Some Economic Considerations About the Management of the Tropical Tunas in the Eastern Pacific Ocean: The Mexican Point of View

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1 INTRODUCTION

1.1 Background

In terms of product value, tuna constitute one of the most important living resources of the sea. These fishes have several qualities that make their management unique. Most of the commercially important species are capable of moving long distances during short periods of time. "They may be in coastal waters of one nation today and in those of another nation or high seas tomorrow. Tuna are sought by large oceanic vessels. Catches are bought and sold in an international market with the raw product being landed, transshipped and processed in many ports throughout the world. In addition, under some circumstances certain species of dolphins—which are protected by the law of several countries—are incidentally caught by the tuna purse-seiners.

To the ichthyologist and fishery scientist "tuna" is any of the 13 species of the tribe Thunnini within the family Scombridae. For the fishermen, international fisheries bodies, trading companies, fish processors, and policy makers the word tuna may be even more broadly defined. In the following discussion the term "tuna" will be restricted to the principal market species of the tribe Thunnini (table 1-1). In particular this work will deal with the purse-seine fishery for the "tropical tunas" yellowfin and skipjack in the Eastern Pacific Ocean. These two species account for more than 50% of the total tuna production in the region. There is also a group of fishes caught incidentally by the purse-seine fleet; these are commonly referred as "tuna-like" species or secondary market species (table 1-1).

In this work the "Eastern Pacific Ocean" (EPO) is defined as the area of the Pacific Ocean east of 150° W (figure 1-1). In particular this work is concerned with the fishery of tunas in the "tropical Eastern Pacific" (TEPO), defined as the area between 30°N and 40°S and east of 150° W.

Historically the Eastern Pacific tuna fishery has been one of the most important in terms of production (figure 1-2). This fishery had its beginning in Southern California (U.S.A.) during the early 1900s. Fishermen sailing from San Diego supplied albacore for a newly developed market for canned white meat tuna. The supply of white meat tuna soon fell short of the rapidly expanding demand. To meet the demand the fishermen moved into tropical waters in pursuit of light meat tropical tunas: yellowfin and skipjack.
For the first forty years fishermen in the Eastern Pacific fished using the pole and line method on vessels known as "bait-boats". This is a difficult and labor intensive method that depends greatly on the availability of live bait-fish. Today the majority of the Eastern Pacific tuna fleet has converted to the more efficient purse-seine method. (table 1-II). The purse-seine is a gear designed to fish at the surface on large schools of fish. This method is especially useful in the tropical Eastern Pacific, where the thermocline is shallow and the thermally sensitive species of tuna are forced into surface waters. The target species for the Eastern Pacific purse-seine fleet are yellowfin and skipjack; although albacore, bluefin, bigeye and several other tuna like species, such as bonito are taken incidentally. The composition of the catches in the EPO is shown in figure 1-3.

The pole and line (bait-boat) and purse-seine are not the only methods used to catch tuna in the Eastern Pacific. Longlining by the Japanese fishing fleet and trolling for albacore by small vessels from the United States are also important, especially in terms of monetary value. However, this work will deal almost exclusively with the purse-seine fishery in the tropical Eastern Pacific.

Table 1-I Principal commercial species of tuna (a); and 'tuna like' or secondary market species (b) in the Eastern Pacific Ocean.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellowfin</td>
<td>T. albacares (Bonnaterre)</td>
</tr>
<tr>
<td>Skipjack</td>
<td>Katsuwonus pelamis (Linnaeus)</td>
</tr>
<tr>
<td>Albacore</td>
<td>T. alalunga (Bonnaterre)</td>
</tr>
<tr>
<td>Bigeye</td>
<td>T. obesus (Lowe)</td>
</tr>
<tr>
<td>Northern bluefin</td>
<td>T. thynus orientalis (Temminck &amp; Schlegel)</td>
</tr>
<tr>
<td>Southern bluefin</td>
<td>T. aaccoyii (Castelnau)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonito</td>
<td>Sarda spp.</td>
</tr>
<tr>
<td>Black skipjack</td>
<td>Euthynus spp.</td>
</tr>
<tr>
<td>Frigate mackarel</td>
<td>Auxis spp.</td>
</tr>
</tbody>
</table>
Since the end of World War II the nations involved in the fishery have been making joint efforts to find a better way to preserve and efficiently exploit the stocks of tuna in the region. In 1949 a Convention for the establishment of the Inter-American Tropical Tuna Commission (IATTC) was signed by representatives of the governments of Costa Rica and the United States; several other countries including Mexico joined the Commission later. Their efforts however, have never been harmonious. The issues of allocation, ownership, access to the resource and, more recently, the incidental catches of dolphins by purse-seiners have been the main source of conflict.
Figure 1-2 A) Total production by the Eastern Pacific tuna fleet (includes only the species listed in table 1-la). B) Percent contribution of the Eastern Pacific fishery to the world tuna production (for the species listed in table 1-la only).

Source: IATTC Annual Reports (several years)
Table 1-1 Composition of the Eastern Pacific international tuna fleet in 1986 (not including longliners and miscellaneous small vessels).

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>NUMBER</th>
<th>PERCENT</th>
<th>CAPACITY</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purse Seiners</td>
<td>159</td>
<td>90.3</td>
<td>109,773</td>
<td>98.5</td>
</tr>
<tr>
<td>Bait-Boats</td>
<td>17</td>
<td>10.7</td>
<td>1,702</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>176</td>
<td>100.0</td>
<td>111,475</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: IATTC Annual Report 1986

Figure 1-1 (A) Species Composition of the Eastern Pacific tuna landings for the period 1974-1984 (includes only the species listed in table 1-1(a)). (B) Contribution of the primary and secondary market species to the total catch by the Eastern Pacific tuna fleet (for 1986 only).

Source: (A) FAO
(B) IATTC
Although tuna can move over long distances, they are not randomly distributed over the oceans. The major portion of the fishing in the Eastern Pacific is done within 200 miles of Mexico, Central America, Colombia, Ecuador, Peru and northern Chile (figure 1-4). These nations had not, until recently, developed large fleets. On the other hand, the United States, a non-resource adjacent nation, has traditionally dominated the fishery with a large and efficient fleet.

Figure 1-4 Geographic distribution of logged yellowfin catch by purse seiners in the EPO during 1970-1985

Source: IATTC.
Mexico, several other Latin American countries, and some island nations of the South Pacific Ocean have been claiming sovereign rights over tuna—and all other fishery resources—within 200 miles from their coasts. The United States does not recognize any rights over tuna beyond the 12-mile territorial sea arguing that tuna needs to be managed by international organizations due to its migratory nature. In addition the United States tuna industry feels that they should have rights to a resource in a fishery that they pioneered and developed at a high cost. The question of who should have jurisdiction over tuna as they pass through the exclusive economic zone (EEZ), of various countries has been the subject of much debate at the third United Nations Convention on the Law of the Sea (LOSC), and elsewhere. Recent developments—particularly the LOSC negotiations and the negotiations between the United States the South Pacific island nations—suggest that resource adjacent nations will gain the control over tuna in their EEZs, and therefore over an important part of the resource.

During the early 1960s a regulatory program for Eastern Pacific yellowfin was instituted within the framework of the IATTC. A system of global quotas was adopted and implemented from 1966 through 1979. From the standpoint of biological conservation the program was considered successful, however from the economic and political points of view the program was a complete failure. During the time the yellowfin regulatory program was in place, far more capacity entered the fishery than was needed to harvest the available catch. In addition to the problem of overcapacity, difficulties arose regarding the issue of allocation. By the mid-1970s the negotiations to reach agreement on catch allocations became very difficult and prolonged. Because of this situation Mexico proposed the creation of a new treaty. The Mexican proposal failed and Mexico withdrew from the IATTC in 1978. Without Mexico and Costa Rica, which also withdrew, it became no longer possible to continue with the yellowfin conservation program. Consequently no regulatory program has been in place since 1979. In 1980, after leaving the IATTC Mexico decided to include the jurisdiction over tuna into its recently established 200-mile EEZ. The United States refused to recognize the Mexican claims and allowed its fishermen to continue fishing for tuna in Mexico’s EEZ. During mid-1980, Mexican naval vessels arrested several American tuna boats. The United States responded by imposing an importation embargo on all tuna products of Mexican origin, effectively closing the most important outlet for the growing Mexican tuna production. In 1986 the embargo was terminated, however, the United States still refuses to recognize the Mexican claims over tuna.

In addition to the problems described above, the Eastern Pacific purse-seine fishery faces another complication: the incidental mortality of dolphins. Schools of yellowfin in the Eastern Pacific are found and caught in association with
dolphins. The reason for the association between these species is not clearly known, but the mortality of dolphins caused by the purse-seine fishery is a major management problem. The association of dolphins with tuna is particularly notorious in the case of schools of large yellowfin in the EPO.

Regulations to protect the populations of dolphins have been passed by several countries including Mexico and the United States. These commonly include the modification of the purse-seine nets and modifications of the fishing operation and search procedures. The effect of these regulations for the tuna industry is that they increase the costs of fishing and may reduce the catches. In addition this problem is a potential source of confrontation among the nations fishing for tuna that do not share the same opinion regarding the need to protect the populations of dolphins. Recently, for instance, the United States has incorporated provisions into its law that prohibits the importation of tuna products from countries whose fishermen fail to take the "appropriate" measures to protect the dolphins.

According to the IATTC, unrestricted fishing during the years 1980 and 1981 caused a reduction in the stock size of yellowfin beyond its optimum size. The result was a decline in the catch rates, which in combination with the access problems stimulated the search for alternative fishing grounds. During 1982 and 83 the strongest El Niño in the past 100 years changed the oceanographic conditions in the region reducing the vulnerability of tuna to purse seiners. In the Western Pacific, on the other hand, the conditions were favorable for the tuna seiners. As a result of all these factors more than half of the Eastern Pacific high-seas fleet eventually moved to the Western Pacific. When the environmental conditions returned to normal in 1984, the catch rates in the Eastern Pacific Ocean improved dramatically.

According to the IATTC annual reports there has been no need for conservation measures to protect the stocks of tuna in the region during the last few years. This however, is not the result of man’s intention but due to nature’s intervention, economics and access problems. Currently, the stocks are at high levels of abundance, catches and catch rates are increasing. These factors combined with a strong demand, rising ex-vessel prices and poor catches elsewhere are again attracting effort into the EPO fishery. If effort continues to increase, it is likely that the need of protection measures will arise in the near future, particularly in the case of yellowfin.

The assumption that tunas are highly migratory, and therefore the only way to regulate the stocks of these species is through international organizations is almost universal in
in fisheries management. Recently however, Ray Hilborn and John Sibert\(^{10}\) suggested that for yellowfin and skipjack long distance movements might be the exception rather than the rule and that for countries with large economic zones the stocks of these species may be considered resident provided that natural mortality is high relative to the emigration rate and enough recruitment takes place inside the country's EEZ\(^{11}\). If this is in fact the case, international regulation for these species may not be as indispensable as it is supposed. Hilborn and Sibert arguments can be of major implications for Mexico—a country with abundant yellowfin and skipjack resources and a large EEZ. If the stocks of tuna in the Mexican EEZ can be treated as resident then Mexico can make full use of its tuna resources according to the country's objectives with little concern about outside harvest rates. Unfortunately, much more research is needed before reliable conclusions can be made on this matter. Meanwhile, I will continue to make the assumption that some form of international cooperation is needed to attain the rational management of tuna stocks. The concept of rational management is used here in its broadest sense, it includes social and economic objectives in addition to the traditional goal of biological conservation.

