Argentina
Towards Rights-based Fisheries Management

Steven N. Schonberger
Juan J. Agar
Fisheries and Aquaculture Thematic Group
Latin America and Caribbean Region
Argentina

Towards Rights-Based Fisheries Management

Steven N. Schonberger
Juan J. Agar

The World Bank
Rural Development Family
The Fisheries & Aquaculture Thematic Group was established in 1997 to improve portfolio performance by facilitating the coordination of fisheries and aquaculture activities within the World Bank's Rural Development Department, Environmentally & Socially Sustainable Development Network. This is an informal publication of the Rural Development Family of the World Bank. It is intended to encourage the exchange of ideas among Bank staff and all others interested in development issues. This paper carries the name of the author and should be used and cited accordingly. The findings, interpretations, and conclusions are the author's own and should not be attributed to the World Bank, its Board of Directors, its management, or any member countries.
# Contents

Acknowledgement vi

Acronyms and Abbreviations vii

Introduction 1

I. Overview of the Argentine Fisheries Sector 5

History of the Argentine Fishing Industry 5

The Resource 7

*Demersal Species* 7

*Pelagic Species* 9

*Main Crustaceans and Molluscan Species* 9

Industrial Structure of the Fishing Industry 10

*Harvesting Sector* 10

*On-Shore Processing Sector* 13

*Markets* 15

*Cost Structure of the Industry* 18

Legal Framework 20

*National Legislation* 20

*Provincial Legislation* 210

Institutional Framework of the Fishing Sector 21

*Fisheries Policy* 21

*Research* 26

*Monitoring and Enforcement* 27

*Seafood Safety* 28

*Foreign Affairs* 28

*National Senate and Chamber of Deputies* 28

*Private Sector Organizations* 29
II. Implementation of the Quota Management System 31

The Current Management Crisis 31
  Overview of the Crisis 31
  Causes of the Fisheries Crisis 32
  Government's Response to the Crisis 33
  Immediate Actions to Address the Crisis 35

Implementation of a Quota Management System 37
  Development of a Consensus-Building Implementation Process 37
  Development of a Legal and Regulatory Framework for QMS 37
  Technical Support to CFP 39
  Quality of Quota Rights 42
  Transferability and Ownership of Quota 43
  Initial Quota Allocation Process 44
  Rent Collection and Cost Recovery 47

Fisheries Management Services Under QMS 53
  Research 54
  Monitoring, Control and Enforcement 56
  Transparency in Fisheries Management 62
  Coordination with Provincial Authorities in Fisheries Management 63

Management Challenges 63
  Management of By-catch 64
  Avoidance of Spillover Effects 65

Wider Management Considerations 65
  Industry Restructuring 65
  Actions to Improve Profitability and Competitiveness 67
  Social Impacts 69
  Conservation of Marine Biodiversity 78

Appendix: Theory and Experience with Rights-Based Fisheries Management 83
  Access Rights In Fisheries And Their Implications For Management 83
    Open Access Regimes 83

    Benefits of Rights-Based Management Regimes 86
      Resource Conservation 86
      Capacity and Effort Reduction 88
      Fiscal Impact 89
      Social Consequences 90
Acknowledgement

The report benefited from the close collaboration and support of the staff of the Secretariat of Agriculture, Livestock, Fisheries and Food, as well as the willingness of provincial officials, INIDEP, harvesting and processing firms, labor unions and cooperatives and NGOs to share their experience, opinions and concerns regarding the development of the sector. It is the opinion of the team which prepared this report that the willingness of these stakeholders to pool their considerable knowledge and talents to address the current challenge represents Argentina’s most important advantage in averting sectoral collapse.
## Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCAMLR</td>
<td>Convention for the Conservation of Antarctic Marine Living Resources</td>
</tr>
<tr>
<td>CDQ</td>
<td>Community Development Quota</td>
</tr>
<tr>
<td>CIC</td>
<td>Scientific Research Commission of the Province of Buenos Aires</td>
</tr>
<tr>
<td>CITEP</td>
<td>Research Center for Fishing Technology and Regional Foods</td>
</tr>
<tr>
<td>CFP</td>
<td>National Fisheries Council</td>
</tr>
<tr>
<td>CONICET</td>
<td>National Council for Scientific and Technical Research</td>
</tr>
<tr>
<td>DFO</td>
<td>Department of Fisheries and Oceans (Canada)</td>
</tr>
<tr>
<td>EEZ</td>
<td>Exclusive Economic Zone</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agricultural Organization of the United Nations</td>
</tr>
<tr>
<td>FCC</td>
<td>Federal Communications Commission</td>
</tr>
<tr>
<td>HAACP</td>
<td>Hazard Analysis Critical Control Point (Seafood processing safety program)</td>
</tr>
<tr>
<td>H&amp;G</td>
<td>Headed and gutted</td>
</tr>
<tr>
<td>INIDEP</td>
<td>National Institute of Fisheries Research</td>
</tr>
<tr>
<td>ITQ</td>
<td>Individual Transferable Quota</td>
</tr>
<tr>
<td>IUCN</td>
<td>International Union for the Conservation of Nature</td>
</tr>
<tr>
<td>IVQ</td>
<td>Individual Vessel Quota</td>
</tr>
<tr>
<td>JRA</td>
<td>Job Research Assistance</td>
</tr>
<tr>
<td>MCS</td>
<td>Monitoring, Control and Surveillance</td>
</tr>
<tr>
<td>MERCOSUR</td>
<td>Common Market of the Southern Cone (Argentina, Brazil, Paraguay and Uruguay)</td>
</tr>
<tr>
<td>MEY</td>
<td>Maximum Economic Yield</td>
</tr>
<tr>
<td>MSY</td>
<td>Maximum Sustainable Yield</td>
</tr>
<tr>
<td>NAFMA</td>
<td>National Fisheries Management Agency (Australia)</td>
</tr>
<tr>
<td>NAFTA</td>
<td>North America Free Trade Agreement (Canada, Mexico and United States)</td>
</tr>
<tr>
<td>NOAA</td>
<td>National Oceanographic and Atmospheric Agency (United States)</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
</tr>
<tr>
<td>POS</td>
<td>Public Quota Share</td>
</tr>
<tr>
<td>QMS</td>
<td>Quota Management System</td>
</tr>
<tr>
<td>SAGPyA</td>
<td>Secretariat of Agriculture, Livestock, Fisheries and Food</td>
</tr>
<tr>
<td>SENASA</td>
<td>National Animal and Plant Health Service</td>
</tr>
<tr>
<td>SRNyDS</td>
<td>Secretariat of Natural Resources and Sustainable Development</td>
</tr>
<tr>
<td>SSP</td>
<td>Sub-secretariat of Fisheries</td>
</tr>
<tr>
<td>TAC</td>
<td>Total Allowable Catch</td>
</tr>
<tr>
<td>TACC</td>
<td>Total Allowable Commercial Catch</td>
</tr>
<tr>
<td>TAGS</td>
<td>The Atlantic Groundfish Strategy</td>
</tr>
<tr>
<td>VMS</td>
<td>Vessel Monitoring System</td>
</tr>
<tr>
<td>WWF</td>
<td>World Wide Fund for Wildlife</td>
</tr>
</tbody>
</table>
**Introduction**

In 1998, for the first time in fifteen years, landings and export revenues from the fisheries sector decreased in Argentina. Landings decreased by 17 percent while export revenues decreased by 14 percent respect to 1997 levels. The sector's decline primarily reflects the depletion of the most important commercial species, Argentine hake, but is symptomatic of a more general management crisis throughout the sector. As a result, Argentina's fisheries sector is currently faced with a choice between a return to export revenue and employment growth, and the collapse of the most important commercial marine species. The distinction between these two scenarios is based primarily on the implementation of an effective fisheries management regime.

The sector, though small relative to overall GDP, has grown at an average annual rate of 15 percent over the past 10 years, generating approximately $1 billion in revenues in 1998 - of which almost 90% is exported - and directly employing approximately 25,000 workers. In addition to their direct, commercial benefits, fisheries resources are the basis of Argentina's fishing communities and are key elements of Argentina's marine ecosystem.

As in many other countries, Argentina's rich marine resources are being exploited at a rate that significantly exceeds the biological capacity of the resource to reproduce itself. The main groundfish, particularly hake and southern blue whiting, have been severely overfished and their abundance is the lowest on record. Captures of hake were estimated at over 800,000 metric tons in 1997, compared to the established total allowable catch (TAC) of 395,000 metric tons. In addition, low spawning stock biomass levels further diminish recruitment prospects, putting at risk the ability for stocks to recover in the medium term.

In the face of an imminent collapse of the hake fishery, the government initiated several actions to avert approaching crisis. In January 1998, the new fisheries law was signed into effect. The law created the Federal Fisheries Council (CFP) and mandated the implementation of a quota management system (QMS) based on individual transferable quota (ITQs). The CFP also instituted area and season closures to reduce the pressure on groundfish stocks, mainly hake.

However, the government has not been able to effectively implement either short-term conservation measures nor put in place the QMS mandated by law. As a result of concerns for lost employment amongst fisheries workers, the government did not enforce the closures, resulting in further depletion of stocks. Conflicts regarding the interpretation of initial allocation criteria for ITQs, particularly between the ice trawler and freezer factory segments of the fishing fleet, have impeded progress in implementation of the QMS.

The delays have increased the likelihood of both biological and economic collapse of the fishery. In order to rebuild stocks, it is likely that very low TACs will have to be established and enforced over the following few years. As a result, the gap between industry capacity and catch levels consistent with recovery of stocks is widening, reducing the likely number of profitable operators and as such increasing the difficulties of effective enforcement and adverse social impacts.

The above scenario is not unique to Argentina and as such, Argentina can benefit from the both the successes and failures of other countries with important industrial fisheries. The selection of QMS is consistent with successful experience in other industrial fisheries - in particular New Zealand, Australia and Iceland - where ITQs have provided industry with an incentive to work for a sustainable fishery, reducing Government’s role in management. At the same time, the collapse of the Atlantic groundfisheries of Canada and the United States demonstrate the potentially irreversible social
consequences of the failure to take decisive action to conserve commercial stocks due to short-term political concerns regarding industry profitability and employment.

While recognizing that each fishery is unique in its biological, economic, social, political and legal context, the World Bank, based on its limited understanding of Argentina’s fisheries sector gained from extensive interviews with representatives of industry, workers, national, provincial and municipal governments, scientists and environmentalists, suggests that government consider the following actions consistent with international experience in sustainable fisheries management. The proposed actions, while new to the fisheries sector in Argentina, are consistent with the progressive actions taken in other areas of the economy to ensure sustainable growth.

- Government’s first priority should be to address the immediate crisis in hake. Effective action to limit captures and work with industry and local governments to minimize the social impacts of reduced catch will demonstrate Government’s commitment to sustainable management of Argentina’s fish resources consistent with new fisheries law. In order to address the crisis, this report recommends that Government:
  - Publicly acknowledge, at the highest levels of government, the probable collapse of the hake fishery and resultant long-term loss of employment and profitability unless drastic short-term actions are taken to conserve the resource.
  - Establish a hake crisis advisory committee composed of national and local government officials, industry and labor unions. The primary function of such a committee is to provide transparency to the management process and to facilitate dissemination of information to stakeholders.
  - Establish TACs consistent with the precautionary approach and ensure constant stock monitoring so that adjustments to the TAC can be made throughout the year based on actual catch levels and the apparent health of the stocks. International peer review of hake stock assessment data, as was carried out in 1998, can increase the legitimacy of decisions regarding TACs.
  - Define a schedule of closed seasons (paradas biologicas), consistent with the TAC. If scheduled throughout the year, industry can better manage the utilization of labor and capital to reduce disruptions. Interim quota allocations are not recommended due to the difficulty of monitoring and enforcement, and the establishment of a quota allocation precedent which may complicate ITQ allocation.
  - Demonstrate the government’s commitment to enforcement through highly visible actions which are prosecuted fully and rapidly as soon as the restrictions are put into place. If necessary, Government may wish to request special enforcement powers during the crisis period to increase penalties, speed up the judicial process and increase the likelihood of conviction.
  - Utilize the government’s preeminent powers under the new fisheries law in conservation matters to reach agreement with provincial authorities on the strict enforcement of harvesting and bycatch restrictions for hake in waters under provincial jurisdiction, particularly in critical spawning grounds. Government may wish to work with provincial authorities to ensure effective enforcement.
- Develop, in conjunction with the competent areas of government, local governments, unions and industry, a targeted social assistance program for workers displaced by the sharp reductions in catch. Given the need for rapid deployment, the program should be focused on facilitating access of vulnerable fisheries workers to existing unemployment and safety-net programs through formal agreements to allocate sufficient budgetary resources to these programs in affected coastal communities.

- Implement a public information campaign which clarifies the status of the sector, the need for drastic measures, the consequences (using examples from collapsed fisheries in foreign fisheries) of failure to act, and government’s programs to assist the most vulnerable workers during the crisis.

As the government demonstrates its capacity to manage the hake crisis, it can then develop the required institutional capacity to implement the QMS. Suggested actions are:

- Establish a QMS implementation committee which can draw on Argentine and international expertise from the public sector, industry and NGOs to advise the CFP on implementation of the new fisheries law, including development of the regulatory framework and comprehensive management program, which takes into account by-catch and spill-over impacts.

- Determine which species should be included in the initial implementation of the QMS. This report recommends that the government first implement the QMS in fisheries which do not suffer the same degree of over-capitalization or biological risk as in the hake fishery. International experience demonstrates that the benefits of an effective QMS are realized more quickly in a “healthy” fishery, which results in greater stakeholder support for broader QMS implementation.

- Clarify to all stakeholders the process required to establish the QMS and the key policy decisions which have to be taken.

- Define the rights associated with ITQs, carefully weighing any restrictions, such as on transferability, against the impact on the value of quota, and therefore incentives for sustainability, resulting from such restrictions. One means to assess the implications of any restrictions on quota value is to ask bankers to indicate how any proposed restrictions would affect the value of the quota as collateral.

- Strengthen capacity to manage the QMS, in particular (i) monitoring and enforcement of catch limits, (ii) establishment and management of a quota registry, and (iii) management of research. Emphasis should be on developing credibility in the system through transparency, professionalism and accountability. Many of these functions can be partially or completely contracted out, particularly if supported with industry funding.

- Develop non-judicial means to resolve legal challenges by establishing alternative procedures for the settlement of grievances such as appeals boards.

- Define the policy objectives of the initial allocation of quota. While the general parameters are described in the new fisheries law, quota allocation will be the first concrete interpretation of the law by government. The policy objectives and their implications should be reviewed with judicial authorities prior to actual allocation and government may even request a ruling by the Supreme Court on the legitimacy of the policy objectives and consequent quota allocation strategy so as to minimize potential legal challenges.

- Consider an initial allocation between fleet segments only and provide the participants in the fleet segment with a specified period of time to determine their own individual initial allocation.
Identify rent and cost recovery mechanisms prior to the implementation of QMS.

Determine government's role, if any, in facilitating industry restructuring (such as through buybacks) consistent with lower, overall catch levels.

In the context of more general labor policy reform, identify factors which lead to increasing informalization of fisheries workers through cooperative arrangements and which, as a result, do not provide safety net provisions for loss of employment.

Review tax and tariff provisions which may serve as disincentives to value-added processing of fisheries products for domestic consumption and export.

The measures suggested are consistent with those recommended in other reports prepared over the past two years by governmental and non-governmental entities within Argentina. However, while the steps to be taken are generally agreed by the stakeholders in the sector, their implementation has been hampered by concerns related to distributional factors between fleet segments and sectoral unemployment. For this reason, initiating implementation in national or provincially-managed fisheries other than hake may provide a more conducive environment for developing a QMS appropriate to the Argentine legal, ecological, economic and social context.

This report is divided into two main sections followed by a technical appendix. Section one provides an overview of Argentina's marine fisheries sector, including history, geographic and industrial structure, and legal and institutional framework. Section two is an advisory document for the Argentine fisheries sector on implementation of the QMS based on the results of World Bank missions to Argentina in May 1998 and May 1999. The appendix to the main report provides a more extensive review of international experience with QMS implementation.

---


2 The May 1998 mission included: Steven Schonberger (LCSES), Mission Leader; Gert van Santen (MNSRE), Senior Fisheries Economist; Ross Shotton (FAO) Fisheries Resources Officer; Bruce Shallard (consultant), Fisheries Management Specialist; Fernando Mercau (consultant), Employment Specialist; Jolanta Hess (consultant), Employment Programs Specialist; Robin Rackowe (consultant), Seafood Marketing and Industry Specialist; Greg Lovingfoss (consultant), Electronic Monitoring and Surveillance and Juan Agar (consultant), Fisheries Economist. The May 1999 mission included Steven Schonberger; Eduardo Loayza (consultant), Fisheries Management Specialist; and Peter Fiewelling (consultant), Fisheries Monitoring and Enforcement Specialist. Beatriz Iraheta (LCSES) provided support in document preparation. Francis Christy (Fisheries Economist); Ragnar Arnason (Fisheries Economist) and Sunita Kikeri (Senior Private Sector Development Specialist; PSD) were reviewers of the first draft of the report.
I. Overview of the Argentine Marine Fisheries Sector

History of the Argentine Fishing Industry

The fisheries sector began to gain importance early in the twentieth century. Initially, fishing activity centered on the salting industry. Canning developed in the 1930's, becoming the leading processing activity in 1954. Production of frozen fish products began in 1932, but not until the late 1960's did they become the sector's leading export commodity.

The 1960's initiated a period of growth in the fisheries sector resulting from increased domestic demand and the introduction of industrial processing of fillets for export (figure 1). Between 1960 and 1965, total catches increased from 85,000 tons to 172,000 tons. Government initiated a national fishery development policy, which relied primarily on the addition of subsidized fishing units, either imported at reduced tariffs or purchased locally from subsidized shipyards.

Figure 1. Argentine landings between 1960 and 1998

During the 1970's, growth in the Argentine fisheries sector was encouraged by increasing international seafood prices (caused, in part, by reduced catches in the overexploited North Atlantic fishing grounds), the opening of foreign markets, and declining international prices for fishing vessels. Between 1970 and 1974, 78 vessels totaling 24,300 tons were added to the deep-water fleet. The government, through Law No. 19,000 of 1971, established a fisheries promotional regime which provided the industry with tariffs and tax reductions as well as subsidized credit depending on the geographical location of the operations.

This expansion, however, was short-lived due to a series of international and domestic factors. In 1974, fishing activity decreased substantially as result of increased exports of Pacific pollock (a substitute for hake) which saturated the American and European markets, increased American inventory holdings of fish-blocks, and increased fuel prices. On the domestic side, producers faced unstable domestic markets, high and increasing costs, strong local competition, and high indebtedness.
In the mid 1970's, Argentina encouraged the introduction of imported trawlers through exemption of import duties which resulted in a rapid increase in hake catches. Hake landings increased from 109,000 tons in 1975 to 374,000 tons in 1979. In the late seventies, the sector began expanding again as international prices increased and foreign fleets began exiting newly established exclusive economic zones (EEZ), which extended 200 miles from the coast. Between 1976 and 1979 catches increased from 256,200 tons to 550,300 tons (an increase of almost 115 percent). Similarly, freezing and storage capacity increased by 210 percent and 232 percent, respectively. Exports increased by 220 percent in volume and 449 percent in value during the same time period.

In the early eighties the sector again began experiencing difficulties. Low international prices, protectionist policies of importing countries, obsolescence of the deep-sea fleet, and a deteriorating domestic economic situation led to a drop in catches and exports. Catches decreased from 401,771 tons in 1983 to 305,494 tons in 1984. The development of the red shrimp fishery in 1981 softened the economic hardship of the sector. In 1984, red shrimp accounted for 54 percent of exports by value.

Following the Malvinas conflict in 1982, the United Kingdom imposed a 150-mile exclusion zone around the islands. This action resulted in the displacement of the fishing fleets operating in the area. FAO estimated that Argentine fishing vessels operating in this sector had been catching from 5,000 to 10,000 tons of hake a year prior to 1982. Since then, these vessels have moved into other fisheries such as those of squid and shrimp. In 1985, as international seafood prices increased, the fishing industry began to stabilize and recover from the crisis of the early 1980's. Landings increased from 396,874 tons in 1985 to 544,941 tons in 1990.

In the early 1990's the fisheries sector began expanding rapidly again. To limit effort the government instituted a limited entry regime in 1991. Later it introduced catch limits. However, legal challenges, which allowed the transfer of fishing licenses (many of them without any catch limitations) from old and less efficient to newer and more efficient vessels coupled with a weak monitoring and enforcement (MCS) structure resulted in a dramatic increase in effort. Between 1989 and 1996, the fishing effort of freezer trawlers increased five-fold while the fishing effort of the ice trawl fleet tripled.

The increased effort not only translated into increased catches but also into a more diverse catch mix (i.e., from primarily hake to squid and, to a lesser extent, southern blue whiting). The significant growth of squid landings was due to the “chartering” regime established in 1991. The development of the surimi industry resulted in the increase in southern blue whiting catches. Total landings increased from 450,657 tons 1987 to 1,340,000 in 1997. Similarly, exports increased from 241,200 tons (US$267.3 million) in 1987 to 671,000 tons (US$ 1,014 million) in 1996.

In 1994, Argentina and the European Union ratified a fisheries agreement, which granted European fishing companies access to Argentine fish stocks in exchange for financial assistance and increased access to European markets. The agreement resulted in the introduction of 29 European Union vessels (mostly freezer vessels) into the fishery. In 1997, European Union vessels landed 136,764 tons (of which 96,002 tons were hake), about 10% of Argentina's total landings (about 16 percent of the total hake landings).

---

3 For a detailed account of the evolution of fisheries relations in the Malvinas area between Argentina and the United Kingdom, see Bisbal (1993).

4 Under the “chartering” regime, Argentine companies could charter or hire foreign fleets to harvest and process squid, subject to government approval and the payment of a royalty.

5 Two new vessels are likely join the fleet shortly raising the total number of EU vessels to 31.
During the mid and late 1990's, the over-expansion of the sector threatened many valuable resources such as Argentine hake, red shrimp, white croaker, sea trout, southern blue whiting, Patagonian toothfish, and red snapper. This crisis led the government to introduce a series of area closures and fishing bans to avert the collapse of some of these species, particularly hake (see section 2).

**The Resource**

Prior to the 1980's, the Southwest Atlantic was considered one of the few fishing areas in the world with a large potential for expansion, particularly in the Patagonian Shelf and Slope and the Burdwood Bank area. Since then both domestic and foreign fleets have began harvesting most of these stocks, many of which are currently considered to be fully exploited and in some cases overexploited (FAO, 1997a).

Until 1997 the fishing sector experienced sharp increases in total landings. Between 1988 and 1997, total landings rose from 482,609 tons to 1,340,000 tons. Concurrently, it gradually begun to diversify the use of its resource base. Between 1988 and 1997, hake's participation of total landings fell from 62 percent to 43 percent. In 1997, hake, squid and southern blue whiting accounted for 43 percent, 31 percent, and 6 percent of the total landings, respectively.

In 1998 total landings decreased by 16.6 percent with respect to 1997 levels. Squid landings decreased by 30 percent whereas hake landings decreased by 21 percent. Squid landings decreased because the number of chartered jiggers operating in the area diminished while hake landings dropped because of the poor condition of the resource. Hoki landings increased by 125 percent with respect to 1997 levels surpassing landings of southern blue whiting. The sharpest increase, however, was experienced in the high-value red shrimp fishery where landings increased by 258 percent from 1997 to 1998. Figure 2 shows the landings breakdown by species in 1998.

**Figure 2. Landings composition in 1998**

![Graph showing the landings composition in 1998](image)

Source: SAGPyA, 1998

**Demersal Species**

*Argentine Hake.* The Argentine hake (*Merluccius hubbsi*) resource is mainly distributed on the continental shelves of Argentina and Uruguay between 34° to 54° S at depths ranging between 50 to 400 meters. Location and depths vary between winter and summer with a well-defined migration cycle on the

---

6 In 1998, 23,200 tons of red shrimp were caught, approximately 2.1 percent of the total landings. A ton of shrimp has an average value of US$ 8,000.
Argentina: Towards Rights-Based Fisheries Management

shelf. The Argentine hake is a relatively long-lived species. There are three main stocks: one north of latitude 41° S, another one south of latitude 41° S, and in the Gulf of San Matias area. Although the Argentine fleet operates over most of the area of distribution of the species (34° to 54° S), landings from the southern stock (south of latitude 41° S) accounted for 81% of the total landings in 1997. Bottom trawl is the main gear in this fishery. Commercial products include frozen headed and gutted (H&G), regular fish blocks, interleaved fillets, defatted fillets, IFQ graded fillets, and breaded portions and sticks.

Hoki (or Patagonian grenadier). The hoki (Macruronus magellanicus) stock is the most abundant fish resource over the shelf and shelf-break area south of 45° S. In contrast to Argentine hake and southern blue whiting; this is not a long lived-species. At age three reaches maturity, and about half of its maximum length. Bottom trawl is the main gear in the fishery. The main commercial products include headed and gutted, skinned interleaved fillets, and surimi paste.

