequences both for the resources and the long-term economic benefits to the industry and to the larger public.<sup>8</sup>

In recent years, a number of commentators, including FAO staff, academics, and environmentalists, have focused increasingly on global trends in the harvesting sector of the fishing industry. Their chief concern is with the industry's use of the resource, specifically with respect to harvesting capacity and effort.

For this study's purposes, capacity refers essentially to vessels and gear, and effort to vessels, gear, and the labor and the use to which all the above are put. Therefore, capacity and effort are distinct but, to some degree, overlapping and related terms.

Work done by FAO in the early 1990s in preparation for the May 1992 Cancun, Mexico, conference on responsible fishing was largely responsible for prompting this debate. This work made two key points on

fleet trends in the 1980s: that global fleets grew faster than harvests and that their gross operating margins showed substantial deficits.

A 1992 FAO paper on the world fisheries situation points out that "decked" fishing vessels grew from 816,700 in 1980 to 1,172,800 in 1989, an increase of 43 percent, significantly higher than the growth in harvests. Analyses of time series indicate that, between 1970 and 1989, total gross registered tons (GRT) of world fishing fleets increased from 13.6 million to 25.3 million GRT, or by an average 4.6 per year, while landings increased only at an average rate of 2.4 percent annually.

The important point is that during the two decades of the 1970s and 1980s world fisheries harvests grew at only about half the rate as the fleets. FAO staff further assessed these data to take into account the impact of the rapidly changing harvesting technology and, as a result, estimated that the real decline in harvests per unit of capacity was actually even greater.

Obviously, FAO's work on these issues was rough and approximate. Calculations of harvesting capacity and, therefore, harvests per unit of capacity are difficult to do precisely, even under the best circumstances. The definition of capacity has not been resolved, and adequate data on harvests and effort are often lacking. Harvesting capacity, for example, may be assumed to include a number of elements, such as the number of vessels, their size and technical power or efficiency, and the time spent

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"massive overinvestments in fisheries administration and research." Francis T. Christy Jr., "The Death Rattle of Open Access and the Advent of Property Rights Regimes in Fisheries," *Marine Resource Economics*, Vol. 11, pp. 287 - 304.

<sup>8</sup> An excellent recent summary of this overall analytical framework may be found in a U.S. government publication that addresses the situation in U.S. fisheries: National Marine Fisheries Service, NOAA, Commerce, *Our Living Oceans -- The Economic Status of U.S. Fisheries* (Washington: NOAA Technical Memorandum NMFS-F/SPO 22, December 1996).



fishing.<sup>9</sup> Using this definition, even if information on the numbers and size of the vessels is available, assessments may falter for lack of sufficient data on technical efficiency and effort (trips). To help correct these analytical problems, the United States offered recently to host an FAO-organized technical experts, consultation on managing capacity in fisheries in early 1998, and among the tasks of this consultation are presentations on defining and measuring harvesting capacity.

Keeping in mind the above qualifications, FAO has estimated the global overcapacity level in the major food-fish fisheries at about 30 percent.<sup>10</sup> If one adds fisheries for all species (including the lower-value pelagic species), FAO concludes that all world fisheries are being fished at about the maximum sustainable yield (MSY) level. Simply put, there is considerable evidence in support of the view that no aggregate additions to fishing capacity are required in the foreseeable future.

One reason why world fishing fleets increased in the 1980s is that more nations became significant participants in marine fisheries. In fact, the title of FAO's pathbreaking publication of 1993 (*Marine Fisheries and the Law of the Sea: A Decade*

of Change) correctly drew attention to the impact of extended jurisdiction.

In some instances, the resource-rich coastal states rapidly expanded their harvesting capacity. In the United States, for example, a north Pacific factory trawler fleet was developed from practically nothing to more than 60 vessels in less than a decade to take advantage of the groundfish fisheries in waters off Alaska. By the end of the 1980s, this "Americanized" trawl fleet had the capacity to harvest and process onboard more than 1 million tons of groundfish annually, as much as all the allocations given to foreign-flag vessels a decade before. As a result, as early as the mid-1980s, there were growing concerns in government and industry about overinvestment and overcapacity in this sector, and, in 1987, the U.S. Congress passed a measure to restrict foreign investments in the harvesting sector of the North Pacific groundfish fisheries.