During the early 1980s, in an attempt to resolve the management problems in the EPO, two initiatives were taken by the countries involved in the tuna fishery: (1) the Eastern Pacific Ocean Tuna Fisheries Agreement which in essence establishes an international licencing authority. Currently only Panama and the United States have ratified this agreement. And (2) the Working Group for Regional Coordination in the Rational Utilization of the Tuna Resources within the framework of the Latin American Organization for Fisheries Development (OLDEFESCA), an initiative led by Mexico which is currently working toward a regional agreement that will recognize the sovereign rights over tuna in the EEZ. Unfortunately neither of these proposals seems to offer a viable solution. To be effective an international tuna management agreement in the Eastern Pacific Ocean must include the United States and Mexico in the same side. It seems, for the moment, that the probability of a meaningful agreement between these countries regarding tuna resources is small.

1.2 The International Tuna Market

To understand many of the factors that affect the stability of the tuna industry it is necessary to describe the demand side of the market. The United States, Japan and Western Europe are the world's principal consumers.
United States

Although the United States has always been one of the top tuna harvesters in the world, it has to import large amounts of frozen and canned tuna to be able to meet its huge domestic demand. United States consumers purchase about one third of the global tuna harvest, but usually account for nearly 60% of the global canned tuna market. In 1987 "Americans ate far more tuna than U.S. Fisherman caught as evidenced by 500,000 tons of imports. No country consumes more canned tuna than the U.S. (40 million cases in 1987)."

Over the past 25 years, there has been a relatively steady upward trend in the consumption of tuna in the United States. However, there have been several temporary declines in consumer demand for tuna associated with specific events, such as publicity about contamination or the threat posed to dolphins by the tuna seiners and more recently by the high price of canned tuna. Consumer demand in the United States is also sensitive to the quality of canned tuna. Since 1980, the consumers have switched from tuna packed in oil to tuna packed in water. It is estimated that about 60% of the current consumption in the United States is in the form of tuna packed in water. However, the high priced market for fresh tuna has the potential to increase, during 1987, 10,000 to 12,000 tons of fresh tuna were used in the United States and it is expected that this market will grow 20 to 25% per year during the next several years.

Japan

In contrast to the consumer in the United States, who consumes almost only canned tuna, the Japanese market is more diversified. In Japan tuna is consumed smoked, dried, salted, and fresh. The Japanese market specialized in raw tuna (sushi) continues to attract a great deal of attention due to the high prices paid. However, it is a small market and requires the fish to be handled and stored with extreme care. The species more utilized by the Japanese are bigeye and bluefin, which are caught in the TEPO only in low quantities. Overall the Japanese market for fresh tuna is unstable and subject to large fluctuations in price. However more and more producers are considering the Japanese market as a source of high returns.

According to a report presented in the International Tuna Trade Conference it seems that the Japanese market has reached its saturation point.
Western Europe

The imports of canned tuna by several European nations have been increasing rapidly during the past years, they have even exceed, when pooled, imports by the United States. The principal buyers of canned tuna in Europe are France, the United Kingdom and West Germany. The principal consumer countries of frozen tuna are Italy and France.

In addition to the markets discussed above, Thailand is another country that deserves to be mentioned as an important producer and importer of tuna.

1.3 Economic Efficiency

Even in the years when catches have been good, the tuna industry has recently faced tough times in terms of its financial situation. Over-capacity, access problems, fluctuating oceanographic conditions, low product prices, increasing costs of production, and a bad reputation due to the incidental captures of dolphins are among the factors contributing to the financial problems.

Although the stocks of tuna in the region are in no immediate danger of being overfished, the fishery should not be left totally unregulated. If the nations of the region want to obtain benefits from the tuna resources, a careful attention to the economic factors involved in fisheries management is mandatory.

To be efficient -- in terms of economic theory -- a fish stock should be utilized to exploit it such that the net present value of future returns is maximized according to a socially optimum discount rate. Optimal utilization at any period is then achieved at that effort level where the marginal value of harvest is equal to the marginal social cost of providing it.

This work should not be interpreted as implying that economic efficiency should be the only or most important goal for the EPO fishing industry or in particular for the Mexican tuna industry. Rather it is argued here that the efficiency criterion must be included in every fishery management plan at least to assure positive economic returns from the fishery; otherwise, sooner or later, the fishery will become a burden to the country's economy instead of a benefit.
An important part of this work deals with the issue of economic efficiency. For this reason, it is important to highlight that efficiency, used alone, is an insufficient criterion for economic policy. Efficiency is not unique. There are, in principle, an infinite number of efficient solutions, each associated with a different distribution of social product. The efficiency criterion then does not necessarily solve the problem of a fair distribution of wealth.

There are, in addition to efficiency, other legitimate goals in fisheries management. These can be -- to mention a few of them -- a fairer distribution of income, community stability or the promotion of regional economic development. However, at least in principle, the achievement of these alternative goals implies a reduction in efficiency. The above argument is true only if the rest of the nation's economy is working efficiently (i.e., on the efficiency frontier). This situation is far from being true in Mexico, a country with a severe unemployment problem and a highly centralized and inefficient economy. Therefore, in the case of Mexico, the effect on the overall economy from achieving economic efficiency in the tuna industry is ambiguous. Finally, the concept of efficiency (i.e., the maximization of net present value of future returns) becomes difficult to interpret and apply to policy decisions in the presence of uncertainty.

1.4 The Situation in Mexico

With respect to tuna resources, the Mexican tuna industry is in a privileged position. The Country has a very large EEZ with abundant tuna resources, it is close to the world's largest tuna market, and has a government that is committed to develop a tuna fishery. It has also one of the largest and most modern tuna fleets in the world. All these factors give Mexico the potential to become a major participant in the world tuna industry. During the late 70s, Mexico launched the most ambitious fleet expansion in the history of the Eastern Pacific tuna fishery... Today, Mexico has become one of the most important tuna fishing nation in the region. Mexico was the principal producer of tuna in the EPO in 1985-1986, and the second in 1987. The Mexican fleet contributed with over 35% of the total production in this part of the Pacific Ocean.

Despite all the advantages mentioned above, the potential of the Mexican tuna industry has, in recent years, been severely limited by a number of factors most of them caused by poor planning and management. Among the most important of these problems are: a glutted market, high costs of fishing, an acute debt crisis, and the lack of efficient port and processing facilities.
After Mexico proclaimed an EEZ in 1976, the Mexican confidence and hopes in the future of its tuna industry were high. Mexico began looking seriously at alternatives to develop the tuna industry. The government started to finance fishing activities directly and encouraged the private industry to consider the tuna fishery as an opportunity for investment. It was also expected that a number of vessels from the United States were going to fish under the Mexican flag. This confidence may partially explain the decision of the Mexican government to engage in a direct confrontation with the United States knowing that the consequences would be economic retaliation.

Development proceeded as expected. Investment grew substantially. Mexican private groups from Monterrey, Star-Kist Foods from California, and a large Italian tuna processor, combined to form Palmar, the first major Mexican joint venture. The Mexican government worked out an arrangement with Van Camp Foods of California and Ed Gann, a San Diego tuna vessel operator, to form Pescatun. The good news, however, did not last for long. A few years after Mexico proclaimed its EEZ the situation became difficult. A worldwide recession of the tuna industry, the start of the Mexican economic crisis, dropping catch rates in the EPO helped by overcapacity and the 1982 El Niño. These factors, combined with the effect of the embargo, slowed down considerably the development of the Mexican tuna industry. In 1982, Pescatun was dissolved and many vessels returned to the United States flag. In 1984 an important part of the Mexican private groups withdrew from the industry. Since 1983 the export figures have been improving; Mexican tuna has been introduced in Europe. The U.S. market, the largest in the world, was reopened to the Mexican industry in 1986.

1.5 Objectives

The principal aim of this work is to review some important economic and political problems faced by Mexico and its tuna industry in the Eastern Pacific Ocean tuna fishery. An attempt is made to use the Mexican tuna fishery as an example showing the huge complexity involved in the management of marine resources.
NOTES AND REFERENCES


8/ Pacific Fishing, June 1988.

9/ See Inter-American Tropical Tuna Commission, Annual Reports (several years). La Jolla California.


13/ Ibid.


15/ D.M. King, *op cit*, Ref 12.

16/ Ibid.


18/ Ibid.


20/ Anonymous, *op cit*, Ref 17.

21/ Ibid.
22/ Ibid.


24/ Pacific Fishing, June 1988.


28/ Ibid.

29/ Ibid.
2.1 Fishery Policy Goals

Mexico has four global fishery policy goals1: 1) the production of food; 2) the generation of jobs; 3) the attraction of hard currency through exports; and, 4) the promotion of economic development. In addition to these general goals, the particular goals for the tuna fishery include2:

- Exert sovereign power over the tuna resources in the country's 200 mile EEZ.
- Assure a sustained yield from the stocks while attaining the full utilization of the high-seas tuna fleet.
- Protect the populations of marine mammals.
- Improve the industry's economic efficiency by regulating the fishing operations, as well as the processing and trade of tuna products.
- Obtain the necessary information to describe the behaviour and trends in the fishery.

2.2 The Fleet

The development of the Mexican tuna fleet over the past 20 years has been impressive. The total number of vessels grew from 11 in 1970 to 86 in 1986 totaling over 43,000 metric tons (mt) of carrying capacity3. An important feature of this growth has been the change in fleet composition, especially the increase in purse-seine vessels exceeding 1,000 mt of carrying capacity; the number of vessels in this category increased from 11 in 1981 to 40 in 1986 (table 2-I). These large purse-seiners have a longer range of operation. Thus, the Mexican tuna fleet is not only one of the largest operating in the Eastern Pacific, but is also a high-seas fleet capable of fishing anywhere tuna occurs.

The ownership structure of the Mexican fleet consists of three general groups. These groups include: 1) the private enterprises which control approximately 75% of the active fleet (table 2-II) and may include considerable investments by foreign interests in joint-ventures4; 2) state owned
Table 2-I Composition, in number of vessels, of the Mexican Tuna Fleet during the period 1981-1986 (not including longliners and miscellaneous small vessels).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Purse Seiners</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;1000 tons</td>
<td>11</td>
<td>10</td>
<td>18</td>
<td>28</td>
<td>38</td>
<td>40</td>
</tr>
<tr>
<td>500 to 1000 tons</td>
<td>22</td>
<td>22</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>&lt;500 tons</td>
<td>9</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Bait-Boats</td>
<td>12</td>
<td>15</td>
<td>11</td>
<td>20</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>56</td>
<td>61</td>
<td>79</td>
<td>88</td>
<td>86</td>
</tr>
<tr>
<td>C. Capacity</td>
<td>21075</td>
<td>30181</td>
<td>32450</td>
<td>41045</td>
<td>45530</td>
<td>45530</td>
</tr>
</tbody>
</table>

Source: Secretaría de Pesca (México)

In recent years the Mexican tuna fleet has been characterized by an inactivity of a large percentage of its units. At the beginning of 1986, the fleet included 88 vessels, of them only 47 started operation. The situation did not improve in 1987, when no less than 13 large seiners remained docked in the port of Ensenada. The principal problems have been the lack of financing and legal hassles over ownership due to debt problems.

Table 2-II Ownership structure of the Mexican Tuna fleet in 1987 showing the share of the catch by each sector in 1987 (includes only active vessels).