Southern blue whiting. The southern blue whiting (Micromesistius australis) stock is distributed between 37° and 47° S in the shelf break area during winter and spring, and between 47° and 56° S at depths greater than 130 meters during the summer. This specie is relatively long-lived. Southern blue whiting is an important prey species for many Patagonian shelf fisheries such as Argentine hake, southern hake, and hoki. Southern blue whiting is primarily harvested by mid water trawls. The main commercial products include surimi paste, frozen whole, headed and gutted and regular fish blocks.

Kingclip (or pink cusk eel). The main kingclip (Genypterus blacodes) concentrations are found between 40° and 48° S, at depths ranging between 50 to 350 meters. The pink cusk eel is a long-lived, slow growth and low fecundity species. Kingclip is caught by bottom trawls and long lines. The main commercial products include frozen headed and gutted, interleaved fillets, and graded fillets.

Croaker. The croaker (Micropongonias furnieri) resource is distributed along the Argentine and Uruguayan coasts ranging between 34° to 41° S. Higher concentrations are found in El Salado region between June and September. The croaker is a long-lived species that inhabits sandy and muddy bottoms up to a depth of 60 meters. Bottom trawls target croakers and the main products include frozen headed and gutted, interleaved fillets, and graded fillets.

Patagonian toothfish. The largest concentrations of Patagonian toothfish (Dissostichus eleginoides) resource are found between 37° 5' and 39° 5' S over the continental shelf and to the south of Malvinas between 52° 5' to 54° 5' S during winter. During the summer they become more dispersed along the continental shelf and slope. Patagonian toothfish is a relatively long-lived and a slow growth species. Bottom trawls and longlines are the main gears in this fishery. The main commercial products include frozen headed and gutted and fillets.

Southern codfish. The southern cod (Salilota australis) resource is centered to the north and west of the Malvinas Island at depths of around 200 meters during the winter. In the summer, the resource is found on the Santa Cruz shelf. The southern codfish resource is targeted by trawls. During the winter codfish tend to form well-defined aggregation while during the summer they tend to disperse. The main commercial products are frozen whole, headed and gutted or fillets, salted and dried.

Grouper. The grouper (Acanthistius brasili anus) is found along the coast year around with largest concentration detected to the north of the San Jorge Gulf and Peninsula de Valdez. Bottom trawl is the main gear in this fishery. Commercial products include headed and gutted, regular fish blocks, interleaved fillets, graded filets, and breaded portions and sticks.
Pelagic Species

**Argentine anchovy.** The Argentine anchovy (*Engraulis anchoita*) is one of the few unexploited stocks in the area. It ranges from Brazil to latitude 48° S. There are two main stocks: the Buenos Aires and Patagonian stock. The Buenos Aires stock ranges between Brazil and latitude 41° S, whereas the Patagonian stock ranges between 41° S to 48° S. The anchovies are of tremendous ecological importance since they serve as prey for many commercially important species, such as Argentine hake, Argentine short-fin squid, mackerel, and sea trout. Hoop nets and mid water trawls are the main gears used. The main commercial products are salted whole, headed and gutted, and canned fillets in oil.

**Chub mackerel.** The chub mackerel (*Scomber japonicus*) resource is distributed between 35° S and 45° S. There are two main stocks: the northerly Buenos Aires province stock and the southerly “El Rincón” region stock. These stocks are geographically delimited by latitude 39° S. The main gears are lampara-like purse seine and mid-water trawls. The main products are either whole or headed and gutted, and canned in oil or tomato sauce.

**Atlantic bonito.** The bonito (*Sarda sarda*) resource is located on the Buenos Aires shelf. Purse seiners primarily target these stocks. The main commercial products include headed and gutted, and canned in oil.

Main Crustaceans and Molluscan Species

**Argentine short-fin squid.** The Argentine short-fin squid (*Illex argentinus*) resource has a wide distribution. In the fall, they are found between 38 to 42° S, whereas in the summer they concentrate off Puerto Deseado and Golfo Nuevo. The Argentine short-fin squid has a short life cycle that lasts 12-14 months and ends after they spawn. In short life cycle species, the concept of maximum sustainable yield is not applicable since long-term harvest levels ensuring the reproductive capacity of the resource cannot be defined. Resource availability largely depends on the success each reproductive season and the events leading to recruitment. The fishery is primarily managed by monitoring each year’s recruitment and its evolution and ensuring there is enough spawner escape to guarantee adequate recruitment the following year. Automatic jigs and bottom trawls are the main gears in the fishery. The main commercial products include frozen whole, heads, tentacles and fins, tubes, skinless tubes, rings and breaded rings.

**Argentine Red Shrimp.** The Argentine red shrimp (*Pleoticus muelleri*) resource is distributed between 23° and 50° S. It is found from June to March in the Patagonian and Buenos Aires coastal regions, with large populations in Bahia de Camarones and Golfo de San Jorge. This resource has a relatively short life span (estimated at 2 years) with extremely high and variable growth rates. Like in the case of squid, the concept of maximum sustainable yield is not appropriate for management purposes. Double rig beam trawls and bottom trawls are the main gears used in the fishery. Commercial products include frozen whole, graded and tails both in shell and shelled.

**Patagonian Scallops.** The Patagonian scallop (*Zigochlamys patagonica*) resource is distributed from Tierra del Fuego to 35° S at depths ranging between 40 to 200 meters. The main concentrations are found between 39°30' and 42°30’ at depths ranging between 80 to 120 meters. These are sessile organisms that do not conduct reproductive migrations that modify their distribution areas. Bottom trawls and scallop dredges are the main gears in this fishery. The main commercial products include whole, half-shelled, and IFQ meat.

**King crab.** The king crab (*Lithodes santolla*) resource is located along the coast between Tierra del Fuego and the Gulf of San Jorge. Northward of the Gulf of San Jorge is found offshore following the Malvinas current until the southern Brazil. Although king crabs are frequently found at depths of 700
meters, the highest concentrations are usually found between 30 and 120 meters. Bottom trawls and traps are the main gear types in this fishery. The main commercial products include whole and legs.

Fake King crab. The false king crab (*Paralomis granulosa*) resource is distributed between the Malvinas Islands and Tierra del Fuego up to the Gulf of San Jorge. There are two stocks: the Beagle channel stock and the coastal Tierra del Fuego stock. The main gear type in the fishery is a trap. The main commercial product is frozen whole.

**Industrial Structure of the Fishing Industry**

Argentine landings account for about 1.1 percent of the world’s total marine landings according to FAO latest survey. In 1998 the fisheries sector contributed approximately 0.32 percent of the GDP and 3.3 percent of total exports.

**Harvesting Sector**

The Argentine fishing fleet has 731 registered vessels. The fleet can be grouped into three broad categories according to size, range, and operational mode: coastal or inshore vessels, ice trawlers, and processing vessels (table 1). This last group consists of freezer trawlers, shrimp trawlers, surimi boats, longliners, scallop boats, jiggers, and factory vessels.

<table>
<thead>
<tr>
<th>Fleet type</th>
<th>Number of vessels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inshore</td>
<td></td>
</tr>
<tr>
<td>Artisanal</td>
<td>186</td>
</tr>
<tr>
<td>Coastal</td>
<td>124</td>
</tr>
<tr>
<td>Ice trawl</td>
<td>133</td>
</tr>
<tr>
<td>Processing</td>
<td>288</td>
</tr>
<tr>
<td>Factory</td>
<td>17</td>
</tr>
<tr>
<td>Freezer</td>
<td>103</td>
</tr>
<tr>
<td>Longline</td>
<td>23</td>
</tr>
<tr>
<td>Scallop</td>
<td>4</td>
</tr>
<tr>
<td>Shrimp</td>
<td>32</td>
</tr>
<tr>
<td>Surimi</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>731</strong></td>
</tr>
</tbody>
</table>

Source: SAGPyA, 1998

---

7. According to preliminary FAO figures, the world’s total fish production (including aquaculture and inland fisheries) was approximately 122 million tons. Of this figure, 97.2 million came from marine captures.

8. In 1997, Argentina’s estimated GDP and total exports were approximately US$ 298.1 billion and US$ 28.7 billion, respectively.
Over the last decade the freezer and factory fleet grew rapidly. Between 1989 and 1998, the freezer and factory fleet increased by 461 percent. In terms of landings share, the freezer and factory fleet accounted for 28.2 percent of the total landings in 1989 and for 67.4 percent of the total landings in 1998.

**Figure 3 Landings by fleet type**

![Chart showing landings by fleet type](image)

Source: SAGPyA, 1998

Argentina has approximately 25 coastal ports where most of the marine coastal catch is landed. However, the top six ports alone account for 90 percent of the country’s landings (figure 4). The Mar del Plata fleet is primarily composed of ice trawlers that landed 48 percent of the port’s catches, followed by inshore boats that landed 26.3 percent and the freezer boats that caught the remaining 25.5 percent. In the remaining ports, the processing fleet predominates.

Over the last several years, landings in the Patagonian region have increased dramatically, reducing Mar del Plata role as the nation’s leading port. Mar del Plata’s share of the total catch has dropped from 90 percent in the 1980’s to 60 percent in 1991 and to 31 percent in 1998. In contrast, provinces from the Patagonian region increased their share of landings from 39 percent to 64 percent between 1991 and 1998. The shift in landings reflects, in part, industry’s desire to be closer to newly developed fishing grounds in the South Atlantic.

Although no comprehensive studies on the industrial structure of the extractive sector exist, the level of concentration in the hake fishery appears to be high. INIDEP has estimated that even though the number of business groups that own vessels which harvest hake increased from 49 to 98 between 1987 and 1996, a small group of firms control a majority share of the hake landings. They estimated that small- and medium-sized firms, which account for 77 percent of the firms operating in the hake fishery, control only 10 percent of the catches. The largest 10 percent of the firms, by contrast, control over 70 percent of the catches.

**Inshore Fleet**

The inshore fleet, or “yellow fleet”, consists of artisanal boats and coastal boats. Of the inshore fleet’s total landings, the artisanal boats accounted for 12 percent whereas the coastal boats accounted for 88 percent. In 1998, hake, sea trout Brazilian flathead, white croaker, flounder, rays and anchovies accounted for 42 percent, 8.3 percent, 6.7 percent, 5 percent, 3.9 percent and 3.2 percent of the inshore fleet’s total landings, respectively.
The artisanal fleet is made up of boats ranging from 10 to 17 meters in length that have a limited holding capacity (4 to 14 tons). These boats do not possess any cooling equipment. The fleet is old and technologically dated, and its fishing trips usually last one day. Seventy percent of the fleet operates from Mar del Plata. These boats tend to be family operated. The inshore fleet does not process their catch on board. They tend to mostly pack in ice their catch.

The coastal inshore fleet is technologically more advanced than the artisanal fleet. This fleet consists of boats ranging from 17 to 25 meters in length and possessing larger (18-40 tons) and refrigerated holds. Their fishing trips last from 1 to 12 days. Mar del Plata (65 percent) and Rawson (21 percent) are the main ports from which this fleet operates.

**Ice Trawler Fleet**

The ice trawler fleet is composed of 133 trawlers ranging from 25 to 63 meters in length. They possess refrigerated holds. The fish are preserved in layers of ice. These boats do not process the fish onboard. The fleet provides chilled product to processing plants on shore. These operations tend to be vertically integrated. Most of the boats are owned by firms, which have onshore plants in Mar del Plata, Puerto Madryn, or Comodoro Rivadavia. Fishing trips usually last from 4 to 15 days.

In 1998, hake, anchovies, squid sea trout, and rays accounted for 69 percent, 3.6 percent, .35 percent, 2.9 percent and 2.6 percent of the landings, respectively. Most of the ice trawler fleet operates from Mar del Plata (77 percent) and to a lesser extent from Puerto Madryn (7 percent) and Comodoro Rivadavia (5 percent).

**Processing Fleet**

The processing fleet consists of freezer and factory, surimi, scallop, and shrimp trawlers, jiggers and longliners. The trawler component of the processing fleet varies in size depending on the resource they exploit. Unlike the other segments of the fleet, the processing fleet does not only chill its catch but does some processing on board.
The smaller trawlers (30 to 42 meters in length) primarily harvest shrimp, whereas the larger trawlers (up to 70 meters) target squid and hake. The shrimp trawlers seek shrimp exclusively. The longline component exploits high value species such as the Patagonian toothfish, southern hake, and kingclip, while the jiggers concentrate on squid. The processing fleet's fishing trips last up to 60 or 70 days.

In 1998, squid (37 percent), hake (30 percent), southern blue whiting (9 percent), and hoki (12 percent) made up most of the landings. Most of the freezer fleet operated in Puerto Madryn (26 percent), Puerto Deseado (25 percent), Punta Quilla (19 percent), and Mar del Plata (18 percent). On the other hand, most of the factory fleet operated in Ushuaia (24 percent), Puerto Deseado (24 percent), and Puerto Madryn (19 percent).

**Employment in the Harvesting Sector**

The harvesting sector employs approximately 12,027 people. The processing fleet is the largest employer in this sector, hiring approximately 72 percent of these workers. The ice trawler fleet provides jobs to 18 percent of the workers, while the inshore fleet employs 11 percent (6 percent in the coastal fleet and 5 percent in the artisanal fleet).

**On-Shore Processing Sector**

According to the National Industrial Fisheries Census of 1996, there are 234 active processing plants and 69 active cooperatives. Most of the processing activity takes place in Buenos Aires. Table 2 shows the location of the processing plants by province. The cooperative arrangement is under the processing and filleting of fresh and chilled seafood undertaking, and is discussed latter in the section on Employment in the Processing Sector.

**Table 2. Location of processing plants by province**

<table>
<thead>
<tr>
<th>Processing type</th>
<th>Buenos Aires</th>
<th>Rio Negro</th>
<th>Chubut</th>
<th>Sta. Cruz</th>
<th>Tierra del Fuego</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing and filleting of fresh or chilled finfish and shellfish*</td>
<td>96</td>
<td>6</td>
<td>14</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Freezing and cold storage</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Processing, filleting and freezing of Finfish and shellfish</td>
<td>43</td>
<td>-</td>
<td>18</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Salting</td>
<td>20</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Canning</td>
<td>7</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Fish meal and oils</td>
<td>5</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Algae processing</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>173</strong></td>
<td><strong>8</strong></td>
<td><strong>34</strong></td>
<td><strong>20</strong></td>
<td><strong>4</strong></td>
</tr>
</tbody>
</table>

Table figures are slightly higher because the breakdown of active processing plants by Patagonic provinces was not available. Nevertheless, the number of active facilities present in Buenos Aires is accurate.

*This undertaking also includes cooperatives. In 1996, there were 61 cooperatives in Buenos Aires and 6 cooperatives in Patagonia. No data was available on the number of active plants by province except for Buenos Aires. Source: National Industrial Fishery Census of 1996.*

13
Location ofProcessing Plants

Traditionally, most of the seafood processing has been centered on Buenos Aires, particularly Mar del Plata. The development of the Patagonian fishing industry significantly changed the makeup of the processing sector. Between 1977 and 1987 the establishment of processing plants in Patagonia was largely due to the existence of provincial promotional regimes. Under this regime, provinces required fishing firms to establish processing plants in the provinces as condition to access coastal fishing grounds, particularly shrimp.

Initially these original plants were rudimentary consisting primarily of filleting tables to ensure compliance with provincial regulations. However, the number and degree of technical sophistication increased during the late 1980's. This was partly due to the development of new fishing grounds and the availability of improved technology. The number of plants as identified by undertaking (processed product type) are shown in Table 3.

Since 1987 the number of active processing plants has dropped by 11 percent. The inactivity level (percentage of non-operating plants) was estimated at 26.5% in 1996, compared with 18.6 percent in 1987. According to the National Fisheries Industrial Census of 1996, the Mar del Plata industry is working at about 72 percent of capacity.

Although the number of plants in Buenos Aires has decreased by 40 percent respect to 1987 levels, over 59 percent of all the processing plants and 88 percent of the cooperatives are still located in Mar del Plata. In contrast, the number of firms in the Patagonia increased by 77 percent. Most of the growth was experienced in the processing, filleting and freezing undertaking that grew by 18 firms (Table 3).

Table 3. Number of active processing plants

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing and filleting of fresh or chilled finfish and shellfish</td>
<td>52</td>
<td>3</td>
<td>71</td>
<td>1</td>
<td>35</td>
<td>19</td>
</tr>
<tr>
<td>Freezing and cold storage</td>
<td>4</td>
<td>-</td>
<td>5</td>
<td>22</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Processing, filleting and freezing of Finfish and shellfish</td>
<td>51</td>
<td>10</td>
<td>56</td>
<td>27</td>
<td>43</td>
<td>35</td>
</tr>
<tr>
<td>Salting</td>
<td>35</td>
<td>1</td>
<td>32</td>
<td>1</td>
<td>20</td>
<td>-</td>
</tr>
<tr>
<td>Canning</td>
<td>13</td>
<td>2</td>
<td>16</td>
<td>1</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Fish meal and oils</td>
<td>8</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Algae processing</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Subtotal</td>
<td>163</td>
<td>18</td>
<td>185</td>
<td>34</td>
<td>112</td>
<td>60</td>
</tr>
<tr>
<td>Cooperatives</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(61)</td>
<td>(6)</td>
</tr>
<tr>
<td>Total</td>
<td>181</td>
<td>219</td>
<td>239</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: National Industrial Fishery Census of 1996
Employment in the Processing Sector

An estimated 12,600 people work in the processing sector, including both formal processing plant workers and cooperative workers. Of the total number of workers in the sector, 3,630 workers (3,112 in Mar del Plata alone) are believed to be employed by cooperatives.

The overall number of employees in the processing sector has decreased by 11 percent since 1987. Buenos Aires was particularly affected as many processing plants moved to Patagonia. Between 1987 and 1996, the number processing workers in Buenos Aires fell by 25 percent, while the number of workers in Patagonia increased by 37 percent.

In the early nineties, cooperatives developed as a means to cut labor costs and increase efficiency. Packers, farm workers, and filleters who formerly were employed by processing plants, formed (or were encouraged to form) cooperatives. These cooperatives do not own their plants but rather are hired to fillet for the larger processing plants on a piecemeal rather than a salary basis. This allows processors to better adjust their labor utilization to the fluctuations in the supply of raw material. Processors claim that use of cooperatives can reduce overall labor costs by 30 percent.

Approximately 64.2 percent of all processing workers (both formal and cooperative) are found in Buenos Aires, 25.4 percent in Chubut, 9.7 percent in Santa Cruz, and 0.6 percent in Tierra del Fuego. In terms of workforce make up, 72.5 percent of the workers process fish (i.e., filleting, freezing, etc), 18.3 percent are low-skilled workers, 3.7 percent are administrative workers, 2.9 percent are production supervisors and the remaining 2.6 percent load and unload fish.

Markets

International Markets

Argentina is one of the leading seafood exporters in the world. In 1998, seafood exports reached US$ 860 million down from US$ 1,014 million in 1996. The pronounced drop in export revenue reflected the adverse domestic and international market conditions and lower landings. Record shrimp landings prevented export revenue from falling further. Despite the recent downward trend, export revenue has increased consistently over the last decade (figure 5). This sharp rise mirrors increasing landings, particularly of squid.

Over 90 percent of Argentina's landings are exported, mainly frozen. Frozen products account for 93 percent of the exports in weight and value. In 1998, the leading frozen products were hake (34 percent), squid (20.5 percent), shrimp (20 percent) and croaker and sea trout (10 percent).

In 1998, the main exports markets were the European Union, Asia, MERCOSUR and NAFTA (figure 7). Spain accounted for 28 percent of exports to the European Union, which consisted mainly of hake, and to a lesser extent shrimp and squid. Over the last decade, there has been sharp increase in the participation in Asian markets reflecting the emergence of squid as the leading export.

Over 65 percent of the European Union exports were unprocessed. Most of the exports to Asia are unprocessed too. In contrast, 83 percent and 63 percent of the exports to the MERCOSUR and NAFTA were processed. According to INIDEP, 68 percent of the firms classified as medium and small control

9 In 1997, Argentina's beef exports reached a total value of US$ 803 million (430,000 tons)
percent of the value of the hake exports, while the largest 10 percent of the firms' control 45 percent of these exports.

**Figure 5. Total seafood exports**

![Seafood Exports Graph](source: SAGPyA, 1998)

**Figure 6. Leading frozen seafood exports (value) in 1998**

![Main Seafood Frozen Exports in 1998](source: SAGPyA, 1998)

**Domestic Market**

The domestic seafood market is relatively small. Less than 10 percent of the country's landings go to the domestic market. This partly reflects the country's traditional preference for beef products. Nevertheless, Argentines' consumption habits are slowly changing. Between 1990 and 1996, Argentina's annual per capita seafood consumption increased from 6 to 8 kg. This value, however, is still low compared to the world's 14.4 kg average or Western Europe's 24.3 kg average. Most of the fish and shellfish consumed is fresh (80 percent), and the rest is consumed as canned (11.4 percent) and frozen (8 percent).
Argentina: Towards Rights-Based Fisheries Management

Figure 7. Main Export Markets (value) in 1998

Main Export Markets in 1998

<table>
<thead>
<tr>
<th>Market</th>
<th>Value Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAFTA</td>
<td>10.6%</td>
</tr>
<tr>
<td>Mercosur</td>
<td>13.9%</td>
</tr>
<tr>
<td>European Union</td>
<td>50.2%</td>
</tr>
<tr>
<td>Asia</td>
<td>25.3%</td>
</tr>
</tbody>
</table>

Source: SAGPyA, 1998

Figure 8. Main species sold in domestic markets (1992-1996 average)

Main species sold in domestic markets (1992-1996)

<table>
<thead>
<tr>
<th>Species</th>
<th>Value Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hake</td>
<td>60.3%</td>
</tr>
<tr>
<td>Squid</td>
<td>7.7%</td>
</tr>
<tr>
<td>Patagonian smoothhound</td>
<td>4.1%</td>
</tr>
<tr>
<td>Kingclip</td>
<td>3.5%</td>
</tr>
<tr>
<td>Other</td>
<td>24.4%</td>
</tr>
</tbody>
</table>

Source: SAGPyA, 1996

Hake, squid, Patagonian smoothhound, and kingclip are the most important species in the domestic market (figure 8). Between 1992 and 1996, most domestic seafood was sold as fish fillets (55 percent -74 percent) and as whole fish (15-21 percent). Mar del Plata supplies over 85 percent of the seafood products found in the domestic market. Fresh and chilled seafood products accounted for 73.2 percent of the tonnage (71,843 tons) and 81.4 percent of the value (US$ 154,1 million) of Mar del Plata’s domestic bound production.

The port of Mar del Plata is the largest (and almost exclusive) supplier of fresh seafood to domestic markets because of its long tradition in the fresh seafood business and its proximity to the large population centers. Mar del Plata’s offshore fleet supplies most of the fresh hake, while the remaining
species -- croaker, snappers, flounders -- are supplied by the inshore fleet. Most fresh fish markets are supplied by a small number of wholesalers that control about 60 percent of production. These wholesalers buy seafood from independent shipowners and large cold-storage firms. Most of them sell directly to supermarkets, fish stores, and institutional buyers. Many have their own refrigerated truck fleet. Table 4 shows the value of fresh and chilled hake sent from the Mar del Plata to the domestic market.

In contrast to the fresh fish supply, which is largely derived from Mar del Plata, domestically consumed frozen production is geographically decentralized. Most frozen production comes from the provinces of Chubut (30 percent) and Santa Cruz (45 percent) and from Mar del Plata (23 percent), and to a lesser extent from the ports of San Antonio Oeste (mostly king crabs) and Ushuaia (mostly scallops). Supermarkets account for over 90 percent of frozen fish sales, which have been estimated at 3,000 tons per year.

Table 4. Domestic bound production from Mar del Plata

<table>
<thead>
<tr>
<th>Year</th>
<th>Value (US$ million)</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>41.8</td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td>61</td>
<td>46%</td>
</tr>
<tr>
<td>1994</td>
<td>57.6</td>
<td>-6%</td>
</tr>
<tr>
<td>1995</td>
<td>51.1</td>
<td>-11%</td>
</tr>
<tr>
<td>1996</td>
<td>69.2</td>
<td>35%</td>
</tr>
<tr>
<td>1997</td>
<td>103.1</td>
<td>49%</td>
</tr>
</tbody>
</table>


In 1996, US$ 71 million worth of seafood was imported. The leading suppliers were Chile (18 percent), Ecuador (17 percent), and Brazil (15 percent). Prepared and canned products accounted for most (60 percent) of the seafood imports.

**Cost Structure of the Industry**

The industrial structure of the fisheries sector is complex. Firms includes small coastal vessels, independent ice-trawlers, ice-trawlers integrated with onshore plants, independent freezer and factory vessels, freezer vessels integrated with on-shore plants, etc. Neither the Fisheries Sub-secretariat nor INIDEP have a comprehensive economic database. Thus, the objective of this section is to provide an idea of the main variable costs based on available studies and interviews with industry informants.

**Harvesting Costs**

According to recent studies, labor costs account for 50 to 55 percent of the vessels total variable cost, while the other costs are divided between fuel and maintenance. Fuel costs for vessels operating in Patagonia account for 10 to 15 percent of the costs and maintenance costs account for another 15 percent. Fuel costs are higher for the Mar del Plata boats because of their longer steaming time. Ice trawlers from Mar del Plata may steam from one to three days, depending on the season, whereas those in Patagonia may steam for less than a day. According to industry informants ice trawlers are taking longer to fill their holds. Currently, ice trawlers need about 20 days to fill their holds, whereas in the past it took them only 15 days.

