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MANAGING FISHING CAPACITY OF THE WORLD TUNA FLEET¹ Abstract and Executive Summary



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PREPARATION OF THIS DOCUMENT (*FAO Fisheries Circular*. No. 982)

The purpose of this document is to explore means of implementing, with respect to tuna, the International Plan of Action for the Management of Fishing Capacity (adopted by the FAO Committee on Fisheries in 1999). The motivation for preparing it was the growing concern of nations and international tuna organizations that as the fishing capacity of tuna fleets grow, it will become increasingly more difficult to initiate and sustain effective measures to manage and conserve tuna resources. Because most stocks of tuna, with the exception of skipjack, are nearly fully exploited or overexploited, and a growing fleet capacity can cause adverse economic disruptions in the international market for tunas, the document is timely and its subject matter is of critical importance.

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ABSTRACT

The catch of skipjack, yellowfin, bigeye, albacore and bluefin tuna accounts for about five percent of the world production of marine fish, but it represents a much higher proportion of the total value of the catch. With the exception of skipjack, most stocks of tuna are nearly fully exploited or overexploited. As the number and efficiency of vessels that harvest tuna increases, there is a growing concern on the part of nations and international tuna bodies that it will become increasingly difficult to implement and sustain effective conservation measures for tunas. As a consequence, most of the tuna bodies have initiated steps to evaluate the needs and means of limiting the capacity of the vessels in the fisheries with which they are concerned. Because of severe economic problems associated with excess fishing capacity, the fishing industry has initiated its own programmes to limit the capacity for purse-seine and longline fleets. Reasonably good catch statistics for tuna are available for most fisheries, but corresponding information on the numbers and characteristics of tuna vessels is frequently not. For one of the areas where information is available (the eastern Pacific) results of Data Envelopment Analysis suggest that the fleet of purse-seine vessels in the area could be reduced significantly without a corresponding reduction in the catch. So far, there has been very limited action taken by the fishery bodies to control the fishing capacity. The tuna fishery bodies must work together, and with FAO to resolve the problem of tuna fishing capacity. They also need to address the issues related to common property resources and property-rights based management, the allocation of catches and fleet capacities among participants, the rights of access on the high seas, the authority for regional tuna organizations to deal with some of these matters.

EXECUTIVE SUMMARY

Nearly 70% of the world's fisheries are either overexploited or nearly fully exploited, due primarily to a growing world demand for fish and a harvesting capacity that is increasing more rapidly than is the catch of fish. Catch quotas and fishing effort limitations can reduce the overexploitation, but as fleets continue to grow, it becomes more and more difficult to sustain such measures.

Because of the widespread concern over this situation, the FAO Committee on Fisheries (COFI) recommended that FAO convene a series of technical meetings to address the issues of defining, measuring, and controlling fishing capacity. Two such meetings have been held. Additionally, in 1999 COFI adopted an International Plan of Action for the Management of Fishing Capacity, which calls on regional fisheries bodies and states to achieve worldwide an efficient, equitable, and transparent scheme for management of fishing capacity.

Although tuna fisheries were not specifically addressed in the plan of action, they are no exception to the problems of growing fleet capacity, which are so evident in other fisheries. The world fisheries for tunas are very complex. Vessels registered in more than 80 nations, many with divergent objectives, fish for tunas. Some of these are economically highly developed, while others are much less so. Both the tunas and the vessels that harvest them roam over wide expanses of the world's oceans both on the high seas and in the Exclusive Economic Zones of coastal nations. Many or most sets of the principal types of gear produce catches of more than one species of fish, some of which are overexploited and some of which are not. For these and other reasons it will be difficult to find a solution to the problem of a growing capacity that is just, equitable, and effective.

TRENDS IN THE PRODUCTION OF WORLD TUNA FISHERIES

Nearly 4 million tonnes of the principal market species of tuna (skipjack, yellowfin, bigeye, albacore, and bluefin) are taken annually. The Pacific Ocean accounts for about 65%, the Indian Ocean about 21%, and the Atlantic Ocean about 14% of this.

Skipjack tuna comprises about half of the world production of tuna, and is the number one species in every ocean in terms of catch. The world catch of skipjack has increased during the last several decades. In the Pacific, and perhaps the Indian Ocean, skipjack does not appear to be fully exploited, but in the Atlantic there is concern that it is.