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>NUMBER OF VESSELS</th>
<th>CAPACITY M.T.</th>
<th>CATCH M.T.</th>
<th>% OF THE CAPACITY</th>
<th>% OF THE CATCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>41</td>
<td>37,970</td>
<td>78,017</td>
<td>85.36</td>
<td>88.37</td>
</tr>
<tr>
<td>Social</td>
<td>5</td>
<td>2,205</td>
<td>5,490</td>
<td>4.96</td>
<td>4.95</td>
</tr>
<tr>
<td>Government</td>
<td>10</td>
<td>4,290</td>
<td>7,414</td>
<td>9.65</td>
<td>6.68</td>
</tr>
</tbody>
</table>

Source: Asociación Nacional de Productores de Atún, A.C. México
In January 1988 a storm slammed Ensenada the principal Mexican tuna port sinking or damaging nearly 20 fishing vessels and causing $250 million in damages. Thirteen of the damaged vessels were tuna purse-seiners representing about 15% of the fleet carrying capacity. Of these vessels none belonged to the private sector and only one had actually fished under the Mexican flag in 1987. The remaining ranging in size from 1,200 mt down to 540 mt had been taken by the BANPESCA. Many of them, tied up in legal hassles over ownership, debt payments, and damage claims, had lain inactive for the last three years. Thirteen of the damaged vessels were ready to be sold to the private and social sectors. Because of the storm these vessels are not expected to join the fleet any time soon. According to Pedro Galicia Estrada, general manager of BANPESCA, all the vessels are insured and payments are expected soon.

This disaster, is not expected to have a significant impact in Mexico’s 1988 tuna catch, since most of the damaged vessels were inactive any way. However this will jeopardize the ability of the Mexican fleet to increase catches in the near future. It is expected that most the vessels will eventually rejoin the fleet.

A rough way to evaluate the relative operative efficiency of the Mexican fleet is by comparing its catch per ton of carrying capacity (CPTCC) with those obtained by the rest of the international fleet fishing in the EPO, this is done in figure 2-1 for the period 1981-1985. The mean figures of CPTCC registered by the Mexican fleet, were consistently lower than those registered by the international fleet. Stated in other words, the average ton of carrying capacity of the Mexican fleet produced less tuna than the average ton of the pooled carrying capacity of the international fleet even when the Mexican fleet has the advantage of operating under less restrictive access conditions and with a more modern fleet. This may be caused --in addition to the problems described above-- by the relatively recent entry of Mexico in the tuna fishery, particularly in the operation of large purse seiners that require specialized operating techniques. The rapid expansion of the Mexican fleet may have outpaced the availability of experienced labor.

The employment of large modern purse-seiners by Mexican fishermen has been criticized; some analysts have pointed out that this kind of vessel employs a relatively small number of fishermen and are costly to build. They can be efficient fishing vessels for countries with high wage rates located at great distances from the fishing grounds, Mexico is however a labor abundant country with low wage rates, a severe unemployment problem and ports located near very productive grounds. Small purse seiners and bait-boats, although not as efficient in terms of fishing power, require a smaller investments and employ more labor per ton of carrying capacity.
The total number of vessels in the fleet has also been criticized because their catching capacity exceeds the amount of tuna available in the Mexican EEZ\(^1\). It is important to point out however, that the Mexican EEZ is not the only fishing area for the Mexican purse-seine fleet. In the years 1984 and 1985, more than 20% of the catch was taken from waters outside the Mexican economic zone. This trend continued to increase, during the first part of 1986 when 55% of the catch was taken outside the Mexican EEZ\(^1\). This strategy, however, can make the Mexican fleet vulnerable to access restrictions imposed by other resource adjacent countries.

Table 2-III Normal labor requirements in number of crewmen per ton of carrying capacity for different categories of tuna vessels.

<table>
<thead>
<tr>
<th>Category</th>
<th>Crew size</th>
<th>Approx. crew/capacity ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purse-seiners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;1000 mt</td>
<td>21</td>
<td>Less than .021</td>
</tr>
<tr>
<td>500 to 1000 mt</td>
<td>17</td>
<td>.017 to .034</td>
</tr>
<tr>
<td>&lt;500 mt</td>
<td>15</td>
<td>Greater than .03</td>
</tr>
<tr>
<td>Bait-boats</td>
<td>11</td>
<td>.055</td>
</tr>
</tbody>
</table>

Source: Secretaría de Pesca (México).

2.3 Production

Reported catches by the Mexican tuna fleet increased from 7,000 mt in 1970, to a total of over 110,000 mt in 1987 (figure 2-2). Yellowfin, skipjack and bonito constitute more than 95% of the total catch. Species such as albacore, bluefin and bigeye are only occasionally caught.

The most important species for the Mexican tuna industry is yellowfin. During the period 1974-1985, landings of this species ranged between 53% and 87% of the total tuna landings. The second species in order of importance is skipjack which represented between 8% and 44% of the total tuna landings during the same period\(^1\).
2.4 Port and Processing Facilities

One of the reasons for the operational inefficiency of the fleet is the persistence of long queues in port. Lacking modern systems of unloading and handling tuna the ports at Ensenada and Mazatlan cause long delays that increases the costs of fishing operations. In theory the Mexican port facilities (1986) allow for 528 unloading operations annually. The expected number of unloading operations of the Mexican tuna fleet is of only 250 annually. Therefore, in theory, there is plenty of capacity to allow for a smooth unloading operation in the ports. In practice, the lack of machinery and skilled labor, poor (ground) access conditions in some ports, difficulty in obtaining foreign spare parts, and the lack of an efficient fiscal regime makes the real port capacity to be much lower than the theoretical capacity. Table 2-IV shows the principal Mexican tuna ports and processing capacity.

The presence of a large and modern tuna fleet is not matched by the processing facilities. Mexico continues to offer canned tuna in the same presentation of 50 years ago (the 192 grams can of tuna in oil). Many of the Mexican processing plants produces with obsolete machinery at a high cost. Once cost of the can—which has to be imported—is added the Mexican canned tuna becomes relatively costly to produce, and therefore is unattractive to the Mexican consumer and not competitive in the international market. Aiming to improve this situation, Mexican fisheries officials have signed contracts with four national research institutes to develop plastic packaging for tuna. Plastic would replace imported metal plate and make use of Mexico’s oil industry. In addition, if Mexico wants to increase its share of the international market, the Mexican tuna industry must put more emphasis on quality. More careful handling of the product is needed by the fishermen, during the unloading operations, in the storage facilities and by the canneries.

2.5 Costs

The costs of harvesting and processing tuna by the Mexican industry are high relative to other major harvesting countries. Fixed costs are higher than those of other countries. Due to the continuous devaluation of the Mexican currency, the acquisition and depreciation of fishing vessels and other goods used in the processing of tuna is substantial. Much of Mexico’s tuna fleet was purchased from foreign shipbuilders with contracts specifying payments in dollars, so are much of the machinery and parts used in the canneries. For capital acquired in Mexico, commercial interest rates have been very high.
Table 2-19 Principal Mexican tuna ports, showing its real annual processing capacity (figures are for the year 1986).

<table>
<thead>
<tr>
<th>PORT</th>
<th>CAPACITY (M.T.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensenada, B.C.</td>
<td>61,400</td>
</tr>
<tr>
<td>Isla Cedros, B.C.</td>
<td>5,760</td>
</tr>
<tr>
<td>La Paz, B.C.S.</td>
<td>11,520</td>
</tr>
<tr>
<td>San Carlos, B.C.S.</td>
<td>11,520</td>
</tr>
<tr>
<td>Tortugas, B.C.S.</td>
<td>5,270</td>
</tr>
<tr>
<td>Mazatlan, Sin.</td>
<td>11,520</td>
</tr>
<tr>
<td>Topolobampo, Sin.</td>
<td>19,200</td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td><strong>126,720</strong></td>
</tr>
</tbody>
</table>

Source: BANPESCA

Figure 2-1 Catch per ton of carrying capacity of the Mexican and international tuna fleets 1981-1985.
Variable costs are somewhat lower relative to those of other countries, but have been increasing recently. Some of the factors that make these costs to be lower include: cheaper fuel, proximity to fishing grounds and lower labor costs. Cans, labels and packing material make about 25% of the processing cost, while the cost of labor represents only about 2\%.

2.6 Markets

Before the embargo (1980) the United States absorbed virtually all of the Mexican exports, these were mainly sent to Start Kist, Van Camp, Bumble Bee and Sun Harbor in San Diego and San Pedro California.

![Graph A: Percent contribution of the Mexican tuna production to the total production in the Eastern Pacific Ocean.]

<table>
<thead>
<tr>
<th>YEAR</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>3.1</td>
</tr>
<tr>
<td>1971</td>
<td>2.9</td>
</tr>
<tr>
<td>1972</td>
<td>4.4</td>
</tr>
<tr>
<td>1973</td>
<td>3.2</td>
</tr>
<tr>
<td>1974</td>
<td>7.1</td>
</tr>
<tr>
<td>1975</td>
<td>6.2</td>
</tr>
<tr>
<td>1976</td>
<td>7.9</td>
</tr>
<tr>
<td>1977</td>
<td>9.8</td>
</tr>
<tr>
<td>1978</td>
<td>11.4</td>
</tr>
<tr>
<td>1979</td>
<td>16.8</td>
</tr>
<tr>
<td>1980</td>
<td>22.8</td>
</tr>
<tr>
<td>1981</td>
<td>24.5</td>
</tr>
<tr>
<td>1982</td>
<td>36.5</td>
</tr>
<tr>
<td>1983</td>
<td>35.3</td>
</tr>
<tr>
<td>1984</td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td></td>
</tr>
<tr>
<td>1986</td>
<td></td>
</tr>
</tbody>
</table>

![Graph B: Total production of the Mexican tuna fleet in the Eastern Pacific Ocean.]

<table>
<thead>
<tr>
<th>YEAR</th>
<th>TONS x1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>7.4</td>
</tr>
<tr>
<td>1971</td>
<td>7.4</td>
</tr>
<tr>
<td>1972</td>
<td>10.7</td>
</tr>
<tr>
<td>1973</td>
<td>14.3</td>
</tr>
<tr>
<td>1974</td>
<td>14.7</td>
</tr>
<tr>
<td>1975</td>
<td>27.8</td>
</tr>
<tr>
<td>1976</td>
<td>29.3</td>
</tr>
<tr>
<td>1977</td>
<td>25.1</td>
</tr>
<tr>
<td>1978</td>
<td>26.8</td>
</tr>
<tr>
<td>1979</td>
<td>33.6</td>
</tr>
<tr>
<td>1980</td>
<td>36.8</td>
</tr>
<tr>
<td>1981</td>
<td>73.8</td>
</tr>
<tr>
<td>1982</td>
<td>42.1</td>
</tr>
<tr>
<td>1983</td>
<td>40.1</td>
</tr>
<tr>
<td>1984</td>
<td>98.1</td>
</tr>
<tr>
<td>1985</td>
<td>107.4</td>
</tr>
<tr>
<td>1986</td>
<td>116.4</td>
</tr>
</tbody>
</table>

Figure 2-2 A) Percent contribution of the Mexican tuna production to the total production in the Eastern Pacific Ocean. B) Total production of the Mexican tuna fleet in the Eastern Pacific Ocean.
Source: IATTC Annual Report 1986
Not unexpectedly the Mexican tuna industry’s financial problems were blamed on the embargo. However, even without the embargo, it is not clear that the situation would have been much better. During the years that followed the embargo the tuna industry in the United States was going through difficult times. In 1982 the canneries in California were slow to buy fish, even at reduced prices, and boats lay unloaded at the piers for long periods. These conditions led to shutdowns and slowdowns in the canning operations. It is unlikely that these canneries would have bought the increasing Mexican production when they were busy looking for customers for the fish they had already canned.