---

18 Zugarramurdi et al, 1995; Errazti, E. (INIDEP economist) pers. comm. 1998
Processing Costs

The main variable costs in the processing sector are raw materials, labor, ice, packaging, and utilities. Even though their relative shares vary moderately, raw materials and labor respectively account for 60 to 70%, and 10 to 15% of the total costs (table 5).

Table 5. Variable costs from processing plants

<table>
<thead>
<tr>
<th>Product type</th>
<th>Raw material (%)</th>
<th>Labor (%)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filleting (hake)</td>
<td>60-70</td>
<td>15-20</td>
<td>Mar del Plata processor (pers. comm., 1998)</td>
</tr>
<tr>
<td>Filleting (hake)</td>
<td>70</td>
<td>20</td>
<td>INIDEP, 1998</td>
</tr>
<tr>
<td>Canning (sardines and anchovies)</td>
<td>23-44</td>
<td>11-17</td>
<td>Zugarramurdi et al, 1995</td>
</tr>
<tr>
<td>Salting (anchovy)</td>
<td>50-60</td>
<td>9-12</td>
<td>Zugarramurdi et al, 1995</td>
</tr>
</tbody>
</table>


In recent years, the overexploitation of the hake resource has resulted in a decrease of mean fish size from 44 cm in 1986 to 40 cm in 1998. Although mean fish sizes have decreased, the yield has not decreased proportionally. Improved technology and the emergence of (filleting) cooperatives, whom are paid on product weight basis, have contributed to maintaining yields relatively stable. (Table 6).

Table 6. Average yields since 1992 (roundfish)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Skinless hake fillet</td>
<td>48.57</td>
<td>47.63</td>
<td>48.21</td>
<td>47.32</td>
<td>46.97</td>
</tr>
<tr>
<td>Boneless hake fillet</td>
<td>43.21</td>
<td>41.25</td>
<td>42.64</td>
<td>40.86</td>
<td>40.33</td>
</tr>
<tr>
<td>Hake H&amp;G</td>
<td>61.88</td>
<td>60.34</td>
<td>57.25</td>
<td>58.45</td>
<td>57.21</td>
</tr>
</tbody>
</table>


Seafood Prices

The development and profitability of the sector has been closely tied to its ability to place domestic production mainly hake and squid in international markets. Most of the seafood production is exported as frozen “commodity items” such as frozen fish blocks, breaded fillets, frozen fillets, H&G, and minced products.

The prices of these commodities are determined by the international seafood markets. Fluctuations in the availability of other groundfish, such as cod and pollock, have significant impacts on price and the ability to place hake and other white-fish products in foreign markets. Similarly, most of the squid production is exported.
Legal Framework

National Legislation

Prior to the establishment of the new federal fisheries law, the fishing activity was regulated by a scattered set of laws, decrees, regulations, and resolutions. Most of the previous regulatory framework was crafted between 1967 and 1991 when fish resources were abundant.

In 1991, government instituted a generalized limited entry regime. Decree No. 2,236 established that only vessels with Argentine flag could only exploit fishery resources under national jurisdiction. It also regulated the granting of fishing licenses to national vessels, establishing different types of licenses: unrestricted, restricted (limitation on species and/or catch), and high seas. The objective was to control effort through limitations on the number of licenses awarded and through restrictions on the replacement of fishing units.

Most of the licenses awarded had no limitation on the amount and type of species they could land. The licenses were granted with no time limitations and were attached to individual vessels. The licenses could be transferred to other vessels if they did not increase effort or if they were replacing idle or wrecked vessels. The decree also allowed the license to be transferred within the same company or holding. Decree No. 2236 also required that firms that were contemplating adding new vessels had to submit an investment proposal. SAGPyA evaluated the proposal based on the technical feasibility and the availability of resources. If the project was approved then a restricted license (i.e., species and/or catch limitation) was issued.

The limited entry regime, however, proved inadequate to control effort, as many firms through legal means were able to buy and transfer permits increasing their harvesting capacity. For instance, many companies were able to buy or transfer unrestricted and restricted licenses to new vessels from sunken vessels or bankrupt companies.

To address the serious limitations of the management regime, a new federal fisheries law was signed in January 1998. Among the most salient changes is the creation of a Federal Fisheries Council, which is responsible for setting national fisheries policy, the introduction of a quota management system (QMS), and definition of the provincial marine jurisdiction.

Provincial Legislation

One of the more contentious issues between the coastal provinces and the Nation has been the problem of overlapping jurisdictions. Prior to the new federal fisheries law, all coastal states had claimed jurisdiction beyond the 3 nautical miles granted by national legislation. The province of Río Negro, for instance, declared ownership and jurisdiction over resources up to the maximum distance over which the Nation claims sovereignty (i.e., 200 miles; Law No. 1960). Similarly, the constitution of the province of Tierra del Fuego, Antarctic, and Islands of the South Atlantic claims jurisdiction up to 200 miles.

---

11 Hake had been in a limited entry regime since 1988.
12 Decree No. 1493 of 1992, however, set an exception by allowing the chartering of foreign vessels for the squid fishery.
13 Licenses could be revoked due to "unjustified" inactivity, vessel owner's bankruptcy, or the unfulfillment of previsional or tax obligations.
Box 1. Argentina's New Federal Fisheries Law (Law No. 24,922)

The goal of Law No. 24,922 is to promote the development of fishing activity commensurate with the rational use of marine living resources while encouraging the use of environmentally friendly industrial processes that achieve the highest value added and generate the most employment for Argentine workers.

The new law:
- Creates the Federal Fisheries Council.
- Introduces a Quota Management System based on Individual Transferable Quotas. Extends provincial jurisdiction from 3 to 12 miles.
- Sets aside quota for the artisanal sector.
- Establishes a National Fisheries Fund.
- Establishes a Resource Extraction Fee.
- Establishes a nationality reserve for crews - all officers and 70% of crew must be Argentine.
- Establishes a strict penalty and infraction regime.

Source: Law 24.922.

The new fisheries law grants the provinces ownership and jurisdiction of marine living resources up to a distance of 12 miles. As of December 1, 1999, only one province, Tierra del Fuego, had ratified the new law, confirming its adherence to the law's provisions.

Institutional Framework of the Fishing Sector

Figure 9 shows the main interrelationships among the key institutions of the Argentine fisheries sector. Their mandate and responsibilities are briefly discussed in the following sections.

Fisheries Policy

National Level

Federal Fisheries Council (CFP). The new federal fisheries law establishes the Federal Fisheries Council as the main body governing national fisheries policy. The Council is composed of the Secretary of Agriculture, Livestock, Fisheries and Food, one representative from each of the coastal provinces (Buenos Aires, Rio Negro, Chubut, Santa Cruz, Tierra del Fuego, Antarctic and Islands of the South Atlantic); one representative from the Secretariat of Natural Resources and Sustainable Development; one representative from the Ministry of Foreign Affairs, International Trade and Religion; and two representatives designated by the President of Argentina. The Secretary of Agriculture, Livestock, Fisheries and Food holds the presidency of the Council. The Council also has an advisory commission composed of representatives of the labor unions and private firms.

The Federal Fisheries Council is responsible for establishing national fisheries management, development and research policy, establishing total allowable catches (TAC) by species based on the maximum sustainable yields estimated by INIDEP, establishing annual catch quotas by vessel, species, fishing area, and fleet type, approving commercial and experimental fisheries permits, advising the "implementation authority" in international negotiations, establishing fishing rights and setting royalties, and regulating the artisanal fisheries sector by establishing a reserve quota for this group.
Argentina: Towards Rights-Based Fisheries Management

Figure 3: Main institutions in the Argentine Fisheries Sector

- Senate and Chamber of Deputies
- Secretary of Agriculture, Livestock, Fisheries, and Food (President)
- Presidential Appointees (2)
- Coastal Provinces (4)
- Provinical Fisheries Management Agencies
- Secretariat of Natural Resources and Sustainable Development
- Advisory Group
- NGOs
- Secretary of Agriculture, Livestock, Fisheries and Food (Implementing Authority)
- SENASA
- INIDEP
- Navy
- Coast Guard
- Subsecretariat Fisheries
- National Fisheries and Aquaculture Directorate
- Aquaculture Division
- Fisheries Administration and Surveillance Division

1 Buenos Aires, Río Negro, Chubut, Santa Cruz, and Tierra del Fuego, Antarctic, and Islands of the South Atlantic.
2 Autonomous agencies of SAGPyA.
3 Through collaborative agreements with SAGPyA.
Argentina: Towards Rights-Based Fisheries Management

Secretariat of Agriculture, Livestock, Fisheries and Food. The original fisheries law, passed by Congress, specified the creation of a Secretariat of Fisheries in the Ministry of Economy and Public Works and Services. This provision of the law was vetoed by the President and the Secretariat of Agriculture, Livestock, Fisheries and Food (SAGPyA) was named as the “implementation authority” under the law. SAGPyA, through its Sub-secretariat of Fisheries (SSP), is responsible for conducting and executing national fisheries policy established by the Federal Fisheries Council. SAGPyA is required to conduct and execute scientific and technical research objectives and needs, control total allowable catches (TAC) by species, issue quotas according to the guidelines set by the Council, collect royalties determined by the Council, establish and implement control systems to determine catches in the territorial sea, EEZ, monitor landings in authorized ports, set sanctions and create an infraction regime, check the accuracy of fishing reports, and promote the consumption of national seafood products both domestically and internationally.

SSP has an advisory cabinet and a National Fisheries and Aquaculture Directorate, to which the Aquaculture Division and the Fisheries Administration and Surveillance Division report. The Fisheries Administration and Surveillance Division is in charge of fisheries management and regulation, surveillance, monitoring and enforcement, statistics, sectoral analysis, and seafood promotions. The Aquaculture Division, with a staff of five people, is responsible for promoting the sustainable development of aquaculture, designing guidelines and policies, and providing legal and technical advice.

SSP has a permanent staff of 155 people and a contracted staff of 102 people, who provide most of the technical expertise. Funds from the European Union support 82 of the contracted staff, whereas the other 20 are supported by funds from the Institute for Inter-American Agricultural Cooperation. Lawyers make up a significant percentage of SSP staff.

As of December 1999, the new Government had decided to eliminate the office of Subsecretary of Fisheries and the new administrative structure was still under discussion. An important challenge faced by the new authorities is to create a more sustainable institutional structure, whose technical management functions are insulated, to the extent possible, from political interference and whose funding is secure enough to attract and develop professional staff.

Secretariat of Natural Resources and Sustainable Development (SRNyDS). The Secretariat’s mandate is to assist the Argentine President in all areas concerning the preservation and restoration of environment and conservation of renewable resources as to achieve a healthy environment apt for human development as mandated by Article 41 of the Argentine Constitution. Until December 1999, the Secretariat had four Sub-secretariats: Water Resources, Sustainable Development, Environmental Management, and Coordination. Within the Sub-secretariat of Sustainable Development, the Division of Fish and Aquaculture Resources is primarily involved in marine fisheries issues. The Division’s staff ranges between 10-15 depending on the number of contracted staff.

SRNyDS has an important formal role in setting fisheries’ policy as it sits on the CFP. In addition to their participation in fisheries conservation management issues with the CFP, SRNyDS is involved in in-land fisheries, coastal zone, biodiversity and wetland issues. One of the areas of main interest within their biodiversity initiative is the preservation of marine fauna in particular birds and marine mammals. SRNyDS is working on ways to reduce the incidental catch of marine birds by fishing gear, especially longlines.

As of December 1999, the Sub-secretariat of Sustainable Development is expected to be transferred to the new Ministry of Social Welfare and Sustainable Development. It is not yet clear what functions related to fisheries management will be retained by the new ministry.
Argentina: Towards Rights-Based Fisheries Management

Provinces

Province of Buenos Aires. The Provincial Fisheries Office depends on the Subsecretariat of Fisheries and Natural Resources which in turn depends of the Ministry of Agricultural Affairs of the Province of Buenos Aires. The Provincial Fisheries Office has two offices: the Office of Fisheries Supervision and the Office of Fisheries Development. The Office of Fisheries Supervision houses the Department of Sanitary Supervision and the Department of Technical and Commercial Control. The Office of Fisheries Development houses the Department of Fisheries Technology and Development and Department of Commercial Exploitation. The Provincial Fisheries Office has a staff of about 70, 13 of which are inspectors.

The Provincial Fisheries Office is responsible for, among other things, inspection, control, and surveillance of fishing, aquaculture and frog culture activities throughout the province’s territory, coordinating and controlling commercial and recreational fisheries in marine, freshwater, public or private waters, developing aquaculture, promotion, marketing, and enhancement programs, exercising the powers of sanitary police, proposing hygienic-sanitary rules, inspection, control, and surveillance of fishing, aquaculture and frog culture activities throughout the province’s territory, writing summaries for infractions, permits, and coordinating surveillance activities in the recreational and commercial fisheries sector.

Province of Rio Negro. The Fisheries Office is under the Secretariat of Production, which in turn depends of the province’s governor. The Fisheries Office has four bodies: Technical Advisory Board, the Under-office of Maritime Fisheries, an Administrative Department and the Department of Continental Fisheries. The Fisheries Office has a staff of forty. The Under-office of Maritime Fisheries is responsible for managing marine fisheries while the Department of Continental Fisheries is responsible for managing fresh water fisheries, primarily rainbow trout, salmonids, and silver side.

The Department of Continental Fisheries has four regional offices in Bariloche, El Bolson, General Roca, and Cinco Saltos. The Department of Continental Fisheries is responsible, among other things, for regulating recreational fisheries, issuing recreational fishing permits, controlling poaching, enforcing and monitoring closed areas and seasons, and minimum mesh sizes and fish sizes.

The Under-office of Maritime Fisheries has a Department of Fisheries Police, and is also in charge of the artisanal marine fisheries terminal. The Department of Fisheries Police has a staff of seven inspectors, and is responsible for monitoring and enforcing regulations. The Province of Rio Negro also has policing agreements with the Coast Guard and Navy.

Province of Chubut. The Office of Fisheries and Maritime Interests is the leading fisheries management body in the Province of Chubut. The Office of Fisheries and Maritime Affairs is housed in the Ministry of Production. The Office of Fisheries and Maritime Affairs has an Under-office of Maritime Fisheries and an Under-office of Continental Fisheries. The Office of Fisheries and Maritime Interests has a staff of approximately thirty.

The Maritime Fisheries Under-office is responsible for managing marine fisheries. Their responsibilities include among other things, controlling and recording catches, monitoring fishing vessels in provincial waters, controlling minimum fish sizes, fishing gears, and closed areas and seasons, etc.

The Continental Fisheries Office is responsible for managing freshwater fisheries. Their responsibilities include managing and regulating recreational fisheries and executing enhancement programs. The Maritime Fisheries Under-office has branches in Puerto Madryn, Comodoro Rivadavia, Caleta Cordova, and Rawson, whereas the Continental Fisheries Suboffice is based in Esquel.
The Under-secretariat of Fisheries and Port Activities depends on the Secretariat of Production, which is housed in the Ministry of Economy and Public Works. The Under-secretariat of Fisheries and Port Activities has a General Office of Technical Administration and a Provincial Office of Maritime Interests and Port Activities.

The Office of Technical Administration primarily deals with accounting issues. The Provincial Office of Maritime Interests and Port Activities houses the Fishing Activities Control Office, the Continental Fisheries Office, the Fisheries Development Office, the Research Center of Puerto Deseado and the Summary Office. In addition there are also four more departments (Department of Puerto Deseado, Department of Puerto Santa Cruz, Department of Puerto San Julian, and Department of Puerto Caleta Olivia) that report to the Provincial Office of Maritime Interests and Port Activities.

The Fishing Activities Control Office is divided into two departments: Department of Inspectors and the Department of Operational Control and Fishing Permits. The Division of Operational Control and Fishing Permits is responsible for keeping and updating the deep-sea fishing permit registry, checking the information supplied by fishing companies prior to issuing fishing permits, controlling the fulfillment of obligations regarding industrial plant activities and vessel operations, informing the Provincial Office of Maritime Interests and Port Activities of alleged infractions to the national and provincial legislation regarding fisheries matters, controlling deep-sea fishing permits, and assisting the Fishing Activities Control Office.

The Department of Inspectors is responsible for enforcing the provincial fisheries law and its regulations, keeping up-to-date fishing firm and fishing vessel registry, writing infractions, monitoring vessels that fish in provincial waters, controlling fishing gears, monitoring closed areas and seasons, controlling minimum fish sizes, inspecting processing and industrial plants, controlling the fishing fleets operating in the Gulf of San Jorge on Coast Guard vessels or on planes hired by the Province.

The Continental Fisheries Office has two departments: the Department of Sports Fishing and the Department of Aquaculture. The Department of Sports Fishing is in charge of managing and regulating recreational fisheries and executing enhancement programs, whereas the Department of Aquaculture is responsible for fostering the development of extensive, semi-extensive, and intensive aquaculture, analyzing and evaluating private and public aquaculture projects, and issuing concessions for the development of the activity. It is also responsible for the inspection, control and monitoring of aquaculture facilities, formulation and execution enhancement projects, supervision of the introduction of aquatic organisms with the help and coordination of national and provincial institutions.

The Fisheries Development Office houses the Statistics Department whose responsibility is to collect all statistical information handled by different agencies of the Subsecretariat, process the data, and periodically submit statistical information to the sector. The Infraction Office has a Department of Infractions to which Dispatch Division reports to. The Dispatch Division, on the other hand, has Registry Section whose responsibilities include keeping a registry of infractions, archiving depositions, resolutions, and decrees related to the infractions, and updating infraction statistics. The Dispatch Division is responsible for registering all incoming and outgoing documents, writing of notes and assisting the Infraction Office. The Department of Infractions is in charge of prosecuting infractions and coordinating inspections of fishing vessels as well as fishing plants in the context of legal proceedings. The Research Center of Puerto Deseado is responsible for conducting scientific research.

The Departments of Puerto Deseado, Puerto Santa Cruz, Puerto San Julian, and Puerto Caleta Olivia are responsible for periodically supervising that fishing vessels and establishments meet current regulations, participate with other provincial bodies in the creation and administration of fishing zones, advise fishing
firms on provincial fisheries legislation, provide notification alleged infractions, issue commercial (coastal) and recreational fishing licenses, and assist in the evaluation of aquacultural programs.

Province of Tierra del Fuego, Antarctic, and Islands of the South Atlantic. The Fisheries and Aquaculture Office is responsible for the management of marine and freshwater fisheries as well as aquaculture development. The Fisheries and Aquaculture Office is housed in the Under-secretariat of Natural Resources and Human Environment, which is under the Secretariat of Development and Planning, which in turn is housed in the Ministry of Economy and Public Works.

The Fisheries and Aquaculture Office has two divisions: the Maritime Fisheries Division and the Aquaculture Division. The Department of Maritime Fisheries has a staff of six and the Aquaculture Department has a staff of seven. The Department of Maritime Fisheries is responsible for fisheries management and research, awarding fishing permits, regulating fishing gears, and monitoring and enforcement. Three inspectors in conjunction with personnel from the Coast Guard and Navy carry out the monitoring and enforcement of the coastal artisanal fisheries. The most important artisanal fisheries are mussels, “cholgas” (Aulacomya ater), turbot, silver sides, king crab and soft-shell crab and sea urchins. The Aquaculture Department, on the other hand, is responsible for aquaculture development and technology transfer.

The Fisheries and Aquaculture Office has been active in the assessment of the king crab and soft shell crab resources as well as mussel resources off the Beagle Channel. The Office is also working on evaluation of new technologies for the aquaculture of salmonids. The Tierra del Fuego province with the technical assistance of Fundación Chile are presently raising rainbow trout in net pens off the Beagle Channel. If the technology proves useful, the Fisheries and Aquaculture Office plans to transfer it to the private sector. There is also a rainbow trout restocking and enhancement program in the Olivia River. These stocks are mainly destined to the recreational sector. The Fisheries and Aquaculture Office has laboratory where red tides are monitored systematically.

Research

National Institute for Fisheries Research and Development (INIDE. While many national and provincial government agencies, research centers, and universities conduct fisheries research in Argentina, INIDE is the nation’s leading fisheries research institution. INIDE was founded in 1977 and is an autonomous body of SAGPyA. Of INIDE’s staff of 262, 48 belong to other institutions (5 from the University of Mar del Plata, 17 from SAGPyA, and other 11 are hired through other agencies). INIDE has 54 researchers, 10 of who are temporary; 40 technicians, 16 of who are temporary; and 40 people in administration, services, and research support. Of the 54 researchers, 9 have a doctorate from Argentine universities, and none has obtained a Master’s or Ph.D. degree overseas. None of the personnel sponsored to study overseas has ever returned to INIDE. The institute has a new facility completed in 1993 and three modern research vessels.

The Federal Fisheries Council sets the objectives, policies, and requirements for the scientific and technical research, while INIDE plans and implements these activities. INIDE has five main research areas: demersal resources program; inland water program; pelagic and invertebrate fisheries program; marine environment program; and the technology and information program. The demersal program assesses the health of many commercially important stocks (hake, croaker, stripped white fish, hoki, southern blue whiting, and king clip, among others) and provides scientific advice for their conservation and management. The inland waters program studies the impact of damming activities, primarily in the Río de la Plata basin. The pelagic and invertebrate fisheries program assesses the state of squid, shrimp, king and soft shell crab, and anchovy stocks to provide timely management information and advice. The marine environment program focuses on red tides and understanding the coupling between environmental
fluctuations and population changes. Lastly, the technology and information program conducts research on acoustic technology, gear selectivity, and snapper aquaculture and conducts dockside and open-sea sampling (i.e., size and age structure). INIDEP also has a small economic unit, which works closely with the National University of Mar del Plata, among other institutions.

*Research Center for Fishing Technology and Regional Foods (CITEP).* CITEP was created in 1975 by an agreement between the National Institute of Industrial Technology, the Scientific Research Commission of the Province of Buenos Aires (CIC), and the National Council for Scientific and Technical Research (CONICET). CITEP is mainly devoted to the post-harvest aspects of fish utilization. The goal of CITEP is to improve the quality of foodstuffs and the efficiency and competitiveness of the production processes. CITEP's research is funded by several provincial, national, and international organizations, including CIC, CONICET, FAO, and the European Union.

**Monitoring and Enforcement**

**Secretariat of Agriculture, Livestock, Fisheries, and Food.** Within SSP, the Fisheries Administration and Surveillance Division is responsible for monitoring and enforcement. In addition to its headquarters in Buenos Aires, the Fisheries Administration and Surveillance Division works out of 5 district offices (Mar del Plata, Bahia Blanca, Puerto Madryn, Puerto Deseado and Ushuaia) and two delegations (Comodoro Rivodavia and Caleta Paola). There are approximately 85 active inspectors, although 419 people have been trained to be inspectors. Under agreements with the Coast Guard and the Navy, SAGPyA trains their personnel as inspectors and then hires them as observers. The trained personnel, however, remain part of their original institution. SAGPyA also provides funds to the Coast Guard and Navy to conduct aerial and marine monitoring and surveillance.

The Fisheries Administration and Surveillance Division conducts port inspections where they monitor landings, holds, and transshipments; measure fish; and monitor fishing gears. In 1997, an onboard inspector program was initiated but discontinued due to concerns regarding the quality of selection and training of inspectors.

SAGPyA has also implemented the MONPESAT satellite-based vessel monitoring system (VMS) which uses vessel mounted transponders and global positioning system to track and monitor the activity of approximately 350 fishing vessels outfitted with transponders. In addition to SAGPyA, the Navy, Coast Guard and INIDEP receive information generated by MONPESAT. Currently, the system is used primarily to monitor fishing within closed areas.

**Coast Guard.** The Coast Guard is housed in the Ministry of the Interior, although until recently it was part of the Defense Ministry. The Coast Guard has a staff of approximately 13,000 people. The Coast Guard is responsible for ensuring that fishing vessels meet navigation safety requirements; certifying crews; monitoring and enforcing fisheries regulations (e.g. closed areas, fishing gear regulations); monitoring and controlling the departure of boats; controlling, surveillance, and apprehending domestic and foreign vessels; and conducting oil response and search and rescue operations. Coast guard officials also act as onboard observers and provide policing support to SSP officials in port. The Coast Guard has collaborative agreements with coastal provinces, which provide financial support to expand the Coast Guard's policing activities. The Coast Guard is also responsible for prosecuting the vessels caught fishing illegally by the Navy.

**Argentine Navy.** The Argentine Navy is under the Ministry of Defense. The Navy's responsibilities in the fisheries sector include aerial surveillance; sea patrolling; monitoring and enforcing fisheries regulations; surveillance and apprehension of domestic and foreign vessels; and search and rescue operations. The
Argentina: Towards Rights-Based Fisheries Management

Navy has about 29,000 people under its command. About 70% of the naval air force and fleet participate in monitoring, control and surveillance operations.

One of the most important challenges for the Navy and the Coast Guard alike is monitoring and enforcing regulations against foreign vessels that illegally operate in or near the Argentine EEZ. Although the exact extent of this activity is unknown, a navy plane reported that during the squid season it had sighted 161 foreign fishing vessels operating illegally in Argentina’s EEZ. In addition, many intruder ships are painted red to look like Argentine fishing vessels; it is believed some are “twins” of other licensed Argentine vessels.