Yellowfin is the second most important species of tuna, accounting for about 30% of the total catch of all species. The world catch of yellowfin trended upward until the early 1990s, and after that it stabilized. Yellowfin appears to be fully exploited in all areas where it is fished.

Bigeye accounts for a little more than 10% of the world catch of tunas. Prior to the mid-1980s most of the bigeye were captured by deep-fishing longline gear, and virtually all of them were large fish. After the mid 1980s surface fishing gear began to take large amounts of small bigeye. Longline catches significantly declined as surface catches increased. There is a great deal of concern that this change in fishing strategy has resulted in overfishing of bigeye in most areas.

Albacore comprise about 5% of world tuna production. There are six stocks of albacore, all of which are nearly fully exploited or overexploited. Substantial long-term increases in catch do not appear likely.

Southern bluefin and Atlantic bluefin are substantially overexploited. If the catches of small Pacific bluefin were reduced the total catch of that species would probably increase.

THE TUNA FISHING VESSELS OF THE WORLD

Purse-seine vessels, which range in size from small coastal vessels with carrying capacities of less than 100 tonnes to large vessels with capacities of nearly 4 000 tonnes, harvest about 60% of the world production of tuna. They are the most important type of fishing vessel, in terms of total catch, in every ocean of the world. Data on the numbers and specifications of the world purse-seine fleet is limited. The regional tuna bodies attempt to keep records on the numbers and characteristics of vessels fishing within their regions, but for many of those bodies the data are incomplete. In this paper, it is estimated that there are nearly 600 high-seas purse-seine vessels, with a total carrying capacity of nearly 600 000 tonnes operating in the world's oceans. There are even less data on longliners, baitboats, and other types of vessels that fish for tuna. There is a strong need for the regional tuna bodies to work together to collect and maintain records of the numbers and characteristics of tuna fishing vessels of the world.

FLEET CAPACITY AND PRODUCTION

A long series of reasonably good statistics of catches of tuna is available. However, corresponding information on the numbers and characteristics of tuna vessels making those catches is not available for most tuna fisheries. If such data were available it would be possible to examine the relationship between catch and fishing capacity on a global basis, and to further examine the possibility that there is more fishing capacity than needed to make the observed harvests.

Because a long time series of data on fleet carrying capacity is available only for the eastern Pacific Ocean (EPO), a detailed examination of purse-seine carrying capacity and tuna production for that area is presented. An annual catch quota was placed on yellowfin in the EPO in 1966. Because of good catch rates and high demand for tuna, the fleet of purse-seine vessels began to increase, and competition for the available resource increased. From 1966 to 1979 the purse-seine fleet increased from about 100 000 to 180 000 tonnes of capacity. The catch did not increase proportionately. Because of the fierce competition among tuna purse-seine fleets, it became difficult for governments to agree to continue the conservation programme designed to restrict fishing effort, and overfishing ensued. Catch rates and catches decreased, and much of the fleet transferred its operations to areas outside the EPO. Low fishing effort over the next few years allowed the population of yellowfin to recover to high levels of abundance, and many of the vessels returned to the EPO. Relatively low fishing effort kept the abundance and catch rates of yellowfin high, but this inevitably stimulated fleet growth. In the early 1990s, capacity averaged about 110 000 tonnes, and now it is at about the same level it was in the early 1980s, when economic and overfishing problems developed. This has caused concern among the governments in which vessels involved in the fishery are registered that events of the late 1970s and early 1980s will be repeated. This concern has resulted in steps to limit fishing capacity in the region, but finding a way to do this that is acceptable to all nations involved in the fishery is difficult.

The tuna fishery in the EPO, like those of other oceans, is a multi-species fishery. Some species are fully exploited, but others, notably skipjack, are not. Since the different species are taken in the same fishing operation, increased effort on the underfished skipjack can result in overfishing yellowfin and bigeye. Additionally, establishing that there is excess fishing capacity is difficult, and there have been few serious attempts to do this. The FAO working groups on fishing capacity proposed that a linear modelling approach, Data Envelopment Analysis (DEA), could be used to determine whether there is excess fishing capacity in a fishery. This was applied to the EPO fishery, and the results suggest that there are too many purse-seine vessels operating in this fishery, and that the carrying capacity of the fleet can be substantially reduced without a corresponding reduction in catch. Similar DEA analysis of other tuna fisheries could not be conducted because of lack of data on numbers of tuna purse-seine vessels.

CAPACITY LIMITATION EXPERIENCES IN TUNA FISHERIES

There are few cases in international tuna fisheries for which measures to limit fleet capacity have been successfully implemented.