Facing the impossibility of opening new markets in the short term, and with an increasing surplus accumulating in the ports and even in the fishing boats themselves. The Mexican government was forced to intervene. It began buying the catches and absorbing the storage costs. The government also helped to finance the newly acquired vessels and started an advertisement campaign to promote the domestic consumption. However the Mexican consumer showed no reaction to the advertising efforts and the lack of outlets for the production became an acute problem. The situation got worse when several brand new vessels arrived from the shipyards. In 1982 a year and a half after the embargo was imposed, 50 new boats had been added to the fleet.

In 1982 the Mexican peso fell from 23 pesos per one (United States) dollar to 45 pesos per dollar effectively doubling the cost in pesos of approximately 36 seiners ordered abroad from 8.3 to 16.3 billion pesos. According to the Mexican Fishery Secretariat (SEPESCA) vessel owners were about 450 million dollars in debt by 1984. The Mexican currency has been losing ground since then, exceeding 2,000 pesos per dollar in 1988. Without the earnings from tuna exports the impact of the devaluation was devastating. Massive subsidies from the government were necessary to keep the industry from sinking.

Since 1983, as Mexico developed new markets, exports (mainly in frozen form) have been increased. They reached more than 62,000 mt (fig 2.3) in 1987 most of it to Italy (fig 2.4). In August 1986 the United States’ government lifted the embargo imposed on tuna products. Mexican frozen tuna will be allowed to enter the United States according to the following schedule:
It is still early to evaluate the effects of the reopening of the United States' market to Mexican tuna. The situation does not look favourable. The tuna industry in California is severely crippled with only a few canneries operating. The tuna industry, however, is showing signs of recovery this may bring better business perspectives for the Mexican industry. It is estimated that the Mexican exports of frozen tuna will be sent to Puerto Rico and American Samoa. The introduction of Mexican canned tuna in significant amounts is less likely due to tighter importing restrictions from part of the United States.

Fig. 2.3 Total Mexican tuna exports in metric tons (1981-1987). Source: Secretaria de Pesca: Anuario Estadistico (several years).
Fig. 2.4 Principal importer countries of Mexican tuna.
Source: Secretaria de Pesca: Anuario Estadistico (several years).
NOTES AND REFERENCES


3/ Ibid.


5/ Secretaría de Pesca, op cit, Ref. 2.

6/ Ibid.


8/ Ibid.


10/ K. Talley, op cit, Ref. 7

11/ Banco Nacional de Pesca (National Fisheries Bank) a government-controlled institution.


14/ United States Trade Commission, op cit, Ref. 4.


16/ Ibid.

17/ Secretaría de Pesca, op cit, Ref. 2.

18/ Ibid.


20/ Secretaría de Pesca, op cit, Ref. 2.

21/ Ibid.

22/ R. Moya, op cit, Ref. 19.


24/ For a detailed account of the Mexican tuna industry costs see Secretaría de Pesca, op cit, Ref. 2.

26/ Ibid.

27/ Secretaría de Pesca, *op cit*, Ref. 2.


29/ Ibid.


32/ These are voluntary restraints agreed upon by the Mexican Government. See Secretaría de Pesca, *op cit*, Ref. 2.
3 INTERNATIONAL MANAGEMENT PRIOR TO 1980

3.1 The Inter-American Tropical Tuna Commission

After World War II the nations involved in the Eastern Pacific tuna fishery began a series of discussions with the intention of instituting an international organization that could help manage the tuna resources in the region. The first meaningful result of these discussions was the establishment of the Inter-American Tropical Tuna Commission (IATTC) by the United States and Costa Rica in 1949. Subsequently Panama, Equador, Canada, Japan, France Nicaragua and Mexico joined (table 3-I).

The original objectives of the IATTC were to study the biology, ecology and population dynamics of tuna (mainly yellowfin and skipjack) and related species, including the species used as baitfishes; and, if necessary, to recommend the appropriate conservation measures to maintain the stocks of fish at levels that would sustain maximum yield. In 1976 the Commission's duties were broadened to include problems arising from the tuna-porpoise relationship.

Table 3-I Nations member of the Inter-American Tropical Tuna Commission during the period 1950-1987.

<table>
<thead>
<tr>
<th>Country</th>
<th>Membership Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>1968 TO 1984</td>
</tr>
<tr>
<td>Costa Rica**</td>
<td>1950 TO 1979</td>
</tr>
<tr>
<td>Ecuador</td>
<td>1961 TO 1984</td>
</tr>
<tr>
<td>France</td>
<td>1973 TO ----</td>
</tr>
<tr>
<td>Japan</td>
<td>1970 TO ----</td>
</tr>
<tr>
<td>Mexico</td>
<td>1964 TO 1978</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>1973 TO ----</td>
</tr>
<tr>
<td>Panama</td>
<td>1953 TO ----</td>
</tr>
<tr>
<td>USA**</td>
<td>1950 TO ----</td>
</tr>
</tbody>
</table>

* The Convention came into force in 1950.
** High Contracting Parties.
Source: IATTC Annual Reports (several years).
The commission staff reports on its assessments of the stocks of tuna at the commission's meetings. If regulations are needed, the staff makes general recommendations in this regard. The recommendations are then discussed by the member nations at intergovernmental meetings. If agreement is reached at the intergovernmental meeting and the recommendations of that meeting are then accepted by the Commission, member nations then set the necessary regulations. These nations are also responsible for enforcement.

3.2 The Conservation Program for Yellowfin

During the early 1960s, the IATTC scientific staff determined that yellowfin was in need of protection and recommended the establishment of an overall annual catch quota. A system of quotas was agreed upon in 1961, but the governments of the concerned countries were not able to implement regulations until 1966. Quotas for 1966 through 1979 were adopted and implemented. Quotas have been recommended but not implemented (for reasons exposed later) since 1979. Under this system, quotas were taken on a first-come, first-served basis until the global quota for each particular year was reached.

The conservation program was restricted to a specific area of the Eastern Pacific (figure 1-1) known as the Commission's Yellowfin Regulatory Area (CYRA). Initially, the CYRA encompassed the entire Eastern Pacific yellowfin fishery, but as time progressed, significant catches were taken west of the CYRA.

Although the IATTC regulatory program included only yellowfin, it had major implications for the tuna industry in the region. Yellowfin is the most important fish in the Eastern Pacific surface fishery, both in terms of volume and value. For Mexico, access to yellowfin is vital, since this fish constitutes about 70% of its total landings.

From the beginning, problems arose among the participating nations, in particular regarding the issue of allocation. The largest shares of the total allowable catch were taken by the nations with the largest and most efficient fleets, in particular the United States' fleet. The Mexican tuna fleet was in a stage of early development and therefore in a competitive disadvantage. Mexico maintained that the allocations should be granted on the basis of adjacency to the resource. Opposing this position, the non-resource adjacent nations, especially the United States, refused to recognize claims based on resource adjacency. A system of special allocations was instituted in 1969, however these allocations were granted based on economic need rather than on the concept of adjacency. This new scheme provided for special allowances to be taken by vessels experiencing economic problems but the regulations still consisted primarily of an overall quota for...
As their fleets developed the coastal states were granted increased allocations. The Mexican government felt that this procedure did not solve the problems of unfair competition with larger fleets. The quota that Mexico received from the IATTC members never surpassed 20,000 mt; "despite the fact that over and above 75,000 mt of abundant tuna resources existed adjacent to its coast".

3.3 The Mexican Initiative

By the mid-1970s the negotiations to reach agreement on catch allocations became difficult and prolonged. Because of this difficult and -- in Mexico's view -- unfair conditions, in 1977 Mexico proposed the creation of a new treaty, a treaty compatible with the LOSC's exclusive economic zone regime. With this proposal Mexico was attempting to introduce several new concepts into the regional tuna management. The most important of these concepts include:

1) To include the objectives of economic efficiency and social equity in the management of the tuna resources throughout the region, in addition to the efforts towards conservation.

2) The distribution of a portion of the allowable catch among coastal states based upon the concept of adjacency.

3) The establishment of an international licencing scheme that would apply throughout the region.

4) A standardized system of enforcement.

The United States opposed the formation of a new treaty arguing that there was already one in existence which "was working satisfactorily".

The Mexican proposal for a new agreement failed. Mexico withdrew from the IATTC (in 1978) and declared the jurisdiction over tuna in its recently established EEZ. Without Mexico and Costa Rica (which also withdrew) it became no longer possible to continue with the yellowfin conservation program. Consequently no regulatory program has been in place since 1979. Though the Mexican proposal did not result in a final treaty, it succeeded in establishing a number of important principles to be considered in the formulation of future agreements.
3.4 Economic Considerations

Catch quotas have been the most widely used method for the regulation of pelagic fish stocks. In principle a catch quota enables the impact of the fishery on the stock to be maintained at some desired level, provided that the right information is available. The economic efficiency of a quota system depends on the extent to which it is allocated to individual units (e.g., vessels). With no allocation, fishermen will be encouraged to increase fishing power and effort to get the largest possible share before the overall quota is reached. The result is often a competition for larger shares of the quota. Among other problems excess capital enters the fishery, and fishing costs increase. Therefore an unallocated quota system is not only unable to correct for the open access pattern of exploitation but it can introduce further inefficiencies.

During the time the IATTC yellowfin conservation program was in place far more capacity entered the fishery than was needed to harvest the available catch. During the period 1966 through 1980 the aggregate capacity of the international fleet increased from 46,305 short tons to 189,371 short tons, an increase of 409% (figure 3-1A). At the same time the total catch in the EPO increased from 183,525 to 353,828 short tons (includes all marketable species) an increase of only 93% for the same period (figure 3-1B). This increase in fleet capacity made it even more difficult to reach agreement on allocation.

An inevitable effect of overcapacity is the decrease in the average productivity of individual vessels. Figure 3.2A shows the average annual catch per ton of carrying capacity of the Eastern Pacific purse-seine fleet for the period 1965-1986, this measure is used here as an index of the relative productivity of individual vessels. In 1967 the average vessel was making more than 4 full trips a year, this number decreased to less than 2 full trips per vessel per year by 1979. In other words when the regulatory program started each ton of carrying capacity was producing around 4 tons of tuna. When the program ended a ton of carrying capacity was producing less than 2 tons of tuna.

An additional factor that contributed to attract capital into the fishery was the strong demand for canned tuna which pulled ex-vessel prices up (figure 3.2B). With high prices fishermen were able to offset the decrease in productivity. The catch per ton of carrying capacity multiplied by the tuna ex-vessel (United States) price index is used here as proxy of gross earnings (fig 3.2C). Average gross earnings increased in spite of the decrease in productivity.
Economic theory predicts that without regulation to control effort, capital will continue to enter the fishery as long as fishing is profitable. This trend will continue until the catch rates fall to a point where operating cost are no longer met. At this point some vessels will start to leave the fishery. In the long run most or all of the rent will be dissipated. Whether biological depletion occurs or not depends on where the bionomic equilibrium of the the unregulated fishery lies\(^1\). If the bionomic equilibrium is low, vessels could still meet operating expenses even when the stock size becomes very low\(^2\). The bionomic equilibrium stock size of yellowfin is not well known\(^3\). It is felt that the decline in catch rates during the 70s and early 80s, in the Eastern Pacific yellowfin fishery may have been due to overfishing, but the bionomic equilibrium was apparently not very low, because effort dropped and catch rates increased without catch regulations\(^4\) (see chapter 6).