Seafood Safety

National Food Safety Service (SENASA). SENASA is an autonomous body of the SAGPyA and is responsible for guaranteeing and certifying the healthfulness and quality of agricultural, fisheries, and forest products. It certifies agricultural products for both domestic consumption and the international market after inspecting them for purity, healthfulness, and quality. It also inspects imports.

In the fishery sector, SENASA supervises compliance with hygienic-sanitary procedures for the packing, manufacturing, transporting, and marketing of seafood products, both for domestic consumption and export markets. It also assures the quality of seafood imports. SENASA has a registry of all facilities where seafood products are processed and stored, both onshore and onboard. It currently supervises approximately 250 processing plants and 750 vessels. About 70 SENASA agents work in the fisheries sector.

SENASA has the power to approve processing plants on behalf of the European Union. Inspectors are sent from the European Union once a year. SENASA has required an HACCP (Hazard Analysis Critical Control Point) system for all processors, both ashore and onboard. Almost all processors have complied; however, not all cooperatives have met this requirement.

Foreign Affairs

Ministry of Foreign Affairs, International Trade and Religious Affairs. The Ministry of Foreign Affairs, which is represented on the CFP, fulfills two major roles in the fisheries sector. It is responsible for developing foreign policy in Argentina’s EEZ and adjoining regions and for fostering the fisheries sector through international economic relationships. In the foreign policy arena, the Sub-secretariat for Foreign Policy, the Malvinas Bureau, and the Legal Advisory Office play an instrumental role in developing policies that promote the interests of the fisheries sector. For instance, under the sovereignty “umbrella,” Argentina and the United Kingdom advanced the protection of South Atlantic marine living resources by establishing the South Atlantic Fisheries Commission in 1990. The Ministry also participates in many international discussions and negotiations. Recently it has participated in the United Nations Conference of Straddling Fish Stocks and Highly Migratory Fish Stocks and the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas. The Ministry also acts in the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR). Box 2 provides a brief overview of the main treaties and agreements relevant to the fisheries sector.

National Senate and Chamber of Deputies

The Argentine Congress has been instrumental in the development of new legislative framework and has been an active player in development of fisheries policies. In December of 1997 the Senate and the Chamber of Deputies passed the new federal fisheries law which created the CFP and allowed the use of
individual transferable quotas. The Senate’s Commission on Fishing and Maritime and Port Interests and the Chamber of Deputies’ Commission of Maritime, Riverine, Fishing, and Port Interests are principal commissions dealing with fisheries management issues.

Private Sector Organizations

There are numerous organizations that represent the varied stakeholders in Argentina’s fisheries sector. There is no single organization that represents the interests of the fishing industry. The harvesting sector is organized according to vessel categories with separate organizations representing the owners of the inshore, ice trawl and processing fleets, as well as those who own both ice trawlers and processing boats, and by geographic location and relationship with processing plants.

Labor organizations consist of unions and cooperatives. There are distinct unions for fishing boat captains, crews and processing workers. Unions provide a variety of social services to their members, including health care and training assistance. Cooperatives fulfill both a business management function as well as providing limited social assistance to their members.

Box 2. Multilateral Treaties and Agreements of Global Scope

- United Nations Law of the Sea
- United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks
- Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas
- Biodiversity Convention
- Convention on International Trade in Exotic Species

Multilateral Treaties and Agreements of Restricted Scope

- Antarctic Treaty
- Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR)
- Convention on Antarctic Seals

Bilateral Treaties and Agreements

- Treaty of the Rio de la Plata and Its Maritime Front
- Agreement on Fishing Matters between Argentina and the European Union
- South Atlantic Fisheries Commission

International Agreements on Cooperation and Assistance

- Agreement on Fishing Matters between Argentina and the European Union
- Japan International Cooperation Agency
- Overseas Fishery Cooperation Foundation
- Japan Marine Fisheries Resources Research Center

Source: Ministry of Foreign Affairs, Culture and Religion
A number of Non-Governmental Organizations (NGOs) are actively involved with fisheries issues through research and political advocacy of environmental and social safeguards. Fundación Patagonia Natural, based in Puerto Madryn, has an active fisheries and coastal management research program. Centro de Defensa del Puerto y de la Pesca Nacional, based in Mar del Plata, advocates improved fisheries management and safeguards for coastal communities. In addition, the Argentine affiliates of international conservation organizations such as Greenpeace, Fundacion Vida Silvestre (WWF) and IUCN are active advocates of conservation-oriented fisheries policies.
II. Implementation of the Quota Management System

The Current Management Crisis

Overview of the Crisis

The rapid expansion of fishing effort and capacity over the past decade has led to severe overexploitation of many commercially important fish stocks. INIDEP (1998) classifies Argentine hake, southern hake, southern blue whiting, Patagonian toothfish, red snapper, croaker, sea trout, and king crab as over-exploited species. Some of these stocks are at the brink of collapse. In the case of the Argentine hake resource, landings have been consistently above the recommended level. In 1997, for instance, hake landings reached an estimated 834,000 tons, well above the TAC of 395,000 tons (table 7).

Table 7. Estimated hake catch in 1997

<table>
<thead>
<tr>
<th>Source of Fishing Mortality</th>
<th>Catch (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentine “officially” reported landings</td>
<td>595,000</td>
</tr>
<tr>
<td>Discards and unreported landings (25%)</td>
<td>149,000</td>
</tr>
<tr>
<td>Uruguayan reported landings</td>
<td>50,000</td>
</tr>
<tr>
<td>High seas landings</td>
<td>40,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>834,000</strong></td>
</tr>
</tbody>
</table>

Source: Based on information from SAGPyA and INIDEP.

Decreasing catches per unit of effort, increasing dependence on younger year classes, and diminishing spawning stock biomass all point to the poor condition of the hake stocks. A recent assessment of the stocks concluded that even with a drastic reduction in the TAC to 290,000 tons, there is still an 80 percent chance that the spawning biomass will fall below the level of 30 percent of the virgin spawning stock biomass that is considered desirable for hake (table 8). Furthermore, it was noted that failing to reduce present effort levels would likely result in a 40 percent drop in catch rates and catches of the southern hake stock. The associated reduction in spawning stock biomass may lead to significant declines in recruitment, which in turn would result in continuing declines in catches. Similar conclusions were reached for the northern stock. The collapse of the hake fishery will result in a substantial loss of export revenue and employment.

14 There are three hake stocks: one south of latitude 41°S, another north of latitude 41°S, and the last in the Gulf of San Matias.
Argentina: Towards Rights-Based Fisheries Management

Table 8. Biological reference points

<table>
<thead>
<tr>
<th>Probability of falling below 30% of the virgin spawning stock biomass</th>
<th>Probability y 5%</th>
<th>Probability y 50%</th>
<th>Probability y 80%</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAC (tons)</td>
<td>180,000</td>
<td>247,000</td>
<td>290,000</td>
</tr>
</tbody>
</table>


Causes of the Fisheries Crisis

Historically, Argentine fisheries policy has focused on maximizing production and exports. At the beginning, government policy focused on the addition of subsidized fishing units which could be either imported at reduced tariffs or bought from local, subsidized shipyards, tax exemptions for fuel expenses, and subsidized credit (Law No. 17,500 of 1961 and Law 19,000 of 1971). The strong foreign demand for fish products following the collapse of the world's traditional fishing grounds together with government policies that encouraged investments fostered the rapid growth of the offshore harvesting and on shore processing plant sectors. Throughout this time fishery resources were essentially under open access conditions.

During the mid 1980's INIDEP begins to detect that the hake biomass was dropping. By the late 1980s, there was a growing recognition that fish resources were exhaustible and there was a need to ensure their sustainable use. In 1988 a limited access regime was imposed in the hake fishery. In 1991, a generalized licensing system was introduced. The limited entry regime was complemented with catch quotas aimed at controlling the exploitation rates. Although, TAC had been sporadically used in the past it was not until 1991 that TACs were established on a regular basis in key fisheries. During this time, the domestic economic crisis forced 60-70 fishing firms, mostly ice trawlers, into bankruptcy.

In spite of the economic hardship and the limited entry regime, effort and catches continued expanding. Vessels began to compete against each other for the fish and invest excessively in equipment and technology - “capital stuffing” - resulting in an over dimensioned fleet. Between 1989 and 1996, the fishing effort of freezer trawlers increased five-fold while the fishing effort of the ice trawl fleet tripled. Similarly, landings were consistently above the established TAC (figure 10).

The limited entry regime failed because of several factors. First, there was weak institutional framework in place. SSP was unable to adequately monitor landings and ensure compliance with the management system. Contracting, training, equipping and evaluation of enforcement staff was inconsistent with development of a professional cadre of fisheries inspectors, a situation which was made worse by institutional uncertainty regarding the configuration and funding of SSP. Effective enforcement was further hampered by lack of an appropriate legal/judicial framework. Fines were small (generally less than US$50,000) relative to the potential benefits of violations and were subject to lengthy legal processes. Secondly, the industry was able to transfer fishing licenses (many of them without any catch limitations) from old and less efficient vessels to newer and more efficient vessel. A large percentage of these licenses came from bankrupt operators. Lastly, the underlying incentive structure under limited entry, exacerbated the race to fish and capital stuffing leading to overcapitalization of the fleet. Recent estimates suggest that the hake fleet alone has the capacity to harvest 1,300,000 tons. In 1998, total

15 Under the new licensing system firms that were contemplating adding new vessels had to submit an investment proposal. If the project was approved then a restricted license (i.e., species and/or catch limitation) was issued.

32
landings of all fin and shellfish resources was approximately 1,100,000 tons. Continuing over-capacity and declining stocks led to the passage of the federal fisheries law.

Figure 10. Hake landings and TAC

![Hake landings and TAC](image)


**Government’s Response to the Crisis**

To address the crisis, the Government has taken several steps. First, it introduced a new institutional and legal framework (Law No. 24,922) to reverse the shortcomings of the previous management regime. The new fisheries law mandates the use of a management system based on individual transferable quotas (ITQs) which, by providing fishers with an enforceable claim on actual and future fish, creates an economic incentive for industry to restrict yields to sustainable levels. Second, the Government introduced a series of management measures aimed at rebuilding the stocks. The 1998 hake TAC, for instance, was reduced to 289,000 from 395,000 tons in 1997. In addition, in June 1997 the “Isla Escondida” area closure was significantly expanded to protect hake’s spawning and nursery areas. Also, the use of shrimp selectivity devices, known as DISELAs, was imposed in order to reduce juvenile hake by-catch in the shrimp fishery.

---

16 In 1997 total landings reached approximately 1,340,000 tons.

17 The “Isla Escondida” area closure off the coast of the Chubut province first began in 1984. Over the years, the closure area has been expanded significantly.

18 Since 1991 (Resolution No. 245), a 120 mm mesh size requirement has been in place for all trawlers that target demersal fisheries as a means to reduce the capture of juveniles from all demersal species, not only hake. Unfortunately, hake do not lend themselves to management by mesh size control. Most mesh selectivity experiments in different parts of the world suggest that is unlikely that hake will survive going through a 120 mm mesh because of their anatomy, particularly the ease with which they lose scales (which leads to death).

19 Conservative estimates suggest that between 1990 and 1996 shrimp trawlers and bottom trawlers operating in the shrimp fishery discarded between 20,000 and 75,000 tons of hake (80-300 million fish). Most of the discards were from 0 to 2-year-old individuals. In 1997, the shrimp trawler fleet (the only one allowed to operate in the shrimp fishery) landed 5,500 tons of shrimp and 40,000 tons of hake.
Following concerns that catch levels were still exceeding the recommended hake TAC, the Government implemented two “fleet-specific” fishing bans in 1998. On July 15, 1998, the Government implemented the first fishing ban, which covered all of Argentina’s EEZ and territorial sea north of latitude 47°S (with the exception of the Gulf of San Matias and the common fisheries zone shared with Uruguay). Under the “fleet-specific” fishing ban, all fishing vessels except freezer and factory vessels were required to suspend their fishing activities for 20 consecutive days. The freezer and factory fleets were required to restrain from fishing for sixty days. The Government also required the freezer fleet dedicated to shrimp fishery to halt its activities once their catch of hake, a shrimp by-catch species, reached 1,500 tons.

On November 15, 1998, the Government implemented a second “fleet-specific” fishing ban where the freezer and factory fleet were not allowed to fish for 45 days whereas the other fleets were not permitted to fish for 15 days. These bans, however, failed to keep catches within the specified TAC. Preliminary reports indicate that over 400,000 tons of hake were landed in 1998 despite the recommended TAC of 289,000 tons. In January of 1999, the Government initiated an interim individual vessel quota plan (IVQ), where each vessel was given a hake quota corresponding to 50% of their 1997 catch levels. Legal challenges to the interim IVQ prevented its implementation.

During 1999 the condition of the stocks continued to deteriorate, consequently the Federal Fisheries Council proposed to close the hake fishery from June 1 until the end of the year. Industry reacted by staging an unprecedented manifestation. In Mar del Plata over eighty fishing vessels departed with the intention of blocking the port of Buenos Aires. In Buenos Aires, fishermen protested in front Congress demanding an emergency law. To end the unrest the President passed decree No. 591. The decree declared a state of emergency and stated that only the Federal Fisheries Council could authorize the exploitation of the hake resource. The decree also restricted the operation of the freezer and factory fleet south of 42°S and 150 miles off the coast.

Shortly after Congress passed an emergency fisheries law. The law called for the closure of the fishery until the end of the year and the postponement of the initial allocation of quotas. The law also allowed the ice trawl fleet to operate up to latitude 48°S. The freezer and factory fleets were restricted to operate south of 48°S. In late July, the President issued a decree which set an additional global catch quota of 50,000 tons to expand the maximum allowable catch of hake while the emergency fisheries law was in force.

In August of 1999, the Federal Fisheries Council allocated an additional 50,000-ton quota, which was set in the decree ruling the Emergency Fisheries Law. The quota was to be distributed exclusively among ice trawl vessels, as follows:

- 35,000 tons to be allocated according with the historical catch records, and

---

20 Fleet-specific fishing bans, or biological stops ('paradas biologicas') as they are known in Argentina, have objective of reducing effort. The usually require different vessel classes not fish for a specified period of time. Area closures (‘vedas’), on the other hand, have the objective of protecting juveniles. These closures tend to be area and species specific.

21 The main objection was the use of 1997 as the reference year given that the federal fisheries law stipulated that the 1989-1996 time period should used as the reference time period.

22 The fleet never reached the port of Buenos Aires, however, they did reach the port of La Plata which is approximately 100 km from Buenos Aires.

23 This initial distribution of the quotas was not to set a precedent for the eventual definitive allocation, in accordance with the Federal Fisheries Law.
15,000 tons to be distributed in accordance with a series of aspects, including workforce employed, investments made and several other parameters. Up to 5,000 tons could be reserved to be distributed to sectors of “maximum social interest”

Also, there was a hake ban established which required all vessels to stop fishing for 15 days starting September 1. In September 1999, the courts ordered the suspension of the additional quota allocation of 50,000 tons of hake claiming the allocation was against the spirit of the federal fisheries law and jeopardized the sustainability of the resource.

Immediate Actions to Address the Crisis

The difficulties encountered in implementing restrictions on the hake catch in 1999 demonstrated the strong political forces involved in management of a severely depleted, commercially important resource, and the limited institutional capacity to carry out Government’s resource management mandate. For this reason, this report recommends that Government focus its immediate actions on demonstrating effective measures to limit the hake catch and in so doing, establish its ability to credibly carry out basic management functions. Only when this has been accomplished can Government focus on developing the technical capacity to implement the QMS, preferably initiating its implementation in fisheries without the severe resource depletion and over-capitalization problems which characterize the hake fishery.

In order to protect the hake resource and the economic viability of the harvesting and processing industry, Government needs to act rapidly to implement bold management measures that incorporate the precautionary approach. Based on international experience, this reports recommend that Government take the following actions to address the crisis in the hake fishery:

Recent experience suggests that Government will only be able to effectively carry-out these measures if there is public acknowledgement, at the highest levels of Government, that these actions are the only available option in order to avoid complete collapse of the fishery. Concurrently, the support of local government officials and communities is also essential as they are most likely to suffer the immediate social consequences of conservation actions. Examples from other countries include formation of a crisis committee composed of representatives from national and local government agencies (fisheries and social), industry and labor unions which can increase transparency and facilitate the dissemination of information to stakeholders.

Government should ensure that the levels of allowed fishing are commensurate with the state of the resource. TAC should be set based on the best available scientific assessments and the consistent with high regeneration possibilities. Assessments should be updated frequently to monitor the state of the resource and modify catch levels if necessary. International review of hake stock assessments, as was carried out in February 1998, may increase the credibility of the process to establish TACs.

In order to ensure that catches do not exceed the specified TAC, Government should implement management measures which are most likely to be effective in controlling catches given the current institutional capacity of the implementation authority. Periodic fishery closures have the advantage that they are relatively easy to enforce and verify, depending largely on controls implemented by the Coast Guard in port. If programmed in advance, periodic closures also allow industry to adjust the use of its

The precautionary approach involves the application of prudent foresight. In other words, the absence of adequate scientific information cannot be used as a reason for postponing or failing to take conservation and management measures (see, FAO’s (1995) Code of Conduct for Responsible Fisheries, and FAO’s (1997b) Fisheries management. Technical Guidelines for Responsible Fisheries).
harvesting and processing capacity to minimize employment loss. Alternative measures such as interim ITQ or IVQ allocations, on the other hand, may prove less beneficial. Interim quota allocations, while providing industry with increased flexibility to adjust harvesting and processing levels, are significantly more difficult to enforce as they require continuous monitoring and recording of landings by vessels. In addition, interim quota allocations establish a precedent, which in the future may reduce the Government’s flexibility in allocating quota.

A “zero-tolerance” policy for enforcement of the closures should be established. Special, emergency powers may be required to ensure that violations are quickly prosecuted and steep penalties assessed. Well publicized prosecution efforts can establish Government’s intent to fully enforce the restrictions.

Government should ensure that no vessel be allowed to fish unless authorized in a manner consistent with national legislation. Government, working with the provinces, should take appropriate measures, including gears restrictions, that minimize waste, discard, and catch of non-target species. Additional efforts should be made at the national and provincial level to establish and enforce closure areas as to protect breeding grounds, and other areas of high biological sensitivity.

A social safety-net program should be established prior to announcement of the closure policy in order to provide assistance to vulnerable fisheries workers in coastal communities. Given the urgency of the situation, Government may wish to depend primarily on ensuring that funding for existing programs is made available in the most impacted communities. In order to ensure access to the programs and reduce to a minimum worker anxiety, national, provincial, and municipal official will need to work together with labor unions, cooperatives, industry and community organizations to provide vulnerable workers with orientation and counseling services.

Government should prepare a national information campaign which explains the state of the resource, the cost in terms of permanent loss of employment, exports and economic growth resulting from a collapse, the measures to be taken to limit catch and the accompanying actions to provide a social safety net to the most vulnerable workers. Examples from collapsed fisheries in other countries, such as groundfish stocks in the U.S. and Canada, can demonstrate the social and economic consequences of delaying measures to ensure long term sustainability in favor of maintaining short-term benefits.

Based on international experience, it is expected that the above actions will require the full attention of the CFP as well as the implementation authority25, at least during the first nine months of 2000. In addition to ensuring implementation of enforcement actions and provision of social safety-net services, Government officials will be required to constantly review the situation and defend their actions in public forums in the affected communities as well as seek the ongoing support of elected officials and the judiciary. Accordingly, it is expected that activities related to QMS implementation, while proceeding in parallel, will not be resolved during this period.

25 Throughout this section the area of Government responsible for implementation of fisheries policy is referred to as the “implementation authority” for general references under the new law, and as “SSP” when referring to the specific institutional structure. As of December 1999, SAGPyA had not announced its new institutional structure.
Implementation of a Quota Management System

International experience with QMS indicates that it can be an effective tool to achieve the goal of the new fisheries law that is “to promote sustainable long term conservation of the resources” while “fostering the development of environmentally appropriate industrial processes...”. However, in order to operate effectively, the Government must take a number of actions to establish the institutional basis for introduction of the new management system which typically require more than a year to implement. Figure 10 provides an example of a timetable for implementation of the QMS in Argentina based on international experience.

Development of a Consensus-Building Implementation Process

Consistent with experience in other countries, the shift from a fisheries management regime whose objective is to increase harvesting and exports to one which must limit catch to ensure long-term sustainability has engendered significant mistrust between the various stakeholders in the sector. In Argentina, this is compounded by the concerns of the industry regarding its survival. As a result, Government’s first major challenge is to assure transparency in the definition of the key elements of QMS implementation.

Public information programs are useful tools for focusing industry’s and the general public’s attention on key issues such as the severity of the current crisis, the consequences of inaction; the advantages of the QMS; and international experience with implementation of QMS. One goal of the public information program should be to distinguish between the need to adopt QMS from the distributional issues, which are present regardless of the management tool used. The CFP should prepare and disseminate publications accessible to a non-technical audience, which clarify the concerns of resource managers, industry, labor unions, local communities and NGOs. Government should also organize well-publicized study-tours, including journalists, to countries, which have experienced similar crises and implemented QMS.

During the implementation process, Government should provide ample opportunity for public comment on proposed regulations and key technical decisions. Argentina has the benefit of a sophisticated fishing industry which can cite significant local and international knowledge of fisheries and fisheries management. While the experience in countries such as Canada and the U.S. indicates that extensive public consultation can significantly extend the time required to implement new regulations, the benefits of industry support can greatly facilitate the ability of the implementation authority to carry-out its management responsibilities.

Development of a Legal and Regulatory Framework for QMS

The new fisheries law, while providing broad guidelines, requires substantial additional legal and regulatory clarification to support fisheries management. Amongst the key issues to be defined are:

a) Quality of quota rights (i.e., perpetual or limited term, fixed catch or percentage of TAC);

b) Transferability of quota rights;
Figure 10. Timetable For ITQ Implementation

(Months)

1 2 3 4 5 6 7 8 9 10 11 12

Establish Implementation Committee

----- Visits to NZ/Aust/US-----

----- Legal Clarification -----

----- Initial Publicity of Proposals -----

----- Determine how to apply Allocation Criteria -----

----- Develop New Regulations -----

----- ITQ Operates -----

----- First Reports from Monitoring & Industry on catch against ITQ

----- Publicity/information campaign -----

----- Develop Implementation Plan and timetable -----

----- Social Mitigation Plan -----

----- T of R for Registry project -----

----- Contract for Registry Design & Build -----

----- Design & Build Registry and Systems -----

----- Set TACs -----

----- Negotiate Final Arrangements with Industry -----

----- Develop Implementation Plan -----

----- Plan and timetable -----

----- Social Mitigation Plan -----

----- T of R for Registry project -----

----- Contract for Registry Design & Build -----

----- Design & Build Registry and Systems -----

----- Set TACs -----

----- Negotiate Final Arrangements with Industry -----

----- Develop Implementation Plan -----

----- Plan and timetable -----

----- Social Mitigation Plan -----

----- T of R for Registry project -----

----- Contract for Registry Design & Build -----

----- Design & Build Registry and Systems -----
c) Procedures for implementing the initial allocation of rights including an appeals process to handle complaints concerning initial allocations;

d) Setting up and strengthening of institutions to improve the management system (public or private provision of services, industry role in oversight) including

i. registry and licensing and management plans,

ii. monitoring and enforcement,

iii. overages, by-catch, and spill-over effects,

iv. biological and economic research;

e) Recovery of management costs; and

f) Social and technical assistance for industry restructuring.

The decisions taken will inevitably reflect Argentina’s unique legal, economic and social circumstances, Nevertheless, decision-makers can benefit from the other countries’ experience with QMS in reviewing options. Table 9 presents an overview of key policy decisions taken in these countries.

In making these decisions, Government should expect substantial political and legal pressure as these decisions have important consequences for the profitability and structure of the industry. However, the recognition that there is an urgent need for a new management system and that QMS can deliver significant benefits gives Government an important lever to achieve consensus amongst the stakeholders. Government’s challenge is to provide an inclusive framework that focus on the benefits of implementation and on the costs of failure.