During the same period, while the resource-rich coastal states generally overexpanded their fleets, the distant-water-fishing countries continued to support their excessively large fleets in a number of ways. This latter group sought to find alternative grounds for their displaced fleets, redirecting them to other exclusive economic zones, such as in the eastern central Atlantic, the southeast and southwest Atlantic, and the southeast and north Pacific. More recently, there was an increase of activity in fisheries in international high-seas waters, such as the so-called doughnut hole between the U.S. and Russian zones in the Bering Sea, and in the "peanut hole" in Russia's Far Eastern Sea of Okhotsk.

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<sup>9</sup> Courtland L. Smith and Susan H. Hanna, "Measuring Fleet Capacity and Capacity Utilization," *Canadian Journal of Fisheries and Aquacultural Science*, Vol. 47, 1990, pp. 2085 - 91.

<sup>10</sup> Interestingly, a recent report issued by the U.K. House of Lords Select Committee on Science and Technology on the situation in European fisheries also called for immediate cuts of 30 percent in fishing "effort," as reported by Ehsan Masood, "Briefing Fisheries Science," *Nature*, March 13, 1997, p. 110.

Roughly speaking, the former distant-water states tended to seek new grounds in unmanaged international waters or off the coasts of developing countries. It is worth noting that FAO estimates that the total harvests of distant-water fleets actually increased modestly from 7 to 9 million tons from 1979 to 1989.

A recent U.S. government study on world fishing fleets examined trends in the large distant-water fishing fleets.<sup>11</sup> This study focused on the very large high-seas fishing vessels, which they defined as vessels of 500 GRT or more that operate entirely or mainly in waters beyond 200-mile zones.

The world high-seas fishing fleet grew from 18,217 vessels and 7.8 million GRT in 1975 to 23,718 vessels and 11.1 million tons in 1992, representing an increase of just over 30 percent in numbers of vessels and 45 percent in tonnage. Thus, the high-seas fishing fleet grew significantly in total numbers and, what is even more interesting, in average size per vessel.

In summary, whatever the obstacles to precise definitions and measurements, there is now a consensus among scientists and fishery managers that fishery resources have been and continue to be overused in many parts of the world. In some cases, excessive participation and rates of exploitation have undermined the economic viability of

fisheries, but their biological sustainability has remained intact. Examples of this

condition are pollock in U.S. Alaskan waters and most major tuna species in the Western Pacific. In other instances, resource overuse has eroded the very viability of the stocks. There are many examples of this more dire situation, and among the best are the distressed state of many demersal, cod-like stocks in both the northeastern and northwestern parts of the Atlantic, in waters under U.S., Canadian, and European Union (EU) jurisdiction.

There is little doubt, then, that effort and capacity in fisheries are excessive. Nor is there much question that inadequate management systems are primarily to blame for these results. It is also worth noting that most fishery experts believe that an effective cure has to include limits on entry, preferably organized around regimes based on property, or harvest, rights. The best known of these measures, individual transferable quotas (ITQs), offers the prospect of introducing market-based incentives (and disciplines) in a sector that until recently has been managed practically everywhere on an open access model.

Management systems incorporating ITQs have made significant progress in the past two decades, in particular in countries like New Zealand, Australia, Iceland, and Canada, and even in three U.S. fisheries. At the same time, however, the impetus for expanding the role of ITQs appears to have slowed, at least temporarily, because of industry resistance in countries as different as the United States and Norway. More troubling is the failure of the fishing giants of the world -- China, Japan, and the

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<sup>11</sup> U.S. Department of Commerce, NOAA, NMFS, Office of International Fisheries, *World Fishing Fleets: An Analysis of Distant-Water Operations* (Washington: November 1993).