To be fair, it is necessary to mention that even when the IATTC regulatory program had incorporated provisions to restrict effort in order to improve the industry's economic efficiency, it is likely that such measures had not been followed by Mexico, a country that had a political commitment to develop its own tuna fleet without regard to the cost. This situation is typical in fisheries management, where the objective of economic efficiency is seldom among the main goals of fisheries management.

![Graphs](image)

Figure 3: A) Eastern Pacific tuna fleet carrying capacity. B) Total catch by the tuna fleet in the Eastern Pacific Ocean.
Source: IATTC Annual Report 1986
Figure 3-2  A) Catch per ton of carrying capacity. B) Ex-vessel price index (U.S. ports) C) Catch per ton of carrying capacity multiplied by the ex-vessel price index. For explanation see text.
Fisheries of the United States (several years).
NOTES AND REFERENCES

1/ C.L. Peterson and W.H. Bayliff, Organization, Functions, and Achievements of the Inter-American Tropical Tuna Commission. IATTC Special Report No.5. 1985

2/ Ibid.

3/ Ibid.

4/ See Inter-American Tropical Tuna Commission, Annual Reports (several years).

5/ Peterson and Bayliff, op cit, Ref. 1.

6/ See IATTC, Annual Reports (several years).


9/ Peterson and Bayliff, op cit, Ref 1.

10/ Joseph, op cit, Ref. 7.


12/ Joseph, op cit, Ref. 7.


14/ Joseph, op cit, Ref. 7.

15/ Ibid.


18/ Ibid.

19/ Joseph, op cit, Ref. 7.

20/ Fisheries of the United States (several years).

21/ The biologic equilibrium is the stock size towards which an unrestricted fishery will end, the concept recognizes the economic and biologic forces that govern the fishery. See eg C. W. Clark, Mathematical Economics: The Optimal Management of Renewable Resources, Wiley Interscience Series of Texts Monographs and Tracts, John Wiley & Sons, New York, 1976.
There are situations however, when fishing may continue far beyond the bionomic equilibrium. One of these cases is when a government provides subsidies to the fishermen allowing them to continue fishing even when their operating costs are not met. In this case the danger of overfishing is greater. The Mexican tuna fleet is an example of a heavily subsidized fleet.


4 EXTENDED COASTAL STATE JURISDICTION

4.1 The Law Of The Sea Convention

The expansion of the coastal state's jurisdiction over the living resources to a 200 mile exclusive economic zone is one part of the Law of the Sea Convention that has achieved near-universal acceptance and approval. The establishment of the 200-mile EEZ will embrace over ninety per cent of the world's commercially exploitable fish stocks. Within the EEZ the coastal State has "sovereign rights for the purpose of exploring and exploiting, conserving and managing" the fish stocks. These rights are subject to a number of obligations: the coastal State must take conservation and management measures to protect the fish stocks from overexploitation; and maintain such stocks at levels which can produce the maximum sustainable yield. In addition, the coastal state is to permit the fishermen of other States to fish for the balance between what its fishermen take and the total allowable catch.

The species of tuna covered by the Convention are considered to be part of a special category of stocks defined in the Document as highly migratory. The 1982 LOSC is not explicit on the relationship of highly migratory species to the regime of coastal state rights in the exclusive economic zone. Article 64, which refers exclusively to these species, has been subject to different interpretation. This article reads as follows:

1. The coastal State and other States whose nationals fish in the region for the highly migratory species listed in Annex I shall cooperate directly or through appropriate international organizations with a view to ensuring conservation and promoting the objective of optimum utilization of such species throughout the region, both within and beyond the exclusive economic zone. In regions for which no appropriate international organization exist, the coastal State and other States whose nationals harvest these species in the region shall cooperate to establish such an organization and participate in this work.

2. The provisions of paragraph 1 apply in addition to the other provisions of this part.

Paragraph one of the Article obligates the nations fishing for highly migratory species to cooperate by means of international organizations. In this regard, almost all nations
agree that some form of international cooperation is needed to regulate the stocks of tuna (and other highly migratory species). However there is discrepancy as to whether the obligation to cooperate supersedes the other provisions given to the coastal state by the Convention.

Mexico and the majority of the nations interpret—based on paragraph two of Article 64—that the provisions of this article apply in addition to all other rights and obligations. According to this interpretation the coastal State has sovereign rights over all tuna resources (and all other highly migratory species) within 200 miles. These rights are supplemented with the obligation to cooperate by means of international organizations. A notorious exception to this interpretation is that of the United States (see section 5.2), which interprets Article 64 as relegating the absolute control over tuna (but not other highly migratory species) to the appropriate international organizations; and that tuna is exempted from coastal state jurisdiction beyond territorial seas (12 miles) prior to the existence of an international management scheme.

It is important to emphasize that although the Law of the Sea Convention has not formally entered into force, it is accepted by the vast majority of states. A large part of the Convention has become part of customary international law even before its formal ratification, and as such it is binding on signatories and nonsignatories states alike. Even the United States, which refuses to accept the final version of the Convention, agrees with this view. Today, many coastal states have declared extension of fisheries jurisdiction (EFJ) some of which differ from the EEZ concept delineated by the LOSC however the basic principle—sovereign rights over the resources—remains widely accepted. In the following discussion we will refer to EEZ and EFJ indistinctly but it is necessary to keep in mind that there may be important differences between some EFJ and the EEZ as defined in the LOSC.

4.2 Management Considerations

Biological Conservation

Although much has been said regarding the best way to protect the stocks of tuna from overfishing, little thought has been given to the possibility that such protection is not needed. The need for protection measures requires that in the absence of protection there will be overexploitation. Considering the Eastern Pacific fishery as it now stands, there has been no effective regulation to protect yellowfin for almost ten years, and skipjack has never been protected, yet the stocks of these species are not considered to be in danger of biological overexploitation.
The present conditions in the fishery, however, are likely to change. The current success of fishing operations in the region and the rising level of ex-vessel prices may attract more effort and capital into the fishery and prompt the need for biological protection, particularly in the case of yellowfin.

If the need for regulation measures to protect the stocks arises, then whether control over tuna inside the EEZs is given to coastal states or to an international body can be of major importance. The dominant view is that conservation would be impossible without the existence of international cooperation. There are important disagreements, however, as the form that such cooperation must take. Most Latin American countries propose that international institutions for managing highly mobile species must be build around a central manager's role for nations within whose coastal waters the species spend extended periods of time, and that such institutions must recognize the sovereignty of the nations over tuna within 200 miles of their respective coasts. It is difficult however to conceive an arrangement that can preserve the rights over tuna within the individual EEZs and at the same time achieve enough international cooperation to assure proper management (some proposed arrangements are discussed in chapter 6). Non resource adjacent countries, as already stated, argue that the control over tuna must be given to an international regulatory body and that tuna is exempt of national jurisdiction in the EEZ.

In a recent paper, Ray Hilborn and John Sibert argued that under certain circumstances international management for some species of tuna is not indispensable. In particular, these authors argued that for skipjack and yellowfin long distance movements are the exception rather than the rule, and that for countries with a large economic zone, stocks may be considered resident. The need for international management, as pointed out by Hilborn and Sibert, requires the existence of significant stock interchange between different EEZs and international waters so that fishing for a given species in one economic zone, or in international waters affects the catch rate of that species in another zone. Whether this is true or not depends not only on the extent of fish movements, but on several other factors as well; among the most important are the relative magnitude of these movements and the size of the EEZ, and the recruitment and mortality rates relative to the emigration rate in a given EEZ. If catch rates rates in one zone depends on fishing activities outside that zone then, international cooperation may be the only alternative. International cooperation is likely to be necessary for countries with small EEZs such as most of the Latin American resource adjacent countries in the Eastern Pacific (Mexico may be the exception). The contribution of Hilborn and Sibert argument is not -as Gulland has put it- the destruction of the "myth" that all species of tuna are highly migratory, or that
international cooperation for the management of tuna is no longer needed; much more research is needed before that can be concluded. The value of Hilborn and Sibert argument lies not in the "destruction", but in the questioning of such assumptions. One should not start talking about tuna management by assuming that international cooperation is essential. The possibility of localized control must be considered especially for the less mobile stocks in countries with large EEZ. Closely associated with this view is the need to properly amend the definition and legal status of tuna in the LOSC and elsewhere. Unfortunately, as already mentioned, much more research is needed before the issue can be settled completely. Information on movement and mixing rates, recruitment and other essential biological information is incomplete and often contradictory. It is perhaps ironic that the information needed to solve the controversy must come—due to the magnitude of the problem—from multinational sponsored research projects or from organizations such as the IATTC.

Hilborn and Sibert findings, if correct, may radically change the way tuna is legally and politically viewed (at least in the case of yellowfin and skipjack) and, perhaps open the possibility to countries like Mexico to make full use of its tuna resources within 200 miles according to its own objectives and with little concern for outside harvest rates. In situations where international management is not needed then the coastal state can treat the stocks of tuna in the same way as any other resident stock.

Economic Efficiency and Property Rights

If, in addition to biological conservation, the objective of economic efficiency is considered the problem becomes even more complex. Maintaining a healthy stock is not enough to assure positive economic returns from a fishery. Economic factors must be carefully considered when analysing the desirability of EFJ as well as when designing a harvest or any other regulatory policy.

Although the objective of economic efficiency is seldom the main goal in today's fisheries management, it is useful to consider the conditions that will lead to efficiency and then use this situation as a reference to compare other alternatives. In this section ethical and political considerations will be set aside to concentrate exclusively on the issue of efficiency as regards the EFJ. (political and equity issues will be considered in chapter 6).
Prior to the EFJ regime, the resources of the high seas were open to all, belonging to no one but capable of being reduced to possession by capture. No state could claim a right to any guarantee share of the living resources of the oceans, but all the states had the right to fish on the high seas. A state obtained title or property over fish only once they had been caught. Due to the relatively narrow territorial seas many of the commercial fish stocks were in the high seas and therefore subject to no control. Open access led to economic inefficiency and in most cases to biological overexploitation. At that time the only possibility of management was through international organizations. Several such organizations were created but the results were generally considered unsatisfactory by the concerned coastal states. An important problem was the lack of a legal framework to assign allocations and enforce regulations. Without the possibility of binding agreements to guarantee shares of the catch, the regulations implemented --usually a global catch quota-- resulted in increased competition among the fishermen for larger shares of the quota. This competition made, in many situations, the conditions even worse than under unrestricted fishing. Many economists argued that the lack of a well defined system of property rights to the resource was responsible for many of the problems of the fishing industry. For this reason they actively supported the development of EFJ since it provided the coastal states with unambiguous property rights over the stocks of fish and therefore with the necessary incentives to search for a more efficient exploitation regime. These same economists recognized however that even when the EFJ created the opportunity for an efficient management, such opportunities could easily be lost if the states fail to properly allocate the available catch among their fishermen.

It is less clear however that the opportunities for rational management created by EFJs hold for the stocks that transgress the political boundaries created by EFJs. Control over the so called highly migratory and transboundary stocks is shared by several coastal states. For highly migratory species the stock is fished in international waters as well as in the EEZ of several countries. For these species the opportunity for the creation of unambiguous property rights, and therefore economic efficiency disappear. Unless all the countries fishing for these stocks happen to have very similar objectives or appropriate incentives are created through international organizations, the possibility for efficient management under the EEZ regime is dim.