**Technical Support to CFP**

It is expected that primary responsibility for definition of the key policies associated with QMS implementation will lie with the CFP as the policy-making body under the fisheries law. Regulation of the law, and in particular those provisions related to the definition of the rights and responsibilities of quota holders, restrictions on quota ownership and transferability, initial allocation criteria and mechanisms and cost and rent recovery mechanisms are clearly within the ambit of the CFP, perhaps in close consultation with the judiciary regarding key elements of law or regulation. Delivery of fisheries management services, while technically the responsibility of the implementation authority, will require that the CFP define the overall framework for service delivery including how each service will be delivered (public or private) and paid for. In order to address issues related to industry adjustment, including social assistance programs and fleet adjustment, the CFP will have to work closely with other areas of Government, including the Ministry of Labor, Ministry of Social Development, other areas of the Ministry of Economy, among others.
### Table 9. Policy Options Matrix

<table>
<thead>
<tr>
<th>Country</th>
<th>Basis of initial Allocation of rights</th>
<th>Duration of right</th>
<th>Quota transfer restrictions</th>
<th>Fleet adjustment</th>
<th>Service Delivery*</th>
<th>Research</th>
<th>Enforcement</th>
<th>Registry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>Catch history, employment generation, investment, production of processed fish product on-shore and off-shore, absence of infraction records</td>
<td>Undefined temporal concessions</td>
<td>Inter-fleet restrictions. Concentration caps to be determined</td>
<td>To be studied</td>
<td>Government</td>
<td>Government</td>
<td>Government</td>
<td>Government</td>
</tr>
<tr>
<td>Australia</td>
<td>Catch history and investment in fishery</td>
<td>Open ended but Government can revoke privilege</td>
<td>Quota holding provisions. Minimum quota holding requirements for leasing*</td>
<td>License buy-back</td>
<td>Contracted</td>
<td>Contracted</td>
<td>Mostly government</td>
<td>Logbook data entry contracted</td>
</tr>
<tr>
<td>Canada</td>
<td>Catch history other criteria such as vessel characteristics</td>
<td>Open ended but Government can revoke privilege</td>
<td>“All or nothing provisions” tied to quota vessels. Limitations on the number of quota holdings by vessel</td>
<td>Vessel and license buy-back</td>
<td>Government</td>
<td>Dockside monitoring and on-board observer programs are contracted</td>
<td>Other services provided by Government</td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>Auction*</td>
<td>10 years*</td>
<td>Limits on amount of quota purchased in auctions. Concentration caps</td>
<td>None</td>
<td>Contracted</td>
<td>Government</td>
<td>Government</td>
<td>Government</td>
</tr>
<tr>
<td>Iceland</td>
<td>Catch history and other criteria such as vessel characteristics</td>
<td>Open ended but Government can revoke privilege</td>
<td>Authorization of Fisheries Minister to transfer quotas between regions</td>
<td>Vessels and license buy-back</td>
<td>Government</td>
<td>Government</td>
<td>Government</td>
<td>Government</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Catch history and other criteria such as on-shore and off-shore investments</td>
<td>Permanent</td>
<td>Quota concentration caps.</td>
<td>Quota buy-back</td>
<td>Contracted</td>
<td>Government</td>
<td>Government</td>
<td>Government</td>
</tr>
<tr>
<td>South Africa</td>
<td>Catch history, demographic background.</td>
<td>Up to 15 years*</td>
<td>Authorization of Ministry of Environmental Affairs.</td>
<td>None</td>
<td>Government with limited contracting*</td>
<td>Government</td>
<td>Government</td>
<td>Government</td>
</tr>
<tr>
<td>United States</td>
<td>Catch history and other criteria such as vessel characteristics</td>
<td>Open ended but Government can revoke privilege</td>
<td>Quota concentration caps. Transfer limitation across vessels size categories, areas, quota types (i.e., blocks), etc</td>
<td>Vessel and license buy-back</td>
<td>Government with limited contracting</td>
<td>Government</td>
<td>Government</td>
<td>Government</td>
</tr>
</tbody>
</table>
a Refers to whether there is direct government provision of services or whether their provision can be competitively contracted to third parties. Contracting, however, must be open to competitive bids (i.e., must be fully contestable) independent whether the service is provided by the private or public sector.

b In the southern bluefin tuna fishery, people who want to lease quota must have a minimum holding of 500 kg.

c Under the present law only fisheries that have an “under recovery” and “infant development” status can have their rights auctioned. Presently there are four ITQ fisheries (e.g., red shrimp, yellow shrimp, cod and orange roughy fisheries) all of which have had their rights auctioned. There is a new proposal being considered in Congress which would allocate ITQs of fully exploited fisheries on a historical catch basis.

d Under the Chilean system, rights acquired during the first auction would depreciate by 10 percent annually. In subsequent auctions, the rights would be allocated for 10 year with no depreciation.

e The applicant’s demographic background is used to advance formerly disadvantaged persons.

f Some fisheries may allocate quotas permanently at the end of 1999.

g The research fleet is to be privatized.

h The tax authority (Internal Revenue Service) has treated quotas shares as property, seizing and auctioning more than US$ 1.5 million worth of Alaskan halibut and sablefish IFQ shares from 65 vessel owners for non-payment of back taxes.
Argentina: Towards Rights-Based Fisheries Management

The large number of complex decisions associated with QMS implementation will require establishment of technical advisory support to the CFP. In the past, SSP attempted to provide this support, however its limited resources and the potential conflict with its implementation responsibilities suggest that a distinct, technical secretariat should be established which is directly responsive to the CFP’s policy mandate. Strengthening of the implementation authority, while essential for fisheries management, should be focused on its capacity to carry-out its basic management functions under QMS.

It is suggested that a separate Implementation Committee that reports directly to the CFP be established. The committee’s mandate should be to provide the CFP with recommendations on the additional legal and regulatory provisions required to implement the new fisheries law. The committee’s recommendations should be accompanied by technical analysis, which can be subject to public review. Accordingly, the Committee should have expertise in fisheries management and economics, marine biology and stock assessment, legal issues, social issues, business skills and business management, public communications; and project management. (box 3)

As several countries have implemented QMS in recent years, the Committee should have resources available to draw on international experience through study tours and employment of international consultants.

Box 3. Lessons from QMS Implementation in Western Australia

Fisheries Western Australia is the state government management agency for coastal fisheries (those within 12 miles) which includes such high value species as Rock Lobster and Tiger Prawns. Western Australia has employed different limited entry arrangements, such as input controls and catch limitation mechanisms — including quota rights - to manage its fisheries over the past 36 years.

Amongst the key lessons learned was the need for “skills based management advisory committees rather than those based on industry representation... As fisheries management progresses to deal with issues which extend beyond matters of sustainability, new skills are required to give effect to the wider objectives of resource management. These ought to include skills based representation from outside of the fishing industry in order to balance some of the pecuniary interest which drive decision making around resource management.”


Quality of Quota Rights

The content and quality of the quota right will be the main determinant of the efficiency of the QMS. Some of the primary issues (dimensions) of this right to be resolved are:

Duration. Should the right be issued for a fixed term or for perpetuity? If a fixed term right is chosen, does this last for an x amount of years and then reverts to the Government; or does it regress progressively over its term? Will the fixed term right be subject for automatic renewal or will it be available for tender? Permanent or long term rights are favored because they encourage resource stewardship and long-term planning.

Transferability. Should there be any transfer restrictions? Should they be permanent or phased out? If they are phased out how long should these restrictions last? Limitations of transferability are discouraged because it stagnates the profitability of the industry by preventing the more efficient fishermen from obtaining a larger share of the quota.

Collateral. Should the rights be considered assets? Should the rights be considered secure and tradable? If so to what extent? What would happen in the event of non-compliance? Should the rights be suspended or
taken away? If they are suspended are they still considered collateral? To the extent the rights are secure and tradable, they are considered ideal collateral by lenders because of their ease of disposal relative to fishing boats or processing plants.

Revocability. Under what circumstances should the rights be revoked? What should be done with the right once revoked? What procedures are available for appealing the government's decision?

Risk. Should the rights be set for a certain quantity each year, or should they be specified as a proportion of the TAC. The different alternatives demonstrate part of the process of moving responsibility and accountability for sustainable management of fisheries from Government to the fishing industry. Under the fixed quantity approach, any increase in landings must be purchased by the fishing industry and any decreases in landings would have to be compensated by the government (i.e., the government takes the risk). Under the TAC proportional approach, industry bears the risk and has a greater interest in the sustainable management of the fishery.  

The above considerations should be resolved a priori so that the stakeholders can more accurately gauge the future consequences of the initial allocation. An important consideration in resolving these issues is that any limitations on the long-term quality and security of the right will reduce the expected benefits of the QMS (see appendix).

One means of testing the implications of legal and regulatory provisions on the quality of quota rights is to have them reviewed by the lawyers and credit managers of commercial banks. The bank experts should be asked to determine how any proposed restrictions on the use or disposal of the quota rights would affect the value of the quota right as collateral against a loan. This approach complements an economic assessment of their value in theory with the “acid test” of their value in use in the specific context of Argentina.

Transferability and Ownership of Quota

Restrictions on quota transferability and ownership, like initial allocation, are often used as tools in the pursuit of Government’s policy objectives for the industry. However, unlike allocation criteria which transfer wealth but should not have a long-term impact on industry efficiency, transferability restrictions can directly impede industry performance and may have adverse impacts on the welfare of the very groups which the restrictions were intended to assist. Restrictions on transferability should therefore be avoided. If used, they should be temporary and carefully designed to minimize any distortions.

Transfers of quota not only increase the profitability of the entire industry but also allow marginal fishermen to exit the fishery by selling or leasing their quotas. The ability to trade quota freely ensures the long-run efficiency of the QMS regardless of the initial allocation of quotas. Another advantage of transferability is the flexibility gained. By trading, fishermen may adjust their catch mix and expand or reduce their commitment to the fishery in response to changes in prices, technology and stock abundance. Furthermore, if fishermen cannot fish for a period of time they can reduce the financial hardship and risk by selling or leasing their quota. The ability to transfer quota is also a means to achieve “equity” since new entrants can buy into the fishery. That is not possible under most limited entry programs.

One of the most common concerns about transferability is that QMS will lead to the concentration of quota shares by a few holders. International experience indicates that the industry tends to become more concentrated. However, the extent of the concentration will depend on the efficient configuration for that

---

26 New Zealand initially decided on weight-based allocation. Later it changed to a percentage basis because of the economic and administrative burden of having to continuously adjust to TAC by buying and selling quota in the market.
particular industry. The concentration of quotas may be problematic if it results in monopoly or monopsony power of the quota holder. It is unlikely that this will pose a serious problem for countries like Argentina, which export fish commodities, are price takers in international markets, and have open economies. Any attempt to increase the fish price domestically (i.e., above international prices) will likely attract foreign competitors into the local market, driving prices down.

From an efficiency perspective, limiting transferability reduces the economic benefits that may be obtained from ITQ management. However, such restrictions have been used with mixed success in some countries on a temporary basis to control the rate at which restructuring occurs in the fishery and thus mitigate social dislocations.

Transferability restrictions under consideration should, at best, be time-bound and phased out as soon as possible. Transfer limitations based on vessel categories, geographical location (i.e., to preserve employment), and concentration of ownership should be based on careful analysis of the impacts on industry competitiveness and monopoly or monopsony potential. International experience shows that even though ITQs tend to create a more concentrated industry, there is little empirical evidence on the impact, if any, that quota concentration has had on market share (see appendix). In the Argentine context, it is doubtful that the industry will exercise market power given that it is a price taker in international markets and has an open economy.

**Initial Quota Allocation Process**

Initial quota allocation is among the most contentious issues in QMS implementation. In allocating quota the government should:

a) Define a clear allocation criteria, which reflects the Government’s social and industrial policy goals. This criteria should, to the extent possible, have the stakeholders consensus, and

b) Set up a transparent allocation. The transparency is essential as it guarantees that the different stakeholders can verify the fair application of the allocation criteria. It also contributes to minimize likelihood that some stakeholders’ claim that ‘others’ have improperly influenced the management agency.

**Definition of Government Policy Goals**

Presumably, Argentina will initially allocate quota free-of-charge. The initial quota allocation will represent a substantial transfer of wealth from society to quota recipients. Quota recipients generally view this transfer as partial compensation for the taking of their unlimited access right, which in many cases was granted for an undefined time period.

The new fisheries law provides broad guidelines for allocation of quota of based on historical catches and other factors such as an absence of infraction records and employment generation. An additional allocation is reserved for allocation based on social requirements to be determined by Government. The ambiguity of these guidelines creates the potential for substantial rent-seeking by potential quota recipients.

---

27 For example, article 27 of Law 24,922 prohibits ITQ transfer between the ice-trawl fleet and the freezer factory fleet.
Box 4. The Importance of Initial Agreement in ITQ Allocation

Experience with introduction of QMS in Alaska illustrates how a lack of initial agreement on quota allocation can delay or stop the implementation of QMS.

In Alaska the question of who qualified as a stakeholder, and thus who should receive an allocation, was taken to Court by fishing vessel crew members, as the Government proposed that only skippers and vessel owners should receive allocation. After a three-year delay a Judge ruled that it would be administratively too difficult to include crewmembers. By this time, the original qualifying period for allocation had come into question because of subsequent changes in the fishery. The Judge ruled however that the original qualifying period should apply, thus disadvantaging those that had changed their fishing practices in the interim.

More recently, in the US, there has been a two-year ban imposed on new ITQ, at the instigation of the Senator from Alaska. The reasons for this ban stem from the situation where many of the vessels fishing in Alaskan waters are from Washington State and would get historical precedence to any further species brought into the ITQ system in Alaskan waters.


Government is faced with the challenge of defining clear, transparent, allocation criteria that are consistent with its policy objectives. For example, government must determine to what extent it will utilize allocation of quota to maintain existing regional employment patterns, maintain traditional industry sectors (e.g. the ice-trawl fleet), and encourage those forms of processing that add value. The use of the initial allocation to address social objectives is preferable to restrictions on transferability or ownership as it does not, in of itself, have an effect on the long-term efficiency of the industry. The appendix describes a number of quota allocation options.

Industry Consensus

The weak database and qualitative elements of the allocation criteria under the new law will require that industry agreement be sought on the initial allocation. Negotiations between Government and industry require articulated Government objectives for the QMS program and a clear list of subjects that can and cannot be negotiated.

Ideally, given the difficulty of negotiating with a large number of actors with disparate views as to the operation of the QMS and potential outcomes, government should not negotiate with individual industry groups but should instead insist that industry develop its own solution within the broad guidelines provided by Government. Government can assist this process by:

a) Providing a professional facilitator to clarify the various positions and assist stakeholders in identifying their common positions;

b) Providing impartial and independent advice to the different industry groups to help them identify the implications of different potential bargaining situations and outcomes so that they clearly identify what end-result best satisfies their interests; and

c) Publicizing what decision procedures will be used if the industry cannot agree on the allocations that are proposed by a specified date. This will provide an incentive for the industry to reach agreement amongst them and ensure that progress is not jeopardized if this does not happen.

In cases where there is considerable animosity between industry groups, such as between shore-based and sea-based processors, such a general industry consensus can be extremely difficult to reach as the allocation between such groups in essence requires an interpretation of the social policy to be promoted by Government. In such cases, other countries, such as the U.S. and Canada, Government has determined
Argentina: Towards Rights-Based Fisheries Management

the initial allocation between major industrial segments based on the social and economic criteria, but left individual vessel allocation within the industry segments to the operators themselves.

Transparency in Applying Allocation Guidelines

It is important that the government determines and makes public the method used to calculate the initial quota allocations so that the stakeholders can confirm the fair application of the criteria. While Government should provide opportunity for comment and limited modification, it should refrain from modifying the allocation procedure once it has been accepted.

According to the new Argentine Fisheries Law, initial quota allocations should be based in part on the average performance of permit holders over the period 1989-1996. Average catch over the eight year period implies that the implementation authority has records that accurately record the catch, by species, that was taken by each vessel associated with each fishing permit that qualifies for a quota allocation. This is not the case; data particularly for the earlier years have severe shortcomings in terms of accuracy and completeness. To prevent this requirement from becoming an impediment to implementation of the QMS, the Government may provide current permit holders with the catch that they have registered against each permit to see if there is any disagreement, i.e., the government data records differ to those provided by the permit holders. If so, three situations may arise:

* Where holders of permits can produce copies of their reports that show that the government data are wrong, then the government records should be amended. If there is a discrepancy that cannot be mutually resolved, an appeal process should be available, possibly using an arbitrator.

* Where holders claim that their catch was greater than the records show, but are unable to find copies of the records, the government may decide that there will be no exceptions or concessions granted (the Alaskan approach), i.e., in this case quotas will be allocated based strictly on the data in the Government data base, or, appeals will be accepted in which case an appeal procedure must be put in place.

* Companies may acknowledge that their past catches were knowingly underreported, and a policy will need to be established for this situation. A legitimate case may exist on the part of the claimant if the deliberate mis-reporting was done by a different company which earlier held the fishing permit and subsequently sold it to the current owner whose purchase price was based on actual, rather than reported performance. The main reasons to refuse appeals against the accuracy of the government records are that it rewards past illegal practices and penalizes those who reported their catches honestly.

Recommended actions are to:

* Provide, as quickly as possible, the catch results, that are recorded in the government data base for the qualifying period, to each fishing permit holder for their examination, so they can take action as appropriate; and

* Define an appeals policy that is time bound (less than 2 months from distribution of data) and which would be handled by a panel comprising industry and scientific specialists appointed by the Government.
Box 5. New Zealand’s Formula for ITQ Allocation

In New Zealand, in 1986, Individual Transferable Quotas were allocated on the basis of each person’s historical participation in each fishery. Fishermen were advised of their catch by species by area over a three-year period prior to the introduction of the quota system. They were able to select two out of the three years of catch history, the average forming the basis of their quota. The catch history was then in many cases reduced to fit into the level of Total Allowable Catch (TAC) that had been set in many cases lower than the historical level of catch.

In essence, the New Zealand Quota Management System provided for the initial processes in the following manner:

- The sustainable part of the fish stock, by species and by area, was determined by scientific stock assessment;
- Based on this sustainable concept, TACs were set for each fish stock by area;
- Allowance within the TAC was made for traditional (artisanal) and/or recreational fishing;
- The balance, the Total Allowable Commercial Catch (TACC), was allocated to individual commercial quota holder as ITQ;
- ITQ, once allocated to quota holders, were fully tradable or leasable as a property right.

Allocations in Australia, Canada, and Alaska have followed a similar process, based on historical performance, generally on an average of a short period of years immediately prior to the decision being taken to move to an ITQ system.


Arbitration Procedures

In response to potential industry dissatisfaction with the implementation of the QMS, Government should define procedures for the settlement of grievances. Government, industry and NGOs have all expressed concern that Argentina’s relatively lengthy legal processes may prevent effective action to avoid stock collapse if provisions of the law are continuously subject to court review (World Bank, 1996c.)

Laws or regulations should, to the extent possible, determine the procedure to arbitrate grievances. This situation has several benefits. First, it would reduce the potential animosity between the management agency and the industry during the initial allocation. Also it would reduce the likelihood that industry would claim that others have unduly influenced the management agency. Lastly, since the arbitration procedures are set in the law, this situation should minimize the chances of successful legal challenges.

A key objective of the implementation process should be to resolve by negotiation as many of the stakeholders conflicts as possible. However, a contingency process should exist to handle situations where no agreement is reached. It may be possible to use an arbitrator, but this may not be acceptable, or appropriate, in all cases. A formal appeals process may be necessary with clear specification of what can be appealed – the nature of matters that can be appealed should not be unlimited.

In addition, the government may request a legal opinion from the supreme court on the key components of QMS implementation. This can reduce the likelihood of general legal challenges which could impede or reverse progress in QMS implementation.

Rent Collection and Cost Recovery

In the past, most governments paid for all fisheries management costs. More recently, there has been a growing trend towards cost recovery programs as a means to recover at least some of the management
costs and adopt cost effective management practices. Windfall gains, strive for improved economic efficiency, increased enforcement costs, and increased profitability of the industry have driven QMS countries to recover some of the management costs.

Most of these programs seek to cover some or all of the administrative, monitoring and enforcement, and research costs from the beneficiaries of these programs. In the case of fisheries, ITQ owners, as the primary beneficiaries of fisheries management, should be the primary source of funding for essential management activities. Table 10 describes cost recovery rates and mechanisms among selected countries. Under a QMS, the benefits of effective fisheries management accrue largely to the holders of ITQs, through operational profits and appreciation of the sale or lease value of their ITQs. In addition, if quota is initially allocated rather than auctioned or sold government is providing original quota holders with a windfall gain.

**Introduction of Rent Collection and Cost-Recovery Programs**

The introduction of QMS results in a transfer of significant wealth as fishermen are given rights to exploit a community resource for private gain. The government as a representative of society's interest therefore should decide whether these rights are given away for free and to what extent, if any, should industry pay for the management. If government decides to collect rents or recover some management costs, then it would be advisable to decide on the collection mechanism prior to the implementation of QMS. If this is not possible, government should at least announce that quota holdings might be subject to charges in the future as this leaves the option for rent collection later. This last option, however, is the least preferred as it increases the uncertainty about the quota worth.

**Rent and Revenue Collection Mechanisms**

Taxes generally distort economic decisions and generate excess burdens or deadweight losses-welfare losses beyond any tax revenue collected. Thus, in considering rent collection and/or cost recovery mechanisms several factors should be considered:

- Whether the charge is sufficient to capture the desired rent level and/or whether it covers management costs including research, monitoring, and enforcement;
- Whether the collection mechanism minimizes distortions to efficiency;
- Whether the collection mechanism will result in a desirable redistribution of income;
- Whether the revenues will be efficiently and effectively allocated to support fisheries management;
- Whether the charge level is appropriate as to encourage fishermen to accept and comply with the program; and
- Whether the collection costs prove to be a substantial proportion of the revenues collected. The cost of collection will vary, among other things, due to the number of fishermen and their landings, the authority vested in the management agency, human resources available and the information requirements need to estimate rent levels (i.e., information on cost structure of the industry).
Table 10. Cost recovery and revenue generating mechanism (US$ million)

<table>
<thead>
<tr>
<th>Country</th>
<th>Annual value of fisheries(a)</th>
<th>Annual fisheries management budget</th>
<th>Amount of Management recovered (%)</th>
<th>Revenue collection mechanism</th>
<th>Fishery-specific revenue collection(b)</th>
<th>Service-specific revenue collection(c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>1,500(a)</td>
<td>29.6(a)</td>
<td>4.3 (14.5%)</td>
<td>Fees, royalties on &quot;charting&quot; system (squid) and penalties.(d)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Australia</td>
<td>223(b)</td>
<td>13.1(c)</td>
<td>5.3 (40.5%)</td>
<td>Quota levies, levies based on vessel characteristics, observer fees, license permit fees, etc.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>1,009.4</td>
<td>131.2</td>
<td>28.2 (21.5%)</td>
<td>In competitive fisheries, license fees are based on the average value of landings by fleet category.(e) In individual quota fisheries, license fees are based on a percentage of the average landed value multiplied by quota holdings.(f)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Chile</td>
<td>1,140(a)</td>
<td>17.5</td>
<td>13.6 (78%)</td>
<td>License fees and auction revenue.(g)</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Iceland</td>
<td>778</td>
<td>35</td>
<td>14 (40%)</td>
<td>Quota holding levies on a weight basis</td>
<td>No</td>
<td>Yes(g)</td>
</tr>
<tr>
<td>New Zealand</td>
<td>337.9</td>
<td>29.6</td>
<td>19.9 (67.2%)</td>
<td>Levies on quota holdings by fish stock for ITQ holders, Catch levies on a weight basis for non-ITQ fisheries, Vessel monitoring levy, Licensed fish receivers levy, Conservation service levies, etc.(h)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>South Africa</td>
<td>350</td>
<td>19</td>
<td>7 (36.8%)</td>
<td>Permit fees, application fees, resource rental and levies.(i)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>United States</td>
<td>1,800(a)</td>
<td>900(a)</td>
<td>0.7 (&lt;0.01%)</td>
<td>Fees used to cover administrative costs of issuing permits.</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

\(a\) Includes all marine fisheries regardless of the management regime used. These figures are ex-vessel values unless otherwise noted.

\(b\) Refers to whether the revenue generating mechanism/formula is adjusted by fishery.

\(c\) Refers to whether there are specific charges for distinct services.

\(d\) The figure shown represents an estimate of the country’s gross fisheries product. Although no ex-vessel figures exist, if we use FAO’s country profile 1994 figures (latest available) and relate ex-vessel values to exports, we can “grossly” estimate current ex-vessel values based on 1996 exports (US$ 997 m). Using this relationship we find that ex-vessel value is in the order of US$ 618 m for 1996. Management cost recovered based on the revenue generated by ‘charting’ fees (16 boats at $ 270,000 in 1998).

\(e\) The SSP’s overall budget is US$ 17.42 million, however, US$ 8.9 million are allocated to coastal Provinces leaving a “net” budget of US$ 8.52 million. INIDEP receives US$ 12.13 million (Poplawsky, W., 1999. Pers. comm.).

\(f\) This includes primarily fees and penalties. Penalties generated about US$ 3 million. Fees include among other things royalties paid by the squid charting system. Annual royalties for squid are US$150,000 per vessel. SSP has not yet decided on what fee system will implement.

\(g\) All values are for 1997/98 based on an exchange rate of 1 AUS=0.64 US$ (Kettle, A., 1999. Personal comm.).

\(h\) Fisheries managed by Australian Fisheries Management Authority only (Commonwealth fisheries only (i.e., no state fisheries)). Fish production from state waters accounts for approximately 75 percent of Australia’s total fisheries production.

\(i\) Includes AFMA’s research costs only. Note that most of the research is conducted by Fisheries Research and Development Corporation (FRDC), a government organization.

\(j\) Values are for 1996 based on an exchange rate 1 CAS=$ 0.6558 US$ (Segard, S., 1999. Personal comm.; Cofsky, D., 1999. Personal comm.)
Argentina: Towards Rights-Based Fisheries Management

In competitive fisheries, where all license holders have equal access to the stock, license fees for each species are the same for all license holders in a given vessel category and area. The fees are based on the average annual value of landings per license for the recent four year period (1990-93). This is estimated by taking the annual landed value of the species for the fleet sector, averaged over four years, and dividing by the number of licenses held within the fleet sector. Then based on the average landed value per license an incremental fee schedule is used.