The International Commission for the Conservation of Atlantic Tunas (ICCAT) has taken action to limit the number of vessels operating in the northern albacore fishery to 1993-1995 levels, and vessels greater than 24 meters in length operating in the bigeye fishery to 1991-1992 levels. The Inter-American Tropical Tuna Commission (IATTC) has implemented measures to limit the number of purse-seine vessels that can operate in the EPO, although the agreed-to limits are substantially in excess of what has been recommended by its staff. The Indian Ocean Tuna Commission (IOTC) has recognized that measures to limit capacity are necessary and is investigating means of limiting the fishing capacity of the fleet of large vessels fishing for tropical tunas in the Indian Ocean.

Because of economic problems, the fishing industry has initiated action to limit fishing capacity. The major longline fishing nations, led by Japan, have undertaken to reduce the number of longline vessels by 20%. Vessels removed from the fishery are scraped so that they cannot re-enter the fishery, and the owners are compensated for loss of their vessels. Similarly, most of the owners of purse-seine vessels have formed an organization, whose objectives are to keep the supplies of tuna in balance with demand, and to limit the number of vessels that can fish for tunas.

THE REALITIES OF LIMITING FLEET SIZE

It is clear that there is widespread concern over the size of the world's tuna fleets, and that there is a desire on the part of governments and industry to limit or reduce the number and total capacity of vessels that harvest tuna. Setting capacity limits would mitigate many of the problems that arise in managing tuna fisheries that are associated with setting time and area closures, catch limits, and gear restrictions, and also the economic and political problems created by too much fishing capacity. However, setting limits on fleet size introduces other problems, such as how to harvest underexploited skipjack while protecting fully or overexploited yellowfin and bigeye, how to determine the optimum fleet size for a particular fishery, particularly when individual vessels may fish in more than one fishery during a given year, how to partition or allocate capacity limits among participants, how to measure and monitor vessel efficiency, how to accommodate the desires of states without fleets to acquire them, and so on.

THE ESSENTIAL AND INITIAL STEPS

Before a workable scheme to limit fleet capacity can be achieved, several issues must be addressed.

First, estimates of the amounts of fish available for harvest are a necessary prerequisite for setting capacity limitations. If the data are inadequate, a precautionary approach may be appropriate.

Second, information on the numbers and characteristics of vessels currently operating is needed. In many fisheries, purse-seine vessels harvest the majority of tunas, and in those fisheries priority should be given to the acquisition of data on purse seiners. However, for limitations to be fully effective, all major gear types should be included in the databases, and appropriate limitations applied. The longer the series of data available, the more readily it can be used to determine whether there is excess capacity in the fishery and, if so, what is the optimum fleet size.

Once the measures for capacity limitation are implemented, the parties must establish an effective monitoring and enforcement scheme

SOME POSSIBLE OPTIONS FOR LIMITING FLEET CAPACITY

Several methods have been used to control the harvest of fish. These fall into two general categories, input controls and output controls. The latter are concerned with the results of fishing (*e.g.* catch quotas and/or size limits), while the former are concerned with the manner in which fishing is accomplished (*e.g.* limiting fishing mortality and/or fishing capacity). Most tuna fisheries management has involved output controls, and has been fraught with technical, economic, and political problems. The following principal input and output controls are considered as possible management options.

Maintaining the existing system of output controls. - In some fisheries, the regulations have become so complex that it is difficult for the fishermen to understand them, much less abide by them, and for management agencies to enforce them. This is part of the reason that nearly all of the regional tuna bodies, and also the industry in some tuna fisheries, have called for controls on the number of vessels allowed to operate.

Establishing a moratorium on fleet growth, *i.e.* allowing no new vessels into the fishery, except to replace those lost through sinking, attrition due to old age, or conversion to other uses. This might

work for nations with well-established tuna fleets, but it would not address the problem of how nations without fleets could acquire them, or how nations with small fleets could expand them. Unless it was accompanied with a scheme to handle new entrants, a moratorium would probably be doomed to failure.

Industry programmes to limit fishing effort and/or capacity. - Because of severe economic hardship resulting from too much fishing capacity, the tuna industry has, in two cases, taken the initiative to limit capacity. These initiatives should be recognized and encouraged by governments and regional tuna bodies. It is a major first step in developing a “mind set” within the tuna industry that controls on fleet capacity are needed.