Again, the issue raised by Hilborn and Sibert is of major importance because if some stocks of tuna can be considered resident (ie the catch rates elsewhere do not significantly affect catch rates inside a particular EEZ) then for these stocks the EEZ regime provides the same opportunities for efficient (or inefficient!) regulation as for any other resident stock.
Management Considerations for Mexico

During the 1970s Mexico placed great hopes in the benefits that the exploitation of the marine resources adjacent to its coasts could bring to the nation. Consistent with this position, in 1976 Mexico unilaterally established a 200-mile exclusive economic zone covering an area of approximately 2.5 million km\(^2\). "In taking such a decision, we have taken into consideration the progress achieved within the United Nations Conference on the Law of the Sea\(^{16}\)."

The exclusive economic zone proclaimed by Mexico closely paralleled the model provisions of the exclusive economic zone concept delineated by the LOSC. It provided for sovereign rights over all living and non living resources to 200 miles. Tuna was not included until 1980. The decision to include tuna came as result of the problems with the IATTC and the United States (see chapters 3 and 5).

To Mexico, the exclusive economic zone means more than just the economic value associated with the control of resources. There is a great deal of national pride involved. Mexico has always played a major role in advancing the concept of coastal state control over marine resources: through its proclamation of an EEZ; through its support of the position of other Latin American States in various regional and international meetings; and through its active participation in the LOSC negotiations\(^{17}\). Unfortunately, complex political interests and social objectives have been the principal driving force in Mexico's fishery policy while economic and environmental objectives have often been granted inconsequential importance. In the case of the tuna industry, a commitment to develop a large modern fleet and to exert sovereign control over the resource led the government to divert scarce capital resources --much of which was acquired with funds borrowed from abroad. This situation took place both directly, and indirectly by providing incentives to the private sector to invest in the tuna industry. At the same time the government got involved in a painful confrontation with the United States that closed the world largest market of tuna to the Mexican industry.

Returning to the issue of economic efficiency and again leaving out, for the moment, other considerations, the situation of the Mexican tuna industry regarding EJ over tuna will be considered. Whether Mexico can achieve an efficient use of its tuna resources\(^{18}\) in the long run depends on several factors, all of which involve some degree of uncertainty. Therefore, a rigorous quantitative economic analysis would be difficult. Such an analysis is beyond the scope of this work. Instead, an informal discussion of some conditions that may lead to economic efficiency will be attempted. To do this, let us assume that the sole objective of Mexico regarding its tuna industry is to maximize the net present value of economic re-
turns (i.e. to be efficient). The achievement of such an objective depends in part on the following conditions:

**Effective control over the resource:** even if it is assumed that --in accordance with the LOSC-- Mexico will obtain legal rights over the part of the tuna resources lying within its EEZ, it cannot be asserted that the country will have effective control over such resources. By effective control we mean sole authority (except for environmental factors) over the fate of the stock, capacity to protect it from illegal fishing and capacity to effectively enforce regulations. Leaving out for the moment the issues of enforcement; effective control over the stocks of tuna depends on the extent on which catch rates in the Mexican EEZ are affected by fishing activities elsewhere. This in turn depends on the intensity of fishing operations outside the Mexican EEZ, oceanographic, and biological factors such as movement, diffusion, mortality, and recruitment rates inside it. Given the incomplete knowledge we have of many of these variables, it is not possible to tell with certainty the degree of dependence of the catch rates inside the Mexican EEZ on fishing activities elsewhere and therefore the effects of including tuna into Mexican jurisdiction regarding economic efficiency can only be speculated. The current view is that catch rates inside the Mexican EEZ are significantly affected by fishing activities elsewhere and therefore extending Mexican jurisdiction over tuna is unlikely to lead to an effective unilateral control by Mexico. One alternative, from the Mexican standpoint, is to search for an international regime based on a system of partially allocated quotas (PAQ). The quotas being allocated to the fishing nations based on the concentration of the resources --as measured from historical catches-- inside the country's EEZ. The country is to be permitted, however, to catch its allocation everywhere within the Eastern Pacific (except for the 12-mile territorial sea). This regulatory system is to be complemented by a licencing scheme for the part of the resource corresponding to international waters\(^1\). Even when the magnitude of the PAQs allocated to Mexico may change from year to year, this system can give the country unambiguous rights to a part of the resource (proportional to historical catches by the international fleet in the Mexican EEZ). Mexico can then decide what is the best use for its share of the resource. The Principal problem that such a system faces is the acceptance of non-resource adjacent countries, without their cooperation, the costs of enforcing the regulations would be prohibitive.

An additional problem that can arise if coastal states unilaterally control tuna in their respective jurisdictional waters was pointed out by Joseph and Greenough: The areas of good fishing change from year to year. This is not necessarily a result of migrations, but may be the result of year to year changes in oceanographic conditions (in particular temperature) that can change the vulnerability of tuna to surface
gear in a given location respect to other fishing seasons. For some countries this means that their fleets will be precluded from fishing in the good spots during the years that tuna appears in the EEZ of neighbour countries. For Mexico, a country with a large fleet which is depending more and more on catches taken outside its EEZ, it may not be possible to insure adequate catches if restricted to its own coastal zone and international waters. The PAQ system proposed above is one possible solution to this problem.

**Internal Allocation:** Economic efficiency also depends on how the available catch (or the part of the available catch allocated to Mexico by an international body) is allocated among fishing agents (fisherman, vessels, cooperatives, etc.). With no allocation (i.e. open access) efficiency is likely to be low for reasons already discussed. An alternative suggested by many economists is to create property rights to shares of the total available catch (individual quotas). If quotas are long-lived and freely transferable, fishermen have incentives to make their catch at minimum cost. There is no apparent incentive under an individual quota system to overinvest in vessels and gear. In addition, if quota markets develop, then quota prices became reliable estimates of the value of wild fish in the sea. These estimates can be used, for example, to adjust effort and as a base price in international negotiations over fish. The costs of official development programs, which includes support of local fishing activity, are more accurately estimated if the government must buy quotas for regional distribution at market prices. Pro-environmental organizations can buy quotas (to leave the fish in the sea) to reduce the impact of fishing on the stocks and/or reduce the incidental mortality of dolphins.

Individual transferable quotas (ITQ) have been used in several countries. With results that have given good grounds for optimism. However, in spite of the theoretical advantages ITQs have some significant problems. Probably the most important is that ITQs have not always been welcomed by the fishermen. If the fishing agents fail to perceive the opportunities created by ITQs, then the incentives to behave efficiently disappear. Some other important disadvantages of ITQs include: Quotas, including ITQs on landed weight, offer incentives for wasteful discarding of fish caught at sea, bycatches are not easily accommodated, and, in some cases, ITQs are difficult to enforce.

An additional concern is that as a form of wealth, ITQs may be concentrated in a few hands because of unequal access to capital finance. This rise concern for potential monopolization. So far Mexico has not shown any interest in property rights based systems; the tuna fishery has always been open access to Mexican fisherman and it seems that it will continue to be that way, at least in the near future.
Comparative Advantage: To obtain maximum economic returns from the tuna resources, Mexico must recognize any comparative advantage that a foreign nation may have in the provision of some, or all, of the requisite harvesting and/or processing services. When the EFJ concept was being declared by many coastal states it seemed obvious that the coastal state would enjoy maximum benefits if foreign distant-water harvesting and processing activities in the coastal state’s EEZ were replaced by those of domestic harvesters and processors. Mexico was not the exception; when tuna was included into Mexican jurisdiction during the early 80s the Mexican government made an aggressive effort to ban distant water tuna fishing in order to develop its own fleet. However, as Munro pointed out if distant water fleets have a comparative advantage in terms of opportunity costs relative to the coastal state, then there are sound economic reasons to consider the presence of these fleets not only in the short run, but in the long run as well. If a distant-water nation has comparative harvesting or processing advantage then the contribution of the relevant fishery to the coastal state’s national income can increase if the coastal nation enter into cooperative fisheries arrangements with the distant-water nation. The arrangements can take the form of fee/licencing fishing or joint-ventures. Cooperative fisheries arrangements can be seen as a form of international trade where the coastal nation imports harvesting and processing services (fee/licencing fishing) or where the coastal state imports either processing or harvesting services (joint-ventures). The specific form that the cooperative fishery arrangements should take, if the contributions of the coastal state’s fishery to coastal state national income are to be maximized, will depend simply upon the configuration of distant-water versus coastal state comparative advantage. In addition to the argument above, importing harvesting and/or processing services from distant-water nations can reduce the inherent risk of fishing operations, since it takes away the need by the coastal states to invest in fleet or processing facilities.

In spite of Mexico’s privileged geographical situation with respect to tuna resources, the operating efficiency of the Mexican fleet has been lower (see chapter 2) and its costs of production generally higher relatively to the distant-water fleets of industrialized nations in particular the U.S. fleet. The Mexican tuna purse seine fishery is a capital intensive industry, Mexico however, is a labor abundant country with a high opportunity cost of capital. Many believe that the acquisition of a capital intensive purse-seine fleet by Mexico was a mistake, and that the country would have been better off, in terms of economic returns, by entering into cooperative arrangements--such as fee fishing and/or joint ventures--with distant-water fishing nations. It can be sustained that Mexico and all the countries participating in the fishery would have have been better off by participating in such arrangements instead of being engaged in the damaging confrontation for jurisdictional rights.
An additional potential benefit of cooperative fishery arrangements arises from the existence of barriers to international trade. By entering into such agreements the coastal state may as a consequence be granted easier access to the markets of the trading partners. Neglecting this point was a costly policy mistake for Mexico, since it meant the closure of the largest tuna market in the world.

The protectionist position of the Mexican Government could be defended using the infant industry argument. According to this argument, a country may have a latent comparative advantage in the production of a particular commodity but cannot develop in the presence of established foreign competitors. If this is the case, the argument continues, this industry should be protected during its infancy until the domestic enterprises have fully developed. Once this stage has been completed, the coastal state comparative advantage will be revealed and the need for protection will disappear. In terms of this paper, the issue is whether it was appropriate to facilitate the expansion of the Mexican tuna industry into activities as yet dominated by the United States.

Although the infant industry argument is legitimate in some situations, there is always the risk that such an industry will never mature. If this happens, it may prove difficult to remove such an industry at a later time because of the political pressure exerted by the affected groups. If this is true then the industry will become a permanent burden to the coastal-state economy.

An additional argument for protection is the employment argument. If the presence of distant-water fishing fleets is discouraged, then there will be greater employment opportunities in the coastal state's fishing industry. From an economist point of view, labor costs should be measured on opportunity cost basis when analyzing coastal state versus distant-water fleet comparative advantage. The employment argument is only valid when there is significant unemployment in the coastal state, since it is then when the opportunity cost of labor is very low, lower certainly than the cost to its employers. In this situation it is possible that the distant-water fleet presence will be rejected on an opportunity cost basis. Mexico is certainly a country with a severe unemployment problem. However, the validity of the employment argument in the case of its tuna industry can be questioned. This is especially true for the harvesting sector (ie the fleet) since the Mexican tuna fleet has a low labor to capital ratio (see section 2.2).
In short, the presence of distant-water tuna fishing in the Mexican EEZ should not be dismissed. Whether Mexico should have considered (or should consider in the future) the presence of distant-water nations, in particular the United States tuna fleet, is an empirical question. Opportunity costs (which define comparative advantage) and their evolution over time, research, surveillance, and enforcement costs need to be carefully analysed if a judicious decision is to be made.

**Recognition of market forces:** The Mexican tuna industry has been a production-driven industry. Policy makers, fishermen and processors in the tuna industry have perceived the prevailing goal as maximizing production; marketing considerations, until recently, were given only secondary importance. The typical attitude of the Mexican fishermen is to harvest as much of the resource as possible and then wait and see if the market conditions turn out to be favorable, if not, immediately demand government intervention.