In individual quota fisheries, the fee per ton is equal to 3 percent of the average value of landings up to $50,000 Canadian and 5 percent anything above $50,000 Canadian, based on the average value of landings for the species caught between 1990-93.

Export value for 1997 (Polanco, R., 1999. Personal comm.). It should noted that most of the production is derived from vertically integrated firms, particularly in pelagic fisheries.

Chile does not have a formal cost recovery mechanism. Fishermen have the option of paying their license fees to the Fisheries Research fund instead of paying them to the general treasury as a means of keeping revenues within the sector. In 1998, about 32 percent of Fisheries Research Fund budget came from license fees. The cost recovery figure is based on 1998 license fees estimated at US$10.8 million and from expected 1999 ITQ auctions estimated at US$2.8 million. ITQ auction values vary yearly. It should be noted that the annual value of the fishery is based on export value, not ex-vessel value, and therefore deflates management costs relative to the size of the fishery. (Carbajal, V., 1999. Personal comm.; Polanco, R., 1999. Personal comm.

License fees are based on boat size, specifically GRT (gross registered tonnage).

The Icelandic government collects about 14 million from the industry, however, about 50 percent of the revenues go to fund a vessel buy-back program. In 1998, Iceland exported US$1,384 m. (Arnason, R., 1999. Pers. comm.)

For instance, there is an annual fee on quota holdings that supports monitoring and enforcement. This fee is approximately US$2.5 per cod metric ton of cod equivalent.

Fisheries values are based on NCR (1999) whereas budget and cost recovery rates for 1998/99 are derived from Shallard, B., 1999. Pers. comm. Figures were estimated based on 1 NZS=0.5398 US$.

ITQ Levies will be charged by fish stock on all quota owners on the basis of their quota holding at the end of each month. The levies will be charged irrespective of the amount of fish actually caught against that quota. These are paid on a per ton basis. An annual levy will be charged on catches of the major species not managed under the quota system. These charges are generally not fish stock based; the same rate applies irrespective of the fisheries management area from which the fish is taken, except in the case of scampi. Non ITQ levies will be charged on the basis of monthly catch information supplied in Licensed Fish Receiver (LFR) returns. Total catches of each non ITQ species recorded against a permit holder will be levied at the rate per ton set out below for each species and charged to that permit holder. Conservation Service levies are to cover costs incurred by the Department of Conservation in researching the effects on protected species of by-catch resulting from commercial fishing, and measures to mitigate the adverse effects of commercial fishing on protected species. Money collected from levies generally is applied across the board rather than to specific fisheries as much of the Ministry activity is generally applicable some specific cases such as a stock assessment research project for a specific fish stock will be levied against those quota holders and the funds applied to research on that particular fishery.

Fisheries values are for 1997 whereas budget and cost recovery numbers are for 1999/2000 (Payne, A., 1999. Pers. comm.). Figures are based on an exchange rate of 1ZAR=0.17 US$.

Resource rents and levies are related to the profitability of each fishery.

Average for the 1991-96 period as annual catches in federal waters vary (Andersen et al., 1998).

Estimate based on NOAA's FY 99 request for US$450 million, US Coast Guard expenditure of US$400 million (on fisheries law enforcement alone) and other Federal fisheries program expenditures estimated to be approximately US$50 million (Andersen et al., 1998).
Box 6. Aligning revenues and management costs

In New Zealand, fisheries management costs are allocated on fishery per fishery basis. For example, the costs of the research program on hake are charged only to the hake ITQ shareholders. If there is no research program on squid, then squid ITQ shareholders pay only the general research and stock assessment levy covering general costs that cannot be allocated to specific fisheries. Similar arrangements are made for administration and monitoring and enforcement programs. Cost recovery mechanisms tend to increase efficiency and cost effectiveness of the management, as industry scrutinizes the need, extent, quality, and cost of services rendered by the management agency. Similarly in Australia revenues collected from a particular fishery are only used to cover management costs of that fishery. In Canada, on the other hand, revenues collected from the different fisheries go to a general management fund. Government does not attempt to assess the costs for each fishery.

Source: National Fisheries Authorities of New Zealand and Canada.

Box 7. Cost recovery approaches

In New Zealand cost recovery efforts are based on the “avoidable cost principle”. This principle states that the existence of the commercial fisheries sector generates a cost that would not otherwise exist if the sector was not present. Thus, the sector should be charged for the extra expenditures it generates including any damages to the environment and/or other externalities it may cause in addition to any management and research costs. In Australia, on the other hand, their cost recovery mechanism is grounded on the “attributable cost principle”. Under this principle the commercial fishing industry pays for the costs directly related to fishing activity while the government pays for those activities that may benefit the broader community, as well as the industry, and satisfy a range of specific obligations.

In applying this principle the Australian Fisheries Management Authority (AFMA) first determines what expenditures are attributable to a specific group. Once the “attributable” group has been identified AFMA determines to what extent the costs are recoverable. A cost is considered recoverable if the cost can be effectively collected and enforced.

In determining the “recoverability”, their cost recovery policy considers: among other things, the extent the user group benefits from the activity, consistency with government’s cost recovery policy in other sectors, the existence of extenuating socio-economic considerations, the existence of government policies that impact the cost recoverability for a given activity, and the cost effectiveness of recovering the costs for a particular activity. For instance, AFMA considers that surveillance costs are fully recoverable from commercial fishermen whereas enforcement costs are fully recoverable from the Government.28

Source: Ibid.

Although the use of lump sum charges has been advocated as an effective tax tool because they do not generate excess burden, they are seldom employed as a policy tool. Lump sum charges are unattractive since they are considered “unfair” because if applied uniformly to all fishermen given that the tax collected will be independent of their earnings or quota holdings. Thus, lump sum charges have the potential of penalizing those who have less quota holdings but may be as profitable as other fishermen. These fishermen could, therefore, be forced to exit the fishery if the charge is too high. On the other hand, lump sum charges are easy to collect and monitor given that the quota holders are known to the management agency.

28 For section, surveillance costs cover activities related to the detection of “unauthorized” or illegal fishing activities which are a breach in the legislation. This includes the use of VMS, analysis and auditing of catch declarations and other paper and electronic record. A range of mechanisms are employed by the States, on AFMA’s behalf, to detect illegal fishing activities, including at-sea patrols, in-port inspectors and aerial surveillance. Enforcement covers activities directed at the apprehension and prosecution of those identified through surveillance to be in breach in legislation (AFMA, 1998).
Another possibility would be to adopt a tax on landings. The tax should be set moderately as to minimize any distortionary effects and distributional impacts. The tax rate should consider the impact of the elasticities of supply and demand since they determine to extent of the distortion and who bears the brunt of the cost of the tax. In general the supply of fish is highly inelastic given the biological constraints, the intervention of government in controlling catches or effort, and the stickiness of capital and labor. The demand elasticity, on the other hand, is highly price elastic for export oriented fisheries, like the Argentine industry which is a price taker in the world market. Based on the above discussion the local industry will bear most of the cost of landing taxes since the elasticity of the demand will prevent fishermen from “sharing” the cost of the tax with foreign consumers. Nevertheless a landing tax has several benefits. First, it coincides with fishermen’s ability to pay. Secondly, landing taxes provide an additional incentive to the enforcement agency to accurately report landings. However, a landing tax may offer the incentive to underreport own catches.

Alternatively an \textit{ad valorem} royalty charge could be used as revenue collecting mechanism. An \textit{ad valorem} charge collect rents as a set percentage of the landed price of fish times the quota holdings of the fishermen. In fisheries where fishermen binding constraints a royalty on taxes should be approximate to a landing tax. An advantage of imposing an \textit{ad valorem} charge is that provides with less of an incentive to underreport catches. Also they are relatively the implement and monitor.

An alternative option is to auction the quotas periodically, as does the Chilean QMS. Under this system, quota lasts for 10 years. Each year a given percentage is deducted from the total quota holding and reverts to the management authority. This mechanism is the most efficient in capturing most of the rent since the value of the quota reflects expected discounted benefits from the resource. The system has the additional advantage that is transparent to all the stakeholders. However, it may result in higher collection costs than regular taxation.

More recently, the use of Public Quota Share (PQS) has been proposed, where a certain percentage of the quota sold reverts to the management agency. For instance, if 500 tons of quota is sold and the PQS is 40%, then 200 tons would be acquired by the management agency and 300 by the buyer. This regime would likely affect the market value of the quota. The buyer will presumably pay for 300 tons worth, taking into account that at the subsequent sale of quota, the amount of quota transferred to the second buyer would be 180 tons, with 120 tons (40%) reverting to the management agency.

This scheme has several advantages: a) shares obtained by the management agency could be auctioned off to generate revenue, b) quotas may be withheld from the market to improve the health of the stocks or to allow TAC adjustments, c) government shares could be used for social development programs such as providing the quotas at low cost to disadvantaged communities, d) the scheme is easy to monitor and enforce, e) the scheme is a good tool to extract windfall gains and reduce quota prices for new entrants, f) the scheme reduces anticipatory or speculative investment in the fishery, and g) revenues obtained could be used to cover management costs and provide society with some returns from its resource.

On the other hand, this regime has a series of shortcomings. First, the regime creates an incentive to lease rather than sell the quota. Second, there will likely be fierce opposition by industry to any mechanism that extracts rents (due to anticipation of receiving windfall gains and past history where they did not have to pay for the use of “free” resource). Third, this may slow down the fleet rationalization process as fishermen wanting to exit the fishery will receive less compensation due to the lower value of the quotas.

\footnote{Capital and labor may be sticky because some of these inputs have low opportunity costs and the supply price will have to fall substantially before their use is significantly reduced. Alternative, barriers to entry (such as limited entry programs) may slow down the transfer of inputs from one fishery to another one.}
In addition, there may be difficulty in establishing appropriate PQS. Also, if the management authority has too many quota shares it may acquire market power. Finally, it may be difficult for the management authority to determine the appropriate amount of research and enforcement costs, leading to an excessive expansion of its operations and authority.

Application of Funds

Funds obtained from ITQ revenues should first and foremost be used to cover the administration, monitoring and control and research costs of running a QMS system. The QMS administration should have access to sufficient funds to cover its costs, including those of research and monitoring and control. QMS related research is essential, and requires long term stability to ensure the highest possible quality and reliability. To ensure such funding, the QMS authority may agree with the industry to create a research fund, in which the industry would deposit a fixed percentage of its annual ITQ tax. These funds should be jointly managed by the industry and the authority, and finance the research agenda (box 8).

Box 8. Government and Industry Collaboration in Funding Fisheries Management

In New Zealand, the Fisheries Act of 1996 allows the Government to recover from the commercial fishing industry, in relation to all commercial species, a substantial part of the Government’s costs of managing fisheries. The various categories of services that are to be paid for by the Government or the industry are defined in the Act. The Ministry of Fisheries undertakes an annual cost recovery process in consultation with stakeholders. The Fisheries Act establishes the concept of “Approved Parties” for organizations seeking to participate in the cost recovery consultation process. These Approved Parties are groups, which the Minister of Fisheries considers to have an interest in management and conservation of New Zealand fisheries.

There is a two-stage consultation process for cost recovery as follows:

- Consultation involving all Approved Parties on the nature and extent of fisheries services to be provided by the Government for the coming financial year, and the proposed cost of these services.
- Further consultation with industry representatives to determine how the costs are to be shared by industry sectors, and the levy rate necessary to recover these costs.

Since the introduction of cost recovery, the fishing industry has been concerned, as the major contributor to the revenue of the Ministry of Fisheries, to ensure that it has meaningful input into the type and quantity of the required services and the way in which they are provided. This has been a somewhat controversial process, with the industry not currently satisfied that the process and the resultant charges are appropriately applied. The process is evolving however, with some of the required services being made available for contestable delivery, and there is a possibility that some services will be devolved to the industry in the near future.


Fisheries Management Services Under QMS

Modern fisheries management systems are information dependent. Core fishery management capabilities and services, such as research and MCS, require the assembly, systematization, analysis and dissemination of large amounts of information. In the case QMS, the information requirements are significantly higher because accurate, real time, and verifiable monitor, control and surveillance systems are needed. Information is a strategic resource that requires sound management (FAO 1994.)

Information management is the primary responsibility of the fisheries management implementation authority. In order to carry out this mandate, there must be an understanding between the implementation authority and stakeholders regarding the information required by each fisheries management component.
and the responsibilities attached to them. This requires definition of an information management framework in which:

a) information is managed consistently, properly and transparently,

b) information allows the operation of core fisheries management capabilities and deliverance of fisheries management services,

c) quality and timeliness of the information allows stakeholders to make informed decisions,

d) information promotes a participatory process with the main stakeholders.

The goals and role of Government in the actual implementation of fisheries management services can change substantially under a QMS. As fishers ascertain that sustainable management of fish stocks will result in direct benefits through the capitalization of the value of expected catches in the valuation of quota rights, Government's management focus shifts from impeding violators to encouraging voluntary compliance based on self-interest. This has important implications as well for the role of Government as industry can accept increasing responsibility for management planning and compliance. (box 9)

Research

Responsible fisheries management requires the availability of sound scientific research to assist and advice fisheries managers and stakeholders in setting policies. As it is generally recognized that fisheries management involves management of people rather than the fish, biological and technology research must be complemented by economic and social research.

Argentina has wisely invested in developing an internationally recognized fisheries research institute (INIDEP). Nonetheless, the more extensive information requirements of QMS will necessitate continuous updating of INIDEP's capabilities as well as incorporation of other sources of research, particularly those aspects which go beyond the biology of the fishery.

Biological Research

In setting management objectives, biological research should provide with an understanding of the uncertainties relating to stock size and productivity, reference points, and stock condition in relation to such reference points. For instance, the use of stock size probabilities for proposed management measures makes decision-makers aware of the different tradeoffs and risks involved. Because the stock assessments and TAC recommendations directly impact industry profitability and the value of the rights it would expected that industry will challenge these assessments and recommendations often with their own scientists. Therefore, is essential that the biological data as well as the methodology for estimating stock levels and recommended TACs be completely transparent and available for review and comment. Outside technical peer review may be required, particularly when the recommended actions imply a substantial year-to-year change in the TAC. A recent international stock assessment peer-review concluded that INIDEP's stock assessments over the last four years had been essentially correct. (Butterworth et al, 1998)
Argentina: Towards Rights-Based Fisheries Management

Socio-economic Research

Like most fisheries management agencies SSP has significant information deficits on economic and social conditions of the fisheries. Furthermore, socio-economic research capabilities are limited. Both economic research units at the INIDEP and at the SSP are small and require additional resources.

Under a QMS system, socio-economic information becomes essential since it contributes to determining TAC levels that maximize the value of the fishery. In addition, it can provide policy-makers with deeper understanding of the economic and social costs and benefits of undertaking alternative management measures designed to rebuild stocks, minimize by-catch and discarding and rationalize excess capacity. Lastly, socio-economic research can contribute to improve the profitability of the industry by designing more effective seafood marketing strategies.

Broadening Research and Participation

The broader policy objectives under the new fisheries law - environment, industry profitability and employment concerns – in addition to sustainable stock management, require a wider research agenda. Research focused on stock assessment is not sufficient to support the resource management mandate. Supplying the best available scientific information requires assessing the size and productivity of fisheries in a broader ecological context, including ecosystem impacts resulting from fishing pressure (i.e., by-catch and discards), pollution, habitat alteration and global change. Other issues such as biological diversity, value-added processing and social impacts also need to be analyzed and taken into consideration by fisheries managers, industry and other stakeholders.

This broader research agenda should not be addressed solely by the INIDEP. Experience with agricultural research demonstrates that as research becomes increasingly multi-sectoral and multi-disciplinary, the definition and implementation of the research agenda requires the participation of the full range of stakeholders as well as increasing reliance on partnerships and contracted research. (World Bank, 1996a.)

Establishment of a Fisheries Research Council composed of representatives of the primary stakeholder groups could develop a proposed research agenda for the CFP. Research projects could be carried out by INIDEP, other national, provincial and international research organizations including universities, NGOs and other private research entities and private companies. Joint ventures and contracting through competitive funds provide access to a larger pool of expertise and can reduce the cost of research.

Fishery Management Plans

Fisheries management agencies develop fisheries management plans based on the broad-based information described above. These plans, prepared through an open, consultative process, contribute to establish management goals and strategies, minimize conflicts, and address concerns of the stakeholders. Despite their importance, Argentina has traditionally failed to prepare comprehensive management plans.

During the initial stages of development of fisheries management plans, it is useful to prepare and distribute a management proposal which provides background information on the fishery, short and long-term management objectives, and management options considered. These proposals should be open for public discussion and comment. The next step is to address and incorporate to the extent possible the concerns of the stakeholders with the technical advice of INIDEP and SSP to develop the final management plan. Indicators should be defined in the plan which allow all stakeholders to verify its compliance.
Monitoring, Control and Enforcement

Successful fisheries management systems depend on the effective implementation of management plans through monitoring, control and enforcement activities. The government’s ability to execute these activities in a professional, transparent and accountable manner from the outset will demonstrate its commitment to the new management system. The earlier a credible system is in place, the sooner quota owners will realize the full economic benefits from the system as the price of the right captures the current expectations regarding the enforceability of the rights and the future condition of the fishery.

Monitoring

Monitoring activities rely on the gathering, quality control, and transferring of strategic information. The gathering of information is driven by the information needs of the different management units. For instance, catch information is obtained from the dockside program while by-catch and discard information is obtained from the on board observer program. Information regarding closed areas and seasons compliance is obtained from the MONPESAT system while information regarding gear restriction compliance is obtained from on-shore and at-sea inspections by the management agency, the Coast Guard and the Navy.

The quality control aspect of the monitoring activities is concerned with accuracy of the information. The ability to control data quality both on land and at sea will depend on whether procedures were correctly followed, whether personnel training and equipment was adequate, and whether internal monitoring and auditing procedures are frequently carried out.

The third aspect of monitoring activities is information transfer. The speed and accuracy of the existing infrastructure largely determine the effectiveness of transmission. For instance, the automation of data entry by the use of palm pilot or by the use of automatic weighing scales can further improve quality and timeliness of the information.

Information Gathering - Land based Components

There are two principal means of monitoring catches within QMS systems:

a) direct monitoring of the catch, usually when it is landed, to ensure that the amounts are properly reported and thus do not exceed the stock/species quota for the catch taken.

b) auditing of records concerning fish product flow. This is done by auditing records of fish product movement, e.g., invoices for fish sales, storage, and shipping records, etc.

Direct monitoring of catch, while administratively less cumbersome, is more susceptible to corruption and evasion as there is a single control point – the dockside inspection. Auditing of records, while providing numerous checks, requires a large number of well-trained auditors and substantial information management capacity.

There are no a priori reasons why a mixture of catch monitoring and auditing of records could not be used. In Argentina the emphasis of the monitoring program, at least at the outset, may be on physical confirmation of fish capture at key control points. These points are usually where the product is unloaded (i.e., at dockside) or transshipped, as this facilitates measuring of the catch. In any event, some complementary auditing could be introduced as companies usually keep records of their commercial activities, and may be required to do so for other commercial purposes such as tax compliance.
It is anticipated that monitoring of landings at the dockside will be the primary method of recording catches against quota entitlements. Thus implementation of a greatly strengthened dockside monitoring program must be a priority activity for QMS implementation. There are number of possibilities for execution of this program:

- **Government funded and run program,** in which case negotiations may be necessary over the division of responsibilities with provincial authorities. The necessary staff and operating resources must be identified and actions begun to secure the budget needed to run the program.

- **Industry funded program run by an independent company,** possibly under direct control of the quota holders but subject to government audit and performance requirements. In this case, considerable direction may have to be given to the industry to ensure that the program runs effectively and is operational on time. Note that implementation of such a program could begin immediately and need not await for the introduction of a QMS.

- **Mixed government-industry program,** for example, government may start the dockside monitoring program with the option, or objective, of transferring responsibility to the industry at an appropriate time.

Irrespective of the institutional arrangement chosen, significant effort should be placed on oversight and auditing of the program to reduce opportunities for corruption. As the system demonstrates its viability and ITQs increase in value, industry is likely to take an active, self-policing role.

**Box 9. Private Provision of Fisheries Management Services**

In New Zealand the Registry functions - monitoring, reporting of effort and catch against quota, data entry/analysis/dissemination, quota trading, cost recovery collection are all being moved from the Ministry to the private sector under contractual arrangements with the Ministry of Fisheries, based on precise specifications from the Ministry. The service provider will either be a private company, or a company operated by the fishing industry as a further move to involve the industry fully in management of the fisheries.

In Canada, the dockside monitoring program, which is compulsory for all landings of fish, is operated by private companies. These companies operate under contract to the Canadian Department of Fisheries and Oceans, and are expected to operate profitably as a business.

**Industry Reporting Requirements.** There will be several reporting requirements that the industry must comply with to facilitate enforcement of QMS regulations. These may include the need to register those dealing in fish (trading, processing, storage, and transportation) and maintaining records of all relevant transactions. This information is needed to audit the operations of those dealing in species included in the QMS and to serve as a check on dockside monitoring.

Many existing practices in Argentina related to provision of data by industry should be revised. For example, vessel captains have up to 48 hours to complete catch reports once a vessel lands. These should be completed as each fishing operation (e.g., an individual tow) is finished, and vessel fishing logs should at all times indicate what fish have been caught, how much is in the vessel’s holds, and in what form.

**Port Inspectors Program.** While the port inspector program has dedicated professionals the overall credibility of the program is moderate. Absence of selection criteria, inadequate training, and lack of career development and accountability hamper the effectiveness of the program. In spite of these
Argentina: Towards Rights-Based Fisheries Management

shortcomings the program merits immediate support as it provides a first step in controlling quotas. Presently, inspectors are trained only to inspect the vessels and gear in port prior to departure and monitor and sample offloading. This appears to be an under-utilization of potentially valuable resources.

With appropriate training and equipment these officials could facilitate licensing investigations, conduct complete port inspections, as well as at-sea inspectors, serve as initial analysts to flag anomalies in logs, observer data and landings to enable SSP to take immediate investigative action as necessary. The current administrative formats for port activities are complex and voluminous and could be streamlined considerably for port checks and data entry and analysis.

Information Gathering - Sea based Components

On Board Observers Program. Many management regimes require that fishing vessels carry on-board observers. Their primary task is to observe and record what happens, to provide additional records on fishing operation (e.g. confirm gear design details) and to collect information needed for scientific research programs. Observers are not required to enforce regulations; however, it is claimed that that their presence results in higher levels of compliance than otherwise would occur.

Argentina’s current on board observers program suffers from inadequate funding, training of observers and insufficient coverage. Most of the reports produced are utilized for scientific reasons, losing the opportunity to use the on board observer program as a cross check for quota control and fishing compliance. However, observers should not be given the any enforcement powers.

The lack of positive response by INIDEP to industry requests for fisheries information has resulted in a lack of credibility for this agency and raised concerns that the data is being used and manipulated for political reasons. The on board observer program as a scientific program can become very credible, provide the link with industry for trust in scientific assessments through the publication of results in a sanitized version to preserve industry confidence, but at the same time provide detail data to the individual fleets if requested.

The benefits of this program to industry make it appropriate for contracting out to a competent third party at a later date. It would be appropriate, however, to seek ways to augment funding for this program from the fishing industry through, for example, a trust fund. Fishing vessels would pay a fee directly into this fund with the understanding that the observer coverage would be spread evenly throughout the fleet, and that the information in a sanitized version would be available to the industry. The raw data would be available to the vessel owners whose fishing vessels carried observers.

Inspector At-Sea. In January of 1997, SSP implemented the inspectors on board program where inspectors are placed on fishing vessels. The program is currently not operating. The program was discontinued in January of 1999 due to the lack of funds, which came from European Union Agreement. The inspector on board program was not successful. The program lacked credibility due to the absence of standards in the staff selection process and appropriate and professional training for enforcement officials. Inspectors were considered highly vulnerable to industry coercion.

An alternative approach that has been successfully utilized in other countries is to place inspectors on the Coast Guard and Navy vessels. SSP has the option to send officers at sea with the Navy and Coast Guard, but this is not done as a regular practice. The development of an at sea inspection sub unit as part of the regular fisheries inspector duties would increase the benefits of at sea scheme. The benefits of an at-sea inspection scheme are as follows:
Promotes compliance in the fleet through unexpected inspections and thus serves as a deterrence factor;

Serves to gather data on the fleet operations for cross checking against other data, landings; observer reports, logbooks, etc.;

Assists in gaining information regarding the level of discarding and high-grading in the fleet;

Supports and monitors the on board observer program for professional conduct; and

Promotes an enforcement presence at-sea as well as in port for fisheries MCS.

The promotion of a review of the training scheme and further enhancement for this component of MCS is recommended, in cooperation with the Coast Guard. Cooperation with the Navy is also warranted. However, the use of Navy in civilian surveillance and enforcement activities immediately calls upon the final enforcement and defense power of the nation for these activities when this role might best be reserved for back-up and support for more difficult situations involving foreign fleets.

The liaison between the Navy and Coast Guard is supported by two dedicated liaison officers, one for each institution. It is recommended, however, that the liaison could be more effective if the liaison were directed through the Directorate for Fisheries Administration and not directly to SSP, unless required for a special action.