Intergovernmental regional programmes to limit fishing capacity offer a straightforward approach to setting capacity limitations. The problems facing each of the regional bodies would be essentially the same, too many players, including those in the game, those wanting a bigger share of the game, and those not yet in the game, but wanting to get in.

There are several approaches that can be developed by regional bodies for limiting fishing capacity, but nearly all will have to deal with the issue of allocating fleet capacities among participants. Additionally, using capacity limits as the sole mechanism for managing a fishery has certain shortcomings that will need resolution. It is likely that once limits are imposed, there will be a tendency for the fishing industry to improve vessel efficiency and increase the average number of days a vessel spends at sea. Coupling a catch quota with the capacity limitations could mitigate these shortcomings. If the catch quota were global most vessels would “race” to catch as much of the quota as possible before the period of unrestricted fishing ended. The adverse effect on stock productivity of concentrating fishing effort into a shorter period of time could be diminished somewhat by partitioning the year into a series of open and closed fishing periods. However, most vessels would still “race” to catch more fish during these shorter periods of time. Another alternative would be to assign quotas to individual nations. Partitioning the catch quota among nations would offer the opportunity for each nation to develop plans to manage its fishery within the framework of the vessel limits and catch quotas.

Alternatively, catch quotas could be assigned to individual vessel owners or vessels, instead of to nations. If the individual catch quotas were coupled with individual capacity quotas, many of the problems associated with national catch and capacity quotas would be eliminated. If these quotas were transferable, buy-back schemes could be used to reduce overall vessel capacity, and nations wishing to enter the fishery for the first time, or desiring to increase their fleets, could purchase quotas from those already in the fishery. Of all the schemes for resolving the problems of tuna management, particularly the problem of excess fishing capacity, those that tend to incorporate some form of property rights, which allows the recipient of those rights to trade or transfer them to other users, seems to offer the best opportunities for success. If the regional tuna bodies are to deal adequately with problems of excess fishing capacity, they will need to be authorized to deal with economic and social issues related to the fisheries for which they are responsible, including the authority to assume and assign property rights in the fisheries.

CONCLUSIONS AND RECOMMENDATIONS

It seems clear that the world fleet of purse-seine vessels could be substantially reduced without reducing catch. However, the fleet has been growing, and the individual vessels are becoming more efficient. The same seems to be the case for longline vessels. After suffering serious economic harm, the purse-seine and longline industries have initiated efforts to resolve the excess capacity problem, but so far with limited success. Baitboats and gillnet vessels account for about 20% of the world tuna catch, but there is little information on the numbers and characteristics of these fleets. Over the short term, most of the problems caused by too much fishing capacity could be resolved by considering only purse-seine and longline vessels, but for a long-term solution, all types of fishing vessels must be considered.

There are various actions that governments and international bodies must address before a long-term solution could become a reality. A proper international legal basis for limiting entry into tuna fisheries and assigning property rights to participants in those fisheries must be considered. The rights and obligations of states regarding the utilization of the sea's living resources, and also the authority for international bodies to limit entry and assign property rights, would have to be defined. In this respect, FAO can encourage these changes by convening a series of meetings to determine what changes are necessary and how they should be made.

The five regional tuna bodies would benefit from the establishment of a permanent coordinating body to harmonize their efforts to manage the world's tuna fisheries, particularly with respect to reducing fishing capacity. Such a coordinating body could be structured as an independent body or committee of the regional tuna organizations, or part of the FAO.

A second permanent body or coordinating committee, structured along the lines of the one above, dealing with compliance issues related to capacity limitation and tuna management programmes would be able to monitor programmes and coordinate actions regarding the establishment of common sanctions and compliance measures among the regional tuna bodies.

If there are to be effective programmes to manage fishing capacity the following technical matters must be fully studied: (1) monitoring efficiency changes in fishing vessels under management controls, (2) evaluation of the application and usefulness of vessel buy-back schemes for multinational tuna fisheries, and (3) development and application of methods to measure fishing capacity. The first two matters could be addressed through the format of technical working groups established by FAO. The second could be achieved by a Pacific-wide DEA analysis, which would be possible because individual vessel data are available in the archives of IATTC, the Secretariat for the Pacific Community, and the Forum Fisheries Agency. A joint analysis of these data by scientists affiliated with these fisheries bodies could provide an excellent opportunity to evaluate fully the applicability of this technique to the world tuna fisheries, as was recommended by the FAO working groups on fishing capacity.