It was argued in previous sections that there are potential gains to coastal nations establishing EFJ zones. The possibility exists, however, that trade effects convert these potential gains into losses. Expanded exports due to increase in production may have a depressing effect on the prices of the products whose output has been expanded. It is possible in such cases that the country's real income declines, a situation known in the literature of economic growth as "immiserizing growth." Again, in the case of Mexico's tuna industry, this question calls for empirical research. Information on demand elasticities and the trade position of Mexico in the world market is necessary if Mexico wants to successfully change its tuna industry from a production-driven to a market oriented industry.

**Costs of management:** If not properly considered, administration costs can outweigh the potential economic benefits from fisheries management. Managers must search for practical management programs. These programs must emphasize the creation of incentive compatible regulations which minimize the cost of obtaining information as well as the cost of implementation and enforcement.

The current position of the Mexican Government --exclude all foreign tuna fishermen from the Mexican EEZ-- is an example of an unenforceable regulation, since it provides strong incentives to foreign fishermen to poach in Mexican waters. Mexico lacks the capacity to protect its huge EEZ. To build a fleet dedicated to such a task will, with little doubt, outweigh the benefits. The development of alternative management schemes ensuring the cooperation of all other parties involved in the fishery is mandatory.
NOTES AND REFERENCES

1/ Law of the Sea Convention, article 56(1). For a discussion on alternative interpretations of this article and other concepts related to the rights of coastal states see McRae and Munro Coastal State rights within the 200-mile Exclusive Economic Zone, paper prepared for Workshop on the Scientific Foundations of Rights Based Fishing, Reykjavik, June 27-July 1, 1988.

2/ Law of the Sea Convention, article 61(3).

3/ Law of the Sea Convention, article 62(2). As Munro, pointed out, this obligation is more apparent than real because article 61 gives the coastal state "virtual free hand" in establishing the total allowable catches for fisheries within its zone. In theory the coastal state could set the total allowable catch at such levels as to ensure no surpluses. See Munro (1985), Coastal states, distant water fleets and EFJ: some long-run considerations, Marine Policy, 9(1).

4/ D. McRae and G. Munro, Coastal State 'Rights' within the 200-mile Exclusive Economic Zone, paper prepared for Workshop on the Scientific Foundations of Rights Based Fishing, Reykjavik, June 27-July 1, 1988.


12/ Three to twelve miles.


14/ For an excellent discussion on the subject of property rights as regard commercial fisheries see, Neher, P.A. et al. (eds.) Rights Based Fishing Proceedings of the NATO Advanced Research Workshop on the Scientific Foundations of Rights Based Fishing, Reykjavik, June 27-July 1, 1988, (in press).

15/ G.R. Munro, Coastal States, Distant Water and EFJ; Some Long-run Considerations, Marine Policy, Vol 9 (11), Jan 1985.
16/ Luis Echeverría Álvarez, former President of Mexico, 1975, quoted in: J. A. Vargas, La Zona Económica Exclusiva de México. Siglos, 1980.


18/ It is necessary to mention that this is a partial equilibrium analysis. To assure that economic efficiency in a particular sector of the economy will lead to an overall increase in the country's welfare, the economy elsewhere must also be working efficiently. This conditions are far from being true in Mexico a country with high unemployment rates, and a highly centralized and inefficient economy.

19/ This is a modified version of the PAQ system proposed by Joseph and Greenough in 1979. See Joseph and Greenough, International Management of Tuna, Porpoise and Billfish, University of Washington Press, 1979.

20/ See Joseph and Greenough, op cit Ref. 19.


22/ These property rights do not necessarily need to be given to the private sector: they can be given to the public sector (government controlled corporations) or to the social sector (cooperatives) as long as the objective of these institutions is that of economic efficiency.

23/ See P.A. Neher et. al. (eds) op cit ref 14.

24/ Ibid.

25/ Ibid.

26/ Ibid.

27/ Munro, op cit, Ref. 15.

28/ Quoting Munro (op cit, Ref. 95.) "The economic case for cooperative fisheries arrangements, from the coastal state perspective, is straightforward. It is no more than a variant of the economist's argument for free trade. The argument for free trade, in turn, is that, if nations specialize in the production of goods and services in which they have a comparative advantage and import the goods and services in which they have a comparative disadvantage, the world allocation of productive resources will be superior to that which would prevail if nations were to hinder the flows of trade. All will stand to enjoy a higher standard of living as a consequence."

29/ For the concept of opportunity cost see any standard textbook in international economics.

30/ See Munro, op cit, Ref. 15 (page 5).

31/ Ibid.


33/ Munro, op cit, Ref. 15.


5 UNITED STATES-MEXICO RELATIONS ON TUNA RESOURCES

5.1 Historic background.

The relations between the United States and Mexico over fishery resources have been difficult during the last decades. By 1976, having each established 200-mile EEZ, both countries saw the need to negotiate new agreements concerning fisheries. During the late 70s the United States and Mexico met extensively searching for a mutually satisfactory agreement governing fisheries but their efforts were not fruitful.

Of particular importance for Mexico was the issue concerning the stocks of tuna in the Eastern Pacific Ocean. It was the failure of the Mexican-American treaties to resolve this issue that eventually led to a break down in negotiations. Shortly after Mexico withdrew from the IATTC in 1979, the government of Jose Lopez Portillo emitted a decree claiming exclusive rights over tuna within the Mexican EEZ and stated the intentions of developing the country's own fleet. Mexico established a new system of licensing to allow foreign vessels to fish inside 200 miles. The cost of such a licence was 1,200 U.S. dollars for a sixty day period, in addition to $1,300 per ton of registered carrying capacity. The total amount assigned to the foreign fleet was that amount under the maximum allowable catch not used by the Mexican fleet (i.e., the surplus). For the United States, this meant the partial closure of the traditional fishing ground for the California based tuna fleet. It is often noted that the actions taken to control tuna within the EEZs of Mexico and other Latin American nations, in combination with changes in the oceanographic conditions in the region during 1982-83, have been responsible for the move of an important part of the United States high seas tuna fleet to the Western Pacific.

The United States tuna industry, backed by its government, did not accept the Mexican dispositions, and continued to fish for tuna in the Mexican EEZ. In mid-1980, Mexican naval vessels arrested six American tuna boats. The United States responded by imposing an embargo on all tuna products from Mexican origin effectively closing the largest tuna market in the world to Mexican exports. In August 1986, following several months of discussion between the United States and Mexican governments, the embargo was terminated. The United States, however, still refuses to recognize the Mexican jurisdictional claims. For the Mexican government abandonment of such claims would create a difficult political situation. In September 1987 Mexican authorities seized a California based tuna boat fishing almost 60 miles off the Mexican coast, confiscating the catch and demanding $73,000 in fines. The United States
considered the possibility of reinstating the tuna embargo. Earlier in the year (February), Mexico also seized a California tuna boat fishing inside the 12-mile water limit recognized by the United States as the limit of coastal state jurisdiction over tuna.

5.2 The United States Position

Prior to 1980, the majority of tuna landed by the United States fleet were harvested off the Mexican and Costa Rican Pacific coasts by Southern California fishermen who traditionally paid fees for access to those territorial waters. More recently the United States tuna fishing interest have shifted to the Western Pacific. 1983 was the first year in which the United States tuna catch in the Western Pacific exceeded the one in the Eastern Pacific. There are however reasons to believe that the United States fishing interest will turn back to the Eastern Pacific since catch rates have been improving in the region relative to most other major tuna fishing grounds. In 1987 the United States recovered its traditional position as the leading nation in the tropical Eastern Pacific after several years of trailing behind Mexico.

In 1923 The American Tuna Boat Association (ATA) was created as a non profit fishery cooperative whose purpose was to represent the tuna fleet in their fee negotiations with the Mexican government. Later the government of the United States got directly involved in efforts to protect its tuna fishermen as a result of an increased proportion of tuna catches in Latin American coasts, conflicts over jurisdiction and seizures of United States flag tuna vessels. The Fishermen’s Protective Act was passed in 1954. This Act provides for compensation to United States tuna fishermen whose vessels are seized while fishing in the fishery zones of foreign countries. The Act also makes provision for the United States’ Secretary of State to reimburse expenses incurred by United States fishermen as a result of seizures by foreign countries. Any amount so reimbursed is deducted from the foreign assistance granted by the United States to that country.

In 1976, the United States Congress adopted and President Ford approved The Magnuson Fishery Conservation and Management Act (MFCMA). The United States law through the MFCMA provides for sovereign rights to all fishery resources to 200 miles but excludes the highly migratory species from its jurisdiction and does not recognize other states claims over such species. The MFCMA reserves the right of the United States to recognize the exclusive fishery zones of other nations that fail to accept that highly migratory species (as defined in the Act) should be managed by international agreements, whether or not that nation is party to any such agreements.
The MFCMA also makes provision authorizing the imposition of an embargo on importation of fishery products from any country that seizes a United States fishing vessel as a consequence of a claim of jurisdiction which is not recognized by the United States. The MFCMA makes the imposition of an embargo automatic. All that is required is a certification by the State Department that a United States fishing vessel has been arrested under the circumstances described above. "by doing so, the Act deliberately prevents other considerations such as foreign policy from being allowed to influence the imposition of the embargo".

The MFCMA has a different definition for highly migratory species than does the 1982 LOSC. The MFCMA defines highly migratory species as "Species of tuna which in the course of their cycle, spawn and migrate over great distances in waters of the ocean". This definition differs from the one in the LOSC in than only tuna is included in it. Other highly mobile stocks such as billfish and several others listed in Annex 1 of the LOSC as highly migratory are not considered as such in the MFCMA.

In 1983 the United States proclaimed a 200-mile EEZ. But, in contrast to the Mexican position, opinions in the United States are quite divided over the new LOSC and adherence to international models is not as important a factor in the formulation of domestic marine policy. The United States refuses to ratify the LOSC because certain provisions of the Convention does not meet the country's objectives. The declaration of an EEZ in 1983 by the United States did not change the fishery provisions established in the 1976 MFCMA.

The official position of the United State is that the species of tuna do not come under the jurisdiction of coastal states beyond 12 nautical miles because they travel over great distances across the waters from many countries, and would therefore be better managed by international agreements. In addition the United States interprets the LOSC's Article 64 as precluding the coastal state from establishing sovereign rights over tuna. In the view of the United States, Article 64, requiring cooperation between coastal states and distant water fishing nations to manage tuna on a regional basis, through an international organization, both within and outside the EEZ, supersedes the other rights provided to coastal states over fishery resources by the LOSC.

As viewed from Mexico, the United States position over tuna is nothing more than a pretext used to place their tuna fishermen in a very comfortable position; by excluding tuna --a resource that cannot be harvested in waters of the United States in enough quantities to support the purse seine fleet--- from United States jurisdiction the country puts itself in the
position of not recognizing the claims of other countries. This claims ensure access to the productive grounds. On the other hand, because billfish is important for its sport fishing industry, the United States claims jurisdiction of these species even when they are considered as migratory as tuna.

Whether the U.S. will change its position and recognize the claims of the resource adjacent countries over tuna in the near future is uncertain. There has been, however, pressure from the East Coast and Gulf of Mexico tuna fishermen to include tuna in the U.S. EEZ to protect them from foreign fleets. Although the fishery for tunas in these coasts represent still a minor fraction of the total landings, it is becoming increasingly important. Another significant event is the treaty signed by the United States and several Pacific Island nations regarding U.S. access to tuna resources in the region. In fact, although there has been no formal renunciation by the United States of its position this treaty appears to constitute a de facto acceptance by the United States of the 200 mile limit. The United States has agreed to pay, not only for fishing within the 200 nautical mile EEZ, but also for fishing in the high seas pockets that are enclosed by the EEZ.
NOTES AND REFERENCES


3/ Ibid.