The contribution of these agencies are not accounted in relation to services received to be able to review effectiveness, consequently it is recommended that this be done in the future as ITQs are expected to require more efficient use of sea time. Further, due to the expected reliance on sea patrol information and air surveillance for illegal fishing by unlicensed vessels, it is suggested that quarterly planning meetings be held between these agencies to set priorities and for operation planning. Formal MOAs are also recommended to formalize the services expected by each agency.

SSP suffers from the lack of a dedicated at sea-patrol capability. The fishing industry, as a contribution to fisheries management and an indication of their willingness and desire to become involved in fisheries management, noted they would be prepared to provide a vessel from each of the ice trawl and factory-freezer fleets for MCS at-sea patrols of the other fleet. This would promote transparency in fisheries operations, force professionalism into at-sea operations, contribute to at sea inspection information and compliance activities in a cost-effective manner. Further, it would also promote the idea of fisheries management as a partnership between the fishing industry and government. It is recommended that this option would be pursued. However, it is recognized that current sensitivities between the fleets may make implementation of this idea difficult (even, impossible) at the moment, but consideration should be given at a later time as tensions ease.

Another long-term option is to seek a lease of a renovated fishing vessel for combined research and patrol functions from the private sector. If successful, this could be turned lease-to-purchase agreement. This action would develop a dedicated patrol capability for sea patrols to better monitor the fleets', as QMS become part of the management strategy. As QMS is implemented discarding and high-grading problems will likely increase as to maximize the economic benefits for each trip against the set quotas. At-sea presence is the only way to counter these activities.
Argentina: Towards Rights-Based Fisheries Management

Air based Mechanisms

Satellite-Based Monitoring Systems. A satellite-based vessel monitoring system (VMS) can be a useful complement to the other catch monitoring activities. A sophisticated VMS can track vessel movements and from this information, determine fishing activity. The VMS also permits at-sea reporting of catch, which can then be verified through dockside monitoring. In addition to facilitating monitoring and enforcement of catch, a VMS which is well-integrated into a comprehensive fisheries management information system provides fisheries researchers and managers with more frequent updates on the status of the fishery. However, as indicated above, realizing the full potential benefits of the VMS requires substantial institutional capacity building in order to effectively manage, process and utilize the data collected.

The MONPESAT system has considerable potential but financial difficulties prevent the full utilization of the system. Currently, it is only a position reporting system, which provides considerable benefits to SSP, Navy, and Coast Guard. The full benefits of the MONPESAT system will be realized when the development for reporting catch information from sea can be integrated into the system with appropriate electronic cross checking mechanism for report verification.

Air Surveillance. VMS reduces air surveillance requirements, and if used effectively can focus air surveillance in a more cost-effective manner for each fisheries-dedicated flight. For air surveillance, VMS information should be crossed checked against the initial radar picture, thus, enabling the aircraft to target vessels not carrying the system to verify their activities as non-fishing. Close cooperation with the Navy and Coast Guard operations centers where all vessel information is gathered and integrated from all surveillance data is suggested prior to each surveillance flight for briefing purposes to target the patrol in a cost effective manner.

Control

Control activities require the ability to receive and analyze information. An important asset for improved control activities is the registry. Registries allow up-to-date verification of vessel licensing, quota holdings, catch and infraction data and also timely analysis of the fleet’s activity.

QMS registries need to be versatile as they need to incorporate data from different sources, such as SSP, INIDEP, Coast Guard, Navy, commercial banks, tax and customs authorities. QMS registry should maintain records on:

a) Historical catch,
b) Right ownership,
c) Trades and leases of rights,
d) Licensing of vessels,
e) Right holder and licensee’s compliance with reporting requirements,

30 For example the system of the future should be able to cross check the reported catches during a specified period for vessels verifying the observer data, against the logbooks, against the Captain’s MONPESAT daily summaries and then final trip against the landings and the fleet data against exports.
f) Catch history of right holders and licensees, and

g) Liens on rights by lenders.

The information needs will expand substantially as multiple species are brought into the QMS and offset arrangements are put in-place for by-catch.

The conditions of data access and confidentiality will depend on the government’s policy, but presumably will be the same as those that apply to similar property registries, e.g., for land. In this case, knowledge of who owns what quota may be considered to be in the public domain. However, knowledge of the status of an individual’s holdings, such as how much quota remains to be harvested, may have considerable commercial value. Thus, a well-thought policy concerning information confidentiality will be needed.

**Development of the Registry**

Options for the development of the registry functions include in-house development and operation by SSP, development by a contractor and operation by SSP, and design and operation by one or more contractors.

While design and operation by SSP may provide greater assurance of compatibility with existing information systems there are a number of impediments. The large number of urgent requirements for implementation of the QMS, the limited technical resources in SSP, and the obsolescence of most current information systems may require SSP to contract out most of the development work if the QMS registry is to be implemented promptly. Outside contracting and operation of the QMS registry can isolate the costs of this important function facilitating cost recovery. However, if industry is to cover the cost, industry should participate in supervision of the selection of the private contractors.

**Vessel Licensing**

Licenses are an essential for implementing fishery management plans. The implementation of a QMS system does not remove the need for Government to manage and control the commercial fishing fleet. Effective licensing systems not only identify which vessels are operating but also improves monitoring and surveillance activities.

A significant change under this system is that those persons that own quota should be eligible for a fishing license for any vessel they wish to use to harvest species under QMS. In fisheries not covered by the QMS, licensing procedures can be used to control access.

Argentina can take a number of steps to improve the efficiency and transparency of its vessel licensing system. These include:

- **Systematization of licenses categories and standards by fishery.** Under the present system, each vessel has a license for harvesting multiple species (and in some cases multiple quotas). This licensing system is not only ad hoc and non-transparent to the industry, but is also cumbersome to for development of coordinated sustainable fisheries management strategies.

- **Coordination of the licensing authority with the management and operational units that control the fishery.** Licenses act as the first key control mechanism for fisheries management and transmit to the fishermen what they can catch. The licensing authority should report to the operations unit and become the first control and implementing mechanism in support of an appropriate fisheries management plan.
• **Improved safeguards.** The current MCS system includes a licensing scheme that is removed from operations and control mechanisms which provides little transparency with a myriad of licensing formats, no standard categories or terms and conditions, thus creating an uncontrollable situation for limited entry licensing and catch controls.

• **Integration of provincial and national license systems for improved control and management purposes.**

**Enforcement**

Enforcement activities refer to operations that ensure the compliance with fisheries management plans. While the goal of QMS is to maximize self-interested voluntary enforcement by industry, it is inevitable that the introduction of a new resource management system will be immediately tested, particularly by those excluded from the system and by those who have small quota shares relative to their capacity. It is crucial to establish the credibility of the QMS by implementing strong enforcement measures from the outset. Government must ensure that the implementation authority – SSP - has sufficient legal authority to conduct effective enforcement actions in concert with the Coast Guard and Navy. Legal procedures should be well defined so as to minimize potentially lengthy legal challenges, which can create uncertainty as to the ability to enforce the legal and regulatory provisions of the QMS and absorb significant management effort from the implementation authority.

Enforcement actions, particularly during the initial period of QMS implementation, should be transparent, highly visible and supported by the CFP and Government officials at the highest levels. The government should design the enforcement mechanisms such that the expected costs of breaching the law exceed the expected benefits. Illegal fishing by non-quota holders could include impoundment of vessels as well as stiff fines. Penalties for quota violations must be sufficient to discourage even large, well-financed vessel operators from willingly violating their quota limits. Suspending the quota rights of the violator and/or leasing them to other fishers provides additional benefits to those in compliance and generates revenues for Government.

**Transparency in Fisheries Management**

Under QMS, the credibility of the fisheries management system is critical both to maximize voluntary compliance and to facilitate cost recovery from industry. The current system in Argentina is not well-regarded by industry which considers it to be arbitrary and ineffective in its operation. In order to build the credibility of the system, Government will have to maximize its transparency, providing industry with opportunities to verify management actions and pressure for effective implementation. Amongst the steps which Government can take are:

• Standardization of licensing procedures and characteristics as well as infractions (as above);

• Establishment and publication of service standards for business services such as licensing and quota transfer approvals, as well as reporting and prosecuting infractions;

• Installation of VMS terminals in provinces and in main industry associations with appropriate screening mechanisms to prevent transmission of commercially sensitive information;
Box 10. The Transition of Enforcement in New Zealand Under QMS

The New Zealand Ministry of Fisheries has transformed its approach to compliance under QMS. It now focuses on maximizing voluntary compliance, with deterrence focused on those fishers (foreign and unauthorized) largely outside the QMS. Specific strategies include:

- maintaining good working relationships with fisheries stakeholders;
- collaborating with stakeholders to develop fisheries policies, rules and supporting compliance services;
- ensuring that fisheries laws are administered and enforced fairly and cost-effectively;
- working with fisheries stakeholders to identify compliance risks and developing compliance strategies, systems and service specifications to manage those risks;
- supporting the co-management of fisheries with rights owners who can be held accountable for meeting the duties and obligations associated with their rights;
- delivering criminal enforcement services that inform fisheries stakeholders of their legal obligations and consequences of not meeting them, and apprehend and when appropriate prosecute those operating outside the law.

Source: S. Crothers 1999.

- Development of a fully accessible web-site containing information on TACs, catch-to-date, infractions reported, and actions taken;
- Public participation in management planning activities (as above);
- Industry participation in review of quality and cost-effectiveness of delivery (public or private) of management services;
- Industry participation in contracting of management services when relevant;
- Publication of annual reports on management activities including costs, licenses granted, catch against quota by quota holder, license and quota transfers, violations and penalties levied.

Coordination with Provincial Authorities in Fisheries Management

The strengthening of the national fisheries management system should be carried out in coordination with provincial fisheries management agencies. Cooperation in development of licensing categories and standards as well as operational guidelines for monitoring, control and surveillance can facilitate information sharing across agencies. Joint training of planning personnel, inspectors and observers can improve future collaboration in MCS activities. This is particularly true in the case of fisheries such as hake, in which stocks straddle national and provincial jurisdictions.

Management Challenges

Even in fisheries which benefit from a strong legal and regulatory framework, abundant resources and a well-funded, effective and credible management authority, several challenges remain if Government is to manage the fishery to broader benefit of society. In order to balance efficiency and conservation objectives, provisions need to be made in the regulatory legal and framework to address by-catch and spillover effects on other species. Overly stringent limitations on overage and by-catch can severely reduce the efficiency of fishing operations and create a strong incentive for dumping excess catch at sea.
Conversely, failure to regulate these activities and spillover effects on other species can result in strong pressure on the target and companion species, which can undermine management efforts.

Management of By-catch

Decisions will be required on whether to include a range of species in the QMS at the same time as hake, or whether to delay the introduction of such "by catch" species until some later date. Given the limited current institutional capacity to manage a QMS, it appears desirable to plan for a process, whereby the initial ITQ program would be limited to hake, hoki, and possibly squid with other species phased in as administrative capacity is established.

In any event Government should attempt to introduce flexibility into the management, improve the transferability of quotas, and provide incentives for reducing the overages and discards once overages have occurred. International experience has shown that too rigid of adherence to enforcing the upper bounds of catch, short of placing observers on all vessels results in dumping at sea. Box 11 presents policy options used in addressing overages, by-catch, and discarding problem in a multi-species context.

Box 11. Policy options to mitigate overages, by-catch, and discarding

- Allow for Flexible Mobile Closed Areas. Upon learning that in some areas there is significant discarding due to large concentrations of juveniles or sub-legal individuals temporarily close the area.
- Promote the use of technological innovations that reduce by catch such as the DISELLA and DEJUPA systems.
- Set area and season closures in essential fish habitat areas.
- Set initial allocations of quotas to closely match recent catch rates and fishing patterns to ease overages. Quota allocations that fail to match this criterion have been shown to be an enormous burden facing fishermen.
- Allow quota sales among fleet segments, particularly by-catch species, since otherwise fishermen will end up with unbalanced quota holdings that do not match their catch.
- Set quotas for species groups. In multi-species fisheries it may not always be possible to manage all stocks at MSY without significant economic impacts. A stock may be fished below MSY and still be sustainable.
- Allow quota overages and underages to be "banked". Where catches are taken in excess of quota holdings, provision could be made for the quota holder to purchase further quota, lease further quota, or land catches against another's quota holdings. In any year quota owners could carry forward quota to the next year, providing it is not, for instance, more than X% of their holdings for that fish stock.
- Conversely, they could take catches up to X% more than their quota holdings, the additional amount of catch being deducted from their subsequent year's catch entitlement.
- Allow for retroactive quota trading. Grant fishermen some time to purchase quota to cover catch for which there is an insufficient quota.
- Set deemed or surrender values. Under this system fishermen are allowed to pay the deemed or imputed value of their overage without legal penalty.

Source: Authors.
Avoidance of Spillover Effects

It has been a universal experience in other countries that restricting access to particular stocks results in diversion of fishing effort to the next most profitable species that may in-turn be over-exploited. In some cases the change has been very rapid, causing major damage to the newly targeted stock. For this reason, it is important that in Argentina stocks that are likely to be exploited by the fishing fleet once restrictions are in place for hake should also be included in the first round of introduction of the QMS. However, the implementation capacity of the system should also be taken into account.

Regulations may be required to prevent larger trawlers, which either have no quota or have caught their quota, from exploiting certain non-quota species traditionally fished by inshore and other small-scale vessels. In such cases, quota rights may be made conditional on the harvesting vessels’ remaining outside of inshore fishing ground defined by appropriate closing lines. VMS, and other forms of inspection, may be used to ensure enforcement of such management requirements.

Wider Management Considerations

Industry Restructuring

Government is working with the private sector to develop a strategy for restructuring the fisheries industry. Several years of over-fishing has resulted in considerable over-capacity in both the harvesting and processing segments of the industry. There is consensus between government and the industry that even if the stocks recovered swiftly there is a need to retire excess labor and capital from the fishery.

Restructuring Under QMS

Under a QMS, the transfer of wealth inherent in the allocation of ITQ can serve as significant compensation for those who wish to exit the industry. Unlike the fishing vessel, whose price is largely determined by its use and salvage value, the value of the ITQ is based on the potential revenues derived from the application of the most efficient available technology.

Sale of ITQ by those exiting the fishery also reduces or eliminates the need for Government’s direct intervention in the restructuring process. Government’s role, beyond the initial allocation of quota, is simply to take those actions consistent with maximizing the value of the quota shares (monitoring and enforcement) and which facilitate their tradability (registry and minimal restrictions on transferability). The rate of rent collection, however, will slow down the pace of restructuring.

Ideally, if the rules of transferability of ownership permit an unencumbered market for quota, industry rationalization will occur by itself. However, under a newly implemented QMS, a number of “market-failures” may justify government’s initial, direct intervention in the quota market through implementation of a quota buy-back.  

The purpose of a quota buy-back program is to reduce the number of participants in a fishery so that those who remain have a larger share of the TAC and thus are more likely to have profitable and efficient operations. To do this, the government first allocates a catch quota to qualified participants. This allocation is based on the fractional share of the TAC to which each participant is entitled (the initial allocation) and the TAC, which is determined by the government based, in principle, on conservation

---

See Appendix I for a more thorough discussion of potential imperfections in the quota market.
requirements. The government then offers to buy back quota from any newly entitled quota holder. Experience shows that often many past participants welcome the opportunity to leave the industry if they can obtain some monetary compensation. Any quota bought back is then divided among the remaining quota holders.

**Rationale for Quota Buy-back**

The introduction of a buy-back scheme can have several positive impacts. First, it would likely increase political support and industry acceptance for the implementation of QMS. Government’s willingness to purchase quota will send industry a strong signal about its commitment to the new system. Second, it would ease the transition to a more competitive industry as the less efficient fishermen exit the fishery. Reducing the economic hardship of some sectors of the industry may further improve the acceptance of the QMS. Lastly, a quota buy-back would contribute to correct the initial market failure. The lack of a quota history may result in an initial reticence on the part of buyers and sellers to engage in trades until there are clear signals about the quotas worth. This uncertainty will likely slow down the pace of industry re-structuring. This original restraint, however, could be short-lived as quota leasing markets develop especially if the permanent quota prices are expected to increase. There is some limited evidence that suggests that lease markets develop early on as means to reduce uncertainly over the long-run value of the quota (see appendix).

**Implementation of the Quota Buy-back**

The implementation of a quota buy-back, if justified, would require the government to estimate the extent of the overcapitalization and decide on the target level of fleet reduction. The government then could suggest a non-binding price estimate and ask for bids.

The tender process should be undertaken by an organization independent of the Government and fishing industry and the procedures for the buy-back should be clearly publicized to insure impartiality and transparency. Quota owners would be invited to tender their holdings. Tender prices must be confidential to the organization undertaking the buy-back to ensure fairness and equity in the process. Those who offer to sell their quota beneath the price designated by the government may be offered the designated price if the buy-back funds are not exhausted. If considerable quota is offered below the designated price, a lower price should be offered.

The process could be repeated, but subsequent offers by the government to buy back quota should be at a lower price so as not to penalize those who initially agreed to sell. Consideration may also be given to granting quota in underdeveloped fisheries, such as hoki, as an incentive for those who choose to sell their hake quota through the buy-back.

Government can hold onto the purchased quota to reduce pressure on the resource and then sell the quota as stocks recover. Alternatively, government can redistribute the quota shares proportionally to remaining quota holders and recover the cost of the buy-back through annual levies on quota shares or catches.
Argentina: Towards Rights-Based Fisheries Management

Box 12. New Zealand’s Experience with Quota Buy-back

Prior to the introduction of its QMS in 1986, New Zealand implemented a quota buy-back program in order to address the mismatch of fleet capacity to available catch, which was seen as a major impediment to the introduction of ITQs. The Buy-back was based on two tender rounds on a per species and per management area basis. Nearly 16,000 tons was cut from total fishing effort, largely in one management area and from four species. Total compensation paid out was NZ$42.4 million. The buy-back significantly lessened the need for Government to reduce effort by administrative decree.


Actions to Improve Profitability and Competitiveness

The successful implementation of QMS can improve the profitability and competitiveness of the industry by reducing the cost and levels of inputs used, increasing the outputs and returns per output, easing access to investment credit and identifying new markets. The QMS, combined with reform of the secured transactions framework in Argentina, can also improve access to finance, particularly for small and medium-sized operators. As Argentina’s fish industry has been a traditional exporter, Government assistance to industry to identify and develop new products and markets should be targeted to small and medium enterprises with an emphasis on access to market information.

Reducing Costs

The majority of fisheries products, including those, such as fish sticks and fillets, which represent substantial value-added, are marketed on a commodity basis. As a result, Argentina is a “price taker” in virtually all of its fish products. Industry competitiveness and profitability will depend on reducing production costs and improving quality and marketing. The primary opportunities for cost reductions are in raw material and labor which together account for about 70 to 80 percent of production costs.

INIDEP has estimated that raw materials account for about 70 percent of production costs. Recent stock declines have led to a sharp increase in the price of raw materials. Ex-vessel prices have increased from approximately US$ 200-300/ton in the early 1990’s to about US$ 450-650/ton in the late 1990’s, reflecting, in part, decreased catch per unit of effort. As stocks rebuild, both the quantity and quality of catch per unit effort should increase, and, by securing rights to a known catch, boats can fish more efficiently, reducing time at sea. Processors, by purchasing ITQ, can better ensure access to raw materials.

Another potential area where government could contribute to the economic well being of the industry is through increasing the flexibility of labor markets. The emergence of the cooperatives was a response to employment regulations which limited the ability of employers to better match employee effort with the fluctuating labor requirements in the processing plants. The cooperative arrangement, while providing a solution to the flexibility problem is considered inadequate by both labor and employers. Labor opposes cooperative because they perceive it as a threat to permanent employment and the lack of social coverage. Employers feel that they are less able to control the quality of the products contracted out to the cooperatives. Because of their quality concerns, employers have indicated that their overall costs would decrease if they could hire the cooperative workers on a more permanent basis, albeit while maintaining flexibility in their work schedules.

---

32 New Zealand initially introduced quantity, rather than percentage-based quotas.
In addition, industry has indicated that the existing tax and tariff policies discourage value added production of export goods. Government can assist industry by reviewing tax codes to determine which policies inadvertently hinder value added production by the sector.

**Access to Investment Credit**

Provision of directed credit through a line of credit from Government or provision of a Government guarantee to private banks is often proposed as a means of facilitating industry investment in improved plant and equipment. There are several problems with this approach. First of all, until this year, the fishing industry has been sufficiently profitable in Argentina to permit the more dynamic firms to self-finance much of the needed investment for modernization. Providing subsidized or directed credit would simply award those firms which extracted profits from the industry and effectively penalize those which reinvested their earnings.

Vertical integration in the industry, as in other countries, has improved access of these firms to finance through their larger and more diversified stock of pledgeable assets. In terms of improving access to finance for small-scale operators, effective implementation of the QMS offers a more sustainable solution with minimal Government interference in credit markets.

Bankers and borrowers have both indicated that lending in the sector is based on personal or commercial real estate rather than fishing boats or other non-fixed assets. ITQs, to the extent they are secure and tradable, can offer an attractive alternative for both borrower and lender. In New Zealand, ITQs are listed amongst the primary assets on the balance sheets of fishing companies. They are considered ideal collateral by lenders due to their ease of disposal relative to fishing boats or even small processing plants.

The usefulness of ITQs as collateral in Argentina will depend directly on enforcement of the QMS. However, it also depends on current efforts to improve the framework for secured transactions in Argentina, particularly those associated with *perfection* and *enforcement* of security interests. (World Bank, 1996b.)

The quota registry, to the extent to which it permits registration of liens on quota, can largely address limitations on perfection. Extended legal procedures for repossession, on the other hand, are a reflection of the limitations of the court system whose resolution will require updating of Argentina's commercial code to permit alternative procedures such as harmless repossession of pledged collateral. Nonetheless, ITQs, to the extent to which their value does not depreciate with time, offer an attractive alternative collateral even under the existing framework.

**Identification of New Products and Markets**

Unlike the beef and wine, which developed domestically-focused industries, Argentine seafood companies have always been export-oriented and are generally well-integrated into international marketing channels. As a result, most fish processors in Argentina appear sufficiently sophisticated to seek commercial information and technical expertise without public assistance.

Nonetheless, Government coordination may provide economies of scale in gathering information on existing resources and new markets. Argentina has several export promotion programs, including PREX, PROMEX and ProArg which provide matching grants for participation in trade fairs and other export promotion activities. SSP may wish to assist fish processors and exporters with access to these programs as well as assisting the industry with development of a comprehensive export strategy through:
a) studies that compare the cost and quality of Argentine production with competing suppliers; and

b) studies that investigate marketing requirements for under-exploited products and new markets.

Social Impacts

Opposition to QMS is generally associated with concerns that industry restructuring will have negative impacts on employment and local communities. However, in Argentina, overcapacity is likely to lead to reduced sectoral employment irrespective of the management system applied. It is therefore important to separate those impacts associated with the necessary reduction in fishing effort from those associated QMS. Failure to make this distinction will result in excessive restrictions that will minimize the benefits of QMS.

Irrespective of the source of displacement, social programs designed to mitigate the negative impacts fisheries policies need to:

a) Identify and classify vulnerable workers and local communities,

b) Assess local and regional labor markets conditions,

c) Assess the expected impacts by worker and community type, and

d) Identify existing programs and resources, which can be drawn upon in the design of a targeted assistance strategy.

Vulnerable Workforce and Local Communities

Approximately 9,800 workers depend on the hake fishery. The vulnerable workforce shows a high degree of heterogeneity not only terms of occupation but also geographic location. About 61 percent of the population is located in Mar del Plata while the rest is situated in Patagonia. Males make up 81 percent of the workforce (table 11).

Fifty one percent of the hake dependent population works on shore. Thirty four percent of the on shore workers are under a cooperative arrangement. Cooperative workers are outside a formal employer/employee system of job security and do not have safety net provisions. Most of these workers are under-employed.

Table 11. Population distribution by occupation and region.

<table>
<thead>
<tr>
<th>Location</th>
<th>Males (%)</th>
<th>Females (%)</th>
<th>No. of Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar del Plata</td>
<td>84.1 %</td>
<td>15.9 %</td>
<td>5,965</td>
</tr>
<tr>
<td>On-land</td>
<td>76.2 %</td>
<td>23.8 %</td>
<td>3,990</td>
</tr>
<tr>
<td>On-board</td>
<td>100 %</td>
<td>0 %</td>
<td>1,975</td>
</tr>
<tr>
<td>Patagonia</td>
<td>76.4 %</td>
<td>23.6 %</td>
<td>3,822</td>
</tr>
<tr>
<td>On-land</td>
<td>19 %</td>
<td>81 %</td>
<td>966</td>
</tr>
<tr>
<td>On-board</td>
<td>95.8 %</td>
<td>4.2 %</td>
<td>2,856</td>
</tr>
<tr>
<td>Total</td>
<td>81.1 %</td>
<td>18.9 %</td>
<td>9,789</td>
</tr>
</tbody>
</table>

On shore workforce characteristics

Population size. The hake dependent on-land workforce is composed of approximately of 4,960 workers. Over 80% of this population live in Mar del Plata while the rest lives in Patagonia.

Sex. Women make up 35 percent of the overall on shore workforce. In Patagonia, women's participation is significantly higher reaching 81 percent. In contrast, in Mar del Plata women's participation reaches 23.8%. Between 30 percent and 44.2 percent of them are the heads of household or primary breadwinners.

Age. Nationally, medium aged workers (26-45 years) account for 64 percent of the vulnerable workforce. In Patagonia, medium aged workers make up 81 percent of the workforce whereas in Mar del Plata they constitute 60 percent of the workforce. Table 12 shows the workforce age distribution by region.

Table 12. Age distribution of on-land workforce

<table>
<thead>
<tr>
<th>Location</th>
<th>&lt;25 years (%)</th>
<th>26-35 years (%)</th>
<th>36-45 years (%)</th>
<th>&gt;45 years (%)</th>
<th>No. of Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar del Plata</td>
<td>19.4</td>
<td>33.5</td>
<td>26.5</td>
<td>20.6</td>
<td>3,990</td>
</tr>
<tr>
<td>Patagonia</td>
<td>16.7</td>
<td>40.5</td>
<td>40.5</td>
<td>2.4</td>
<td>966</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>935</strong></td>
<td><strong>1728</strong></td>
<td><strong>1449</strong></td>
<td><strong>845</strong></td>
<td><strong>4,956</strong></td>
</tr>
</tbody>
</table>


Education. The education level is low. Almost 93 percent of the on shore population did not finish high school. In Patagonia, only 50 percent of workers finished primary school. In Mar del Plata, 46.5 percent of the workers finished school. Table 13 shows the education level by region.

Table 13. Education level by region

<table>
<thead>
<tr>
<th>Location</th>
<th>Without instruction</th>
<th>Education level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inc</td>
<td>Comp</td>
</tr>
<tr>
<td>Mar del Plata</td>
<td>18.6</td>
<td>46.3</td>
</tr>
<tr>
<td>Patagonia</td>
<td>2.4</td>
<td>14.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>23</strong></td>
<td><strong>880</strong></td>
</tr>
</tbody>
</table>


Household group. About 78 percent of the on shore population is married or lives with a partner, however, only 28 percent of the workers have spouse or partner who are working. Over ninety percent of the on shore workers lives in family groups composed of 3 or more individuals. Of this number half of them live with 5 or more dependents. In Mar del Plata, 50.5 percent of the workers live in households with more than 5 members. In Patagonia, 57.1 percent of the workers live in households of 5 or more members (table 14).
Table 14. Distribution of household members by region

<table>
<thead>
<tr>
<th>Location</th>
<th>1-2 individuals (%)</th>
<th>3-4 individuals (%)</th>
<th>5+ individuals (%)</th>
<th>No. of workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar del Plata</td>
<td>9.5</td>
<td>40</td>
<td>50.5</td>
<td>3,990</td>
</tr>
<tr>
<td>Patagonia</td>
<td>4.8</td>
<td>38.1</td>
<td>57.1</td>
<td>966</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>425</td>
<td>1,964</td>
<td>2,567</td>
<td>4,956</td>
</tr>
</tbody>
</table>


Earnings. Fifty nine percent of the workforce earns less than US$ 400 per month. In Patagonia, 100 percent of the workforce earned less than US$ 400 per month whereas in Mar del Plata 49.3 percent of workforce earned less than US$ 400. Table 15 shows the income distribution by region.

Over 76 percent of the women earn less than US$ 400, while 19.8 percent of them earn between US$ 400 and 700. In contrast, 52.6 percent of the men earn less than US$400 and 33.3 percent earn between US$ 400 and 700 (table 16).

Table 15. Earning distribution by region

<table>
<thead>
<tr>
<th>Location</th>
<th>&gt; US$ 400 (%)</th>
<th>US$ 401 -700 (%)</th>
<th>US$ 701 -1000 (%)</th>
<th>US$ 1001-1400 (%)</th>
<th>US$ 1401-1700 (%)</th>
<th>No. of workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar del Plata</td>
<td>49.3</td>
<td>35.5</td>
<td>13.6</td>
<td>1.6</td>
<td>0</td>
<td>3,990</td>
</tr>
<tr>
<td>Patagonia</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>966</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,933</td>
<td>1,416</td>
<td>543</td>
<td>64</td>
<td>0</td>
<td>4,956</td>
</tr>
</tbody>
</table>


Table 16. Earnings by sex

<table>
<thead>
<tr>
<th>Location</th>
<th>&gt; US$ 400 (%)</th>
<th>US$ 401 -700 (%)</th>
<th>US$ 701 -1000 (%)</th>
<th>US$ 1001-1400 (%)</th>
<th>US$ 1401-1700 (%)</th>
<th>No. of Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>52.6</td>
<td>33.3</td>
<td>12.2</td>
<td>2</td>
<td>0</td>
<td>3,226</td>
</tr>
<tr>
<td>Females</td>
<td>71.6</td>
<td>19.8</td>
<td>8.7</td>
<td>0</td>
<td>0</td>
<td>1,730</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,936</td>
<td>1,417</td>
<td>544</td>
<td>65</td>
<td>0</td>
<td>4,956</td>
</tr>
</tbody>
</table>


Nationality. Ninety percent of the on-land workforce was born in Argentina. Interestingly, 31% of the workforce is foreign in Puerto Madryn. In contrast, 4.8 percent of the Mar del Plata workforce is foreign.
Argentina: Towards Rights-Based Fisheries Management

On board workforce characteristics

Population size. The hake dependent on board workforce is composed of approximately of 4,831 workers. Fifty nine percent of this population resides in Patagonia while the rest lives in Mar del Plata.

Sex. Women make up 1.4 percent of the overall on board workforce. In Patagonia, women's participation is about 4.2% whereas in Mar del Plata women's participation is nil.

Age. Medium aged workers (26-45 years) account for 69 percent of the on board workforce. In Patagonia, medium aged workers make up 67 percent of the workforce whereas in Mar del Plata they constitute 42 percent of the workforce. Table 17 shows the workforce age distribution by region.

Table 17. Age distribution of on-land workforce

<table>
<thead>
<tr>
<th>Location</th>
<th>&lt;25 years (%)</th>
<th>26-35 years (%)</th>
<th>36-45 years (%)</th>
<th>&gt;45 years (%)</th>
<th>No. of Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar del Plata</td>
<td>11.6</td>
<td>33.1</td>
<td>38.3</td>
<td>17</td>
<td>1,975</td>
</tr>
<tr>
<td>Patagonia</td>
<td>19.3</td>
<td>29.7</td>
<td>37</td>
<td>14.1</td>
<td>2,856</td>
</tr>
<tr>
<td>Total</td>
<td>780</td>
<td>1,502</td>
<td>1,813</td>
<td>738</td>
<td>4,831</td>
</tr>
</tbody>
</table>


Education. The education level is still low but higher than for the on shore workforce. About 72 percent of the on board population did not finish high school compared to 93 percent from the on shore workforce. In Patagonia, only 74 percent of workers finished primary school. In Mar del Plata, 70 percent of the workers finished school. Table 18 shows the education level by region.

Table 18. Education level by region.

| Location     | Without instruction | Primary (%) | | Secondary (%) | | University (%) | | No. of workers |
|--------------|---------------------|-------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|              | Inc | Comp | Inc | 2 yrs | 3 + yrs | Inc | Comp | Inc | Comp | Inc | Comp |
| Mar del Plata| -   | -    | 46.9 | 6.5   | 16.2   | -   | 25.6 | -   | 4.8  | 1,975 |
| Patagonia    | 1.4 | 32.5 | 33.6 | 6.5   | 21.2   | 2.4 | 2.4  | 2,856 |
| Total        | -   | 40   | 1,854 | 1,088 | 505   | 1,111 | 68  | 163  | 4,831 |


Household group. About 78 percent of the population is married or lives with a partner, however, only 28% of the workers have spouse or partner who are working. Almost ninety percent of the on board workforce lives in family groups composed of 3 or more individuals. In Mar del Plata, 45.1 percent of the workers live in households with more than 5 members. In Patagonia, 36.5 percent of the workers live in households of 5 or more members (table 19).
Table 19. Distribution of household members by region

<table>
<thead>
<tr>
<th>Location</th>
<th>1-2 individuals (%)</th>
<th>3-4 individuals (%)</th>
<th>5+ individuals (%)</th>
<th>No. of Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar del Plata</td>
<td>5.9</td>
<td>49</td>
<td>45.1</td>
<td>1,975</td>
</tr>
<tr>
<td>Patagonia</td>
<td>13.9</td>
<td>49.6</td>
<td>36.5</td>
<td>2,856</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>4,831</td>
</tr>
</tbody>
</table>


Earnings. Earnings are considerably higher in the on-board sector. Sixty three percent of the workforce earns less than US$ 1401 per month. In contrast, 59 percent of the land-based workforce earns less than US$ 400 per month. In Mar del Plata, 69.4 percent of the workforce earned less than US$ 1401 per month whereas in Patagonia 59.5 percent of workforce earned less than US$ 1,401. Table 20 shows the income distribution by region.

Table 20. Earning distribution by region

<table>
<thead>
<tr>
<th>Location</th>
<th>&gt; US$ 400 (%)</th>
<th>US$ 401-700 (%)</th>
<th>US$ 701-1000 (%)</th>
<th>US$ 1001-1400 (%)</th>
<th>US$ 1401-1700 (%)</th>
<th>No. of Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar del Plata</td>
<td>1.5</td>
<td>6.1</td>
<td>27.3</td>
<td>34.5</td>
<td>30.6</td>
<td>1,975</td>
</tr>
<tr>
<td>Patagonia</td>
<td>12.6</td>
<td>14</td>
<td>12.2</td>
<td>20.6</td>
<td>40.5</td>
<td>2,856</td>
</tr>
<tr>
<td>Total</td>
<td>389</td>
<td>520</td>
<td>888</td>
<td>1,270</td>
<td>1,761</td>
<td>4,831</td>
</tr>
</tbody>
</table>


Unlike the on-shore workforce, the earning distribution between men and women is close. About sixty three percent of the men and sixty six percent of the women earn less than US$ 1,401 per month (table 21).

Table 21. Earnings by Gender

<table>
<thead>
<tr>
<th>Location</th>
<th>&gt; US$ 400 (%)</th>
<th>US$ 401-700 (%)</th>
<th>US$ 701-1000 (%)</th>
<th>US$ 1001-1400 (%)</th>
<th>US$ 1401-1700 (%)</th>
<th>No. of Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>7.4</td>
<td>11</td>
<td>18</td>
<td>27</td>
<td>36.6</td>
<td>4,711</td>
</tr>
<tr>
<td>Females</td>
<td>33.3</td>
<td>0</td>
<td>33.3</td>
<td>0</td>
<td>33.3</td>
<td>120</td>
</tr>
<tr>
<td>Total</td>
<td>389</td>
<td>518</td>
<td>888</td>
<td>1,272</td>
<td>1,764</td>
<td>4,831</td>
</tr>
</tbody>
</table>


Nationality. Ninety seven percent of the on-board workforce was born in Argentina. About 8% of the Mar del Plata workforce is 8% foreign.

Labor Market Characteristics

Despite the strong performance of the economy in recent years, Argentina continues to have a high unemployment rates. In May of 1999, the official national unemployment rate was 14.5 percent. This high unemployment rate is partially due to the opening of the economy, which makes it more susceptible to
Argentina: Towards Rights-Based Fisheries Management

external shocks such as the Russian and Brazilian devaluations, but it is also due to the government's failure to modernize Argentina's rigid labor laws.

There have been few studies on fishery labor markets. INIDEP estimated that between 1987 and 1996, 11% of the fishery-related jobs were lost in spite of increasing landings. The drop was felt mostly in Mar del Plata where employment fell by 25 percent between 1987 to 1996. In contrast, employment in Patagonia increased by 37 percent between 1987 and 1996. Given the current demographic characteristics of the fisheries workforce, it is accepted that Mar del Plata will experience the greatest job loss, particularly cooperative workers who make up 34 percent of the workforce in the area. Mar del Plata is among the slackest labor markets in the country. Unemployment rate is currently 18.4 percent. Although unemployment rates in Patagonia are closer to the national average, employment opportunities are more limited.

Notwithstanding the bleak labor market conditions, the National Institute of Statistics and Census (INDEC) indicates that job seekers, with a similar demographic characteristics to the vulnerable population, find alternative employment within 6 months. INIDEC's permanent homes survey indicates that 65.5 percent of the population which earns less than US$ 500 per month and is between 30 and 40 years old takes on average less than six months to find another job.

Employment Impacts

In the face of persistent over fishing of the hake resource, the Government will likely implement stringent management measures to prevent the collapse of the hake resource. These measures are expected to generate substantial hardship to many coastal communities. In order to quantify the potential social displacement, two of simplified minimum and maximum impact scenarios were considered.

The minimum impact scenario assumed that 70 percent of the hake dedicated on shore workforce and 65 percent of the hake dedicated on board workforce would be impacted by the implementation of QMS. It was also assumed that 15 percent (20 percent) of the other species on shore (on board) workforce would be affected too. The maximum impact scenario assumed that 100 percent of the hake dedicated on shore workforce and 80 percent of the hake dependent on board workforce would be affected. Also, it was assumed that 10 percent (20 percent) of the other species dedicated on shore (on board) workforce would be impacted (table 22).

<table>
<thead>
<tr>
<th>Scenario I</th>
<th>Scenario II</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>On-shore</strong></td>
<td><strong>On-board</strong></td>
</tr>
<tr>
<td>Hake</td>
<td>Other species</td>
</tr>
<tr>
<td>70%</td>
<td>15%</td>
</tr>
<tr>
<td>65%</td>
<td>10%</td>
</tr>
</tbody>
</table>


Preliminary analyses suggest that between 7,220-10,230 workers could lose their job due to the short-term reductions in hake catch, most them belonging to the cooperatives (table 23).
Argentina: Towards Rights-Based Fisheries Management

Table 23. Preliminary unemployment estimates

<table>
<thead>
<tr>
<th></th>
<th>Mar del Plata</th>
<th>Patagonia</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>On shore</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3,250-4,580</td>
<td>1,430-2,010</td>
<td>4,680-6,590</td>
</tr>
<tr>
<td><strong>On board</strong></td>
<td>1,470-1,950</td>
<td>1,070-1,690</td>
<td>2,540-3,540</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4,720-6,530</td>
<td>2,500-3,700</td>
<td>7,220-10,230</td>
</tr>
</tbody>
</table>


On shore workers

Both formal (i.e., regular processing plant workers) and cooperative workers will be extensively impacted by cuts in the hake TAC. The impact of over-fishing on employment levels is already being experienced in Mar del Plata with many laborers working only two to three days a week. The extent of the employment loss will depend on the duration and extent of the TAC reduction. The cooperative segment will be the hardest hit because they are not protected by collective bargaining agreements, lack a job security system, and earn less than formal workers.

On board workers

Inshore fleet. This segment of the fleet will be moderately impacted by reductions in the hake TAC. In 1998, hake constituted 42 percent of their landings. However, they are a generalist fleet which can easily target other coastal species. Nevertheless they would be susceptible if displaced vessels began targeting the same species they catch.

Ice-trawl fleet. This segment of the fleet will be heavily impacted by TAC reductions. In 1998, hake made up for 70 percent of their landings. However, these workers are protected under collective agreements and have negotiated a subsidy of $150 per month when there is no fishing. Impact of TAC for this group depends on the extent and duration of TAC reductions; and the solvency of the firms to meet their contractual obligations.

Processing fleet (factory and freezer). This processing fleet will be significantly impacted by TAC cuts. In 1998, hake constituted about 30 percent of their landings. Most workers are protected under collective agreements. The impact on this segment will depend on the firms financial situation and their ability to meet their contractual labor obligations. The social impact may be lessened if this fleet can target other species, and meets “crew reserve nationality” requirements.

Other Workers (Canning, Salting, Transport, Warehouse)

The impact on this group has not been quantified. However, TAC reductions are expected to have a spillover effect and create further under-employment.

Assistance Program Characteristics

The above analysis suggests that a social mitigation strategy should focus its efforts to a large extent on cooperative workers. Similarly, the mitigation strategy should be centered on the main hake ports such as Mar del Plata. Also the mitigation strategy should concentrate on job search assistance, mainly towards non-fisheries related employment, and should provide an interim safety net.
Argentina: Towards Rights-Based Fisheries Management

**Institutional Arrangements for Mitigation Assistance**

Institutional arrangements are key factors in the implementation of a social mitigation program. Agreements or memorandums of understanding are instruments routinely used to facilitate the participation of different partners. These instruments indicate commitment levels, which allow partnership representatives to mobilize resources, create an executing agency, and initiate a social mitigation program. It also allows the partners to discuss and agree on the degree of access and other implementation issues such as eligibility, degree and duration of support, implementation and coordination of arrangements, and allocation of resources.

**Eligibility**

The most common criterion used in determining program eligibility is length of service in the industry. To obtain assistance workers are normally required to provide evidence of their past participation in the sector. Many fishery workers are now providing their services to processing plants through cooperatives; however, in the past they worked as formal processing workers. Both the processing plant employers and cooperatives will have to provide proof of their past affiliation.

**Level of Support**

In fairness to unemployed workers from other sectors a maximum level of assistance per worker should be considered. One alternative to set the maximum level of assistance would be to multiply the average wage by the average period of time that an unemployed worker takes to find alternative employment.\(^{33}\)

**Duration**

An important feature of a social mitigation strategy is to provide temporary, one time transitional assistance, which does not institutionalize dependence on social assistance on a permanent basis. Programs that attempt to provide support until “the fish come back” have incurred high costs and perpetuated hardship (box 13).

**Implementation and Coordination**

There are approximately 49 potentially applicable employment, training, and social programs operating in Argentina. In many instances, these programs overlap and duplicate efforts. They are also administrated by different agencies causing confusion among potential users. The fisheries social mitigation program could minimize potential participant’s frustrations by providing information, guidance, and counseling and facilitating access to the appropriate programs. These activities could be provided through a local community “action” centers.

---

\(^{33}\) An estimated $1,500 benchmark based on an average unemployment benefit of $250 for six months.
Box 13. Social Mitigation in the Canadian Atlantic Cod Fishery

As result of the collapse of the cod fishing industry, measures under The Atlantic Groundfish Strategy (TAGS) were introduced in Canada in 1994 (replacing the two-year Northern Cod Adjustment and Recovery Program) to help displaced fishers and plant workers. These measures, costing 1.9 billion Canadian dollars, were for a comprehensive program of adjustment and income support. When it became apparent in 1996 that TAGS was not on course, the government opted to maintain the income assistance part but cancel all other measures. Recent internal assessments of TAGS say it failed because in its main objective of weaning people from the dependence on the moribund cod fishery and government income support. A new program worth between 500 and 750 million Canadian dollars is currently being introduced. Its main components include:

- A scheme to buy back and retire fishing licenses in the hope of permanently reducing the size of the idle fleet
- Offering workers between 55 and 64 the possibility of early retirement

A small element of employment programs and economic development measures. The greatest concern is for dockhands and plant workers who do not meet the criteria for early retirement or license buyback and who have little potential to benefit from training and other programs. Under consideration is a program to offer these cases a one-time cash payment, in exchange for their agreement to relinquish the right to future claims.

Source: G. Peacock, 1999

The provision social assistance that targets fishery workers will require that an executive agency is appointed and administrative and operating arrangements are put in place. The executing agency, accountable for coordination of local delivery assistance, could be made up of national institutional partners and local stakeholders. The implementation of social assistance arrangements requires:

a) Mobilizing infrastructure: premises, equipment, materials (reporting, counseling, contracting), staffing (technical and administrative); 34

b) Developing operating procedures; and

c) Setting up and running an assistance delivery mechanism, e.g., action centers to provide visible evidence of support.

---

34 Staff with technical expertise could be seconded from participating partner agencies.
The action centers should, at a minimum, provide the following services:

a) **Information and access facilitation to program services.** One of the basic needs of displaced workers is access to information such as assistance measures, retraining and job opportunities, counseling and personal support;

b) **Skills Assessment.** This service would improve the matching of workers to assistance programs based on realistic expectations;

c) **Guidance and Counseling.** This service is as important as other assistance measures in reducing social tension;\(^{35}\)

d) **Tracking Results.** This would assist with program monitoring and evaluation;\(^{36}\) and
e) **Advocacy.** If workers experience difficulty in getting their entitlements or in achieving their employment objectives, the center staff should be able to advocate on behalf of dislocated measures.

---

**Box 14. OECD Experience with Labor Programs**

**Self-employment programs**

The experience in OECD countries is that well-designed programs will attract at most 5 percent of the unemployed. Most of the participants are likely to be male, better educated, and in their 30’s. Program costs, excluding administration, are approximately equal to paying unemployment benefits. In OECD countries, half of the businesses started in the first year failed. Each firm, on average, created 1.5 jobs. It has been estimated that of the business started about one of every four would have started without government assistance, indicating a substantial “deadweight loss”.

**Retraining programs**

The OECD experience suggests that public retraining programs for displaced workers are generally not more effective than job research assistance (JRA) in increasing re-employment possibilities or earnings. Retraining programs are between two to four times more expensive than JRA. From a cost-effectiveness perspective, JRA maybe the preferred than retraining. Retraining programs for the long-term unemployed show disappointing results too. Few programs result in gains for re-employment probabilities or wages. Nevertheless, some programs may be more beneficial if targeted towards specific groups such as women.

*Source: Guasch et al, 1997.*

---

**Conservation of Marine Biodiversity**

The stewardship of the Argentine living marine resources is entrusted to the Federal Fisheries Council, which carries out its charge under many treaties, laws, and mandates from Congress. Most of the Federal Fisheries Council’s conservation responsibilities emanate primarily from the federal fisheries law. The goal of law is to promote the development of fishing activity commensurate with the rational use of

---

\(^{35}\) According to social impact assessments in Coal Industry Restructuring in Russia, the provision of information and counseling to both individuals and groups of workers resulted in a significant lowering of social tension.

\(^{36}\) For example, fisheries-related training in Mar del Plata during the last years failed to increase the marketability of the participants. According to the training institutions, not one of the 250 women enrolled in 12 training courses conducted in 1997, which provided instruction in the areas of quality control, filleting, and fishing net weaving, obtained a job in the fisheries sector.
marine living resources while encouraging the use of environmentally friendly industrial processes. Thus, the conservation of biological diversity is one of the foundations of sustainable fisheries management.

**Defining Biodiversity**

Biological diversity is referred as the variability among living organisms from all sources including, among other things, marine and aquatic ecosystems and ecological complexes of which they are part, including diversity within species and ecosystems. There are three hierarchical levels of biodiversity: ecosystem, species and genetic.

Ecosystem biodiversity relates to the variety of interrelated sets of communities and habitats. Diversity rich ecosystems exhibit a high degree of resilience. Resilience reflects the ecosystem’s ability to withstand external shocks either by recovering to its original state (or unperturbed state) or by settling into a new equilibrium.

Species biodiversity relates to the difference among organisms in the ecosystem. In general, species diversity tends to be higher in tropical latitudes compared to temperate latitudes; however, species abundance exhibits the opposite trend. There is also a biological diversity gradient between inshore and offshore areas. Species diversity tends to be greater on the continental shelf than in open ocean.

The last hierarchical level is the genetic level. Genetic diversity refers to the variation of genetic material within and between species populations. The preservation of genetic diversity is essential since it provides individuals with the ability to withstand and adapt to environmental change.

**Effects of Fishing on Ecosystem Diversity**

**Primary and Secondary Production**

Fishing activities can lead to significant changes in the structure and productivity of marine ecosystems. Fishing activities can stress marine ecosystems both directly and indirectly. In terms of direct effects, fishing removes a significant amount of primary and secondary production. On average fisheries remove about 8 percent of the ocean’s primary productivity. However, on non-tropical shelves, fisheries remove approximately 35 percent of the primary production.

Fishing activities not only reduce primary but also secondary productivity, which may significantly alter the structure and dynamics of food webs. Over the last four decades the mean global trophic level declined due to fishing activities. The decline has been due a gradual transition in landings from long-lived, high trophic level, piscivorous fish towards short-lived, low trophic level invertebrates and planktivorous pelagic fish. Increasing the abundance of plantivorous pelagic fish may reduce the availability of plankton to other species. Remarkably, in the South and Central East Atlantic the mean trophic level appears to have increased.\(^3\) Scientist have claimed that the development of new fisheries tends to mask declines in trophic levels present in more developed fisheries.

**Community structure**

Over-exploitation can cascade along the entire food web through competition and predation. The structure and dynamics of the food web may also be impacted by the removal of an apex predator, which can lead

---

\(^3\) In the paper the authors claimed that index showed no trend.
to an increase in prey and competitor’s species abundance. Although no significant changes in the ecosystem structure have been reported there is some evidence suggesting that the anchovy abundance has increased following the collapse of the hake resource. The biomass of short-lived pelagic species, however, is known to vary significantly due to environmental driven fluctuations in recruitment.

*Physical disturbance and habitat modification*

In terms of indirect effects, fishing activities can have more serious impacts on marine ecosystem structure than the removal of biomass. The physical alteration of the seabed by trawling and dredging can potentially change the rates of key global biochemical processes. Marine sedimentary fauna, for instance, plays a key role in global carbon, nitrogen and sulfur cycling. The impact of fishing activities on sedimentary communities and habitats is largely unknown.

There has been some research conducted in this area primarily in