6/ Cicin-Sain et al, op cit, Ref. 1.


11/ S. O'Malley Wade, op cit, Ref. 86

12/ FPA: Sec 2(a).

13/ Cicin-Sain et al, op cit, Ref. 93.

14/ Magnuson Act Section 202(e).

15/ Magnuson Act Section 205.

16/ B. M. Tsamenyi, The South Pacific states, the USA and sovereignty over highly migratory species, Marine Policy, Vol 10(1), 1986.

17/ Magnuson act Section, Sect. 3(14).

18/ Cicin-Sain et al, op cit, Ref. 93.

19/ Only about 4% of the total U.S. tuna catches come from the U.S. EEZ. See Pollack, The West Coast industry opposes a tuna takeover National Fisherman, Vol 67(9), 1987.


21/ S. Pollack, Should we take control of tuna in our FCI?, National Fisherman, Vol. 67(9), 1987.

22/ D. McRae and G. Munro, Coastal State Rights Within the 200-mile Exclusive Economic Zone, Paper delivered to the workshop on Scientific Foundations for Rights Based Fishing, Reykjavik, Iceland, June 27-July 1, 1988.
6 RECENT DEVELOPMENTS AND PERSPECTIVES FOR THE FUTURE

6.1 The Situation to 1987

After Mexico and Costa Rica left the IATTC it became no longer possible to continue with the yellowfin conservation program. According to the IATTC, unrestricted fishing during the years 1980 and 1981 caused a reduction in the stock size of yellowfin beyond its optimum size. The result was a further decline in the catch rates (figure 6-1), which in combination with the access problems stimulated the search for alternative fishing grounds. During 1982 and 83 the El Niño changed the oceanographic condition in the region reducing the vulnerability of tuna to purse seiners. In the Western Pacific, on the other hand, the conditions were favorable for the tuna seiners. As a result of all these factors, more than half of the Eastern Pacific high-seas fleet eventually moved to the Western Pacific. When the environmental conditions returned to normal in 1984. The catch rates in the Eastern Pacific Ocean improved dramatically.

According to the IATTC there has been no need for biological conservation measures during the last few years. This, however, is not the result of man's intentions, but due to nature's intervention, economics and access problems. Currently, catches (see figure 1-2) and catch rates are increasing (figure 6-1). These factors combined with a strong demand in the U.S. market, rising ex-vessel prices (figure 6-2), and poor catches elsewhere are again attracting effort into this region of the Pacific.

6.2 Current Developments in Management

During the early 1980s, in an attempt to resolve the industry's regional problems, two initiatives were undertaken by the countries of the region: a Mexican initiative through "Organización Latinoamericana para el Desarrollo Pesquero" (OLDEPESCA); and, the Eastern Pacific Ocean Tuna Fishery Agreement (the San Jose Convention) by the United States, Costa Rica and Panama.

The OLDEPESCA initiative

In 1982 the Working Group for Regional Coordination in the Rational Utilization of the Tuna Resources was created; initially within the framework of the Latin American Economic System (SELA) and now in the Latin American Organization for Fisheries Development (OLDEPESCA). During a meeting (February 1984) held in Mexico --in which representative delegations and
Figure 6-1 Catch per ton of carrying capacity for the Eastern Pacific tuna fleet (1981-1987).
Source: IATTC Annual Reports (several years).

Figure 4-2 Ex-vessel prices paid in U.S. ports (1986=1). Source: Fisheries of the United States (several years).
observer representatives from many Latin American countries and the Permanent Commission of the South Pacific (Ecuador, Peru, and Chile) participated--a total of 14 basic principles were stipulated under the title "Fundamental Principles for the Formulation of an International Convention for Tunas in the Eastern Pacific". The basic principles approved were:

1-The convention should recognize that the coastal state has sovereign rights over tuna (and all fishery resources) within its jurisdictional waters.

2-The fundamental principles of the regional convention should be conservation, protection and optimum utilization.

3-Optimum utilization is defined as the rational exploitation of the resource, in order to assure its maximum sustainable yield.

4-Decisions taken by the governing body of the regional organization should be made by consensus.

5-The regional organization should promote the collection and exchange of scientific data among its members.

6- The area covered by the organization should be both the coastal waters by members states and adjacent areas on the high seas where tuna occur.

7-The species covered will be those taken in such quantities that a conservation regime is necessary to protect the resource.

8-All coastal states in the Eastern Pacific and those that have traditionally fished these resources in the region should have the option of becoming part of this Convention. The Council should decide on the admission of any other nation as a member depending on the status of the stocks.

9-Each individual coastal state will issue licences governing fishing in its own water.

10-Member states will inform the organization of the quantity of fish that foreign countries can fish. The regional organization will then issue licences for fishing in international waters.

11-The regional organization will determine a global quota for the region and then allocate national quotas, on the basis of the concentration of the resource in each national zone.
12- Coastal countries will submit catch data to the regional organization and, through the respective schemes, should collect information on the catch taken in international waters.

13-Whatever regime may be decided, it must include specific provisions for inspection and control of the fishing regime agreed to.

14-The Convention should pay careful attention to the need for promoting the development of those coastal countries that have not yet been able to catch the concentration of the resources contained in their waters, special provisions will be given to countries with small vessels that may not be able to compete with countries that have more modern vessels.

A draft Convention has recently been created under the name Organización Atunera del Pacífico Oriental (Eastern Pacific Tuna Organization). It is expected that the interested countries will meet sometime this year (1988) to reach agreement on the final form of the Convention. But, since a formal Convention has not been signed yet, and the details of the draft Convention are not available. It is difficult to evaluate the probability of success that a regional organization such as this will have in establishing a viable management regime.

Returning to the issue of economic efficiency, and based in the 14 principles written above, the OLDEPESCA initiative has some major drawbacks. The principal goal of the Convention --as written in objectives 2, 3 and 7-- is that of biological conservation (ie MSY). It is now widely recognized that the objective of maximum sustainable yield is not, in the general case, compatible with rent or welfare maximization. Therefore this plan does not look promising in terms of improving the economic situation of the industry throughout the region.

In terms of management, the Convention (objective 1) gives sovereign rights over tuna to the resource adjacent nations in their EEZs. This implies that within the EEZ each nation can decide unilaterally the available yield, the amount and distribution of effort, the surplus (if any) and so on. It is very difficult to imagine that a meaningful management objective (MSY or any other) can be achieved under this circumstances. The Convention principles as they stand now do not make any provision for restricting effort, but encourage further development (objective 14). No consideration is given to demand and marketing conditions. No provisions are made either to restrict dolphin mortality, which are very important to improve the badly damaged reputation of the tuna industry in the EPO.
In addition--based on objectives 1, 9, and 10--it is unlikely that the United States will approve this agreement, since it implies that its tuna fleet could fish for only the declared surplus in international waters. As has been noted the United States law does not recognize sovereign rights over tuna. Without the participation of the United States the major fishing nation in the region, the costs of enforcing any regulation will be high. In general, the perspectives of success for the regional agreement without U.S. approval are not encouraging.

The San Jose Convention

In 1983 representatives from Costa Rica, Panama and The United States signed the Eastern Pacific Ocean Tuna Fishery Agreement. This Convention establishes an international licensing authority. Tuna vessels of over a certain size of all participating states would be required to purchase an annual licence based on their net registered tonnage. The licence would allow them to fish in the coastal waters, between 12 and 200 miles. Although this treaty should not be characterized as a management tool, it has been suggested that the treaty council will work closely with the IATTC to include conservation and management recommendations in the license-granting process. This treaty will enter into force upon the ratification of five states.

A problem with The San Jose treaty is that it does not recognize the claims of Latin American States from 12 to 200 nautical miles. Therefore it is unlikely that Mexico will agree to be part of it. Since Mexico is adjacent to an important part of the resource and has the second largest fleet in the region; the probability of success of any regional treaty without Mexico is not large.

In short, neither the San Jose Convention nor the OLDEPESCA plan seem to offer a political and economic viable solution for every nation involved in the fishery. To be effective a regional agreement must include Mexico and the United states in the same side. Both parties need to abandon their radical views in favor of a mutually satisfactory arrangement. The United States must recognize that its current policy regarding tuna is, not only inconsistent with customary international law, but with its own law as well. The U.S. must recognize the claims of Latin American countries, just as it is starting to do in the South Pacific. At the same time Mexico and other Latin American countries must recognize the strategic importance of the United States in the tuna industry and the historic rights that their fishermen have. But, even if agreement is reached on the political issues there are many problems to be solved, such as an effective system to control effort and enforce regulations.
Further complicating the situation is the problem of the incidental mortality of dolphins by purse-seiners fishing for yellowfin. The United States National Marine Fisheries Service has ruled that foreign nations exporting yellowfin tuna caught in the Eastern Pacific Ocean to the United States must take steps to reduce the number of dolphins killed during purse seining. Countries that do not take such steps will not be allowed to import yellowfin into the United States. The ruling also requires that by 1991, the average annual rate of dolphins killed by a foreign fleet in the area be comparable to the yearly rate of the United States fleet.

There has also been significant pressure from some international environmental organizations, such as Greenpeace, to stop the killing of dolphins. In a press conference held in Europe, members of Greenpeace denounced that Mexican fishermen have killed close to 200 thousand dolphins during the last two years, and that several species of this marine mammal are in great danger of extinction. Greenpeace stressed that it is necessary to start an international campaign to save the dolphins; and called for a boycott to the Mexican tuna in Europe. Several members of the European Economic Community have already threaten to take their own measures to protect the dolphins such as stopping the imports of Mexican tuna.

In response to these charges the Mexican secretary of fisheries defended its fleet arguing that since 1977 Mexico has been taking measures to reduce the incidental killing of dolphins, and that this measures are equivalent to those used by other countries including the United States. In 1985, in cooperation with the IATTC, Mexico started a program of onboard observers, designed to improve the understanding of the interaction between dolphins and yellowfin. In addition, in 1987, Mexico actualized its regulations regarding the protection of marine mammals. This regulations obligate the use of special nets and the modification of the seining procedures to allow the escape of dolphins, and obligate the owners of tuna vessels to take steps to ensure access to onboard observers and scientists.

It is not clear, however, whether these regulations are actually being followed by the fishermen. Something that is clear is that the potential boycotts of Mexican tuna are a serious threat for the Mexican tuna industry. The governments and consumers in Europe and the United States are very sensitive to the "save the dolphins" campaign. The Mexican tuna industry (but not the Mexican government) must for its own sake make any effort to reduce the mortality of dolphins and launch an aggressive informative campaign aimed at improving its public relations.
NOTES AND REFERENCES

1/ IATTC annual reports.


3/ Ibid.

4/ Anonymous, La pesquería de tóquidos en el Pacífico Oriental y la protección de delfines incidentalmente capturados, Ponencia presentada ante la XIII Reunión Internacional para el Estudio de los Mamíferos Marinos, 6 al 9 de abril de 1988, La Paz, B.C.S.

5/ Ibid.


9/ Anonymous, Foreign nations must reduce dolphin kill; tuna exports at stake. Pacific Fishing.

10/ Ibid.


12/ Ibid.

13/ Anonymous, op cit, Ref. 4.

14/ Anonymous Acuerdo que regula la explotación de los tóquidos en aguas del Pacífico Mexicano y en el Océano Pacífico Oriental con embarcaciones de bandera Mexicana, Diario oficial de la Federación, 29 de junio de 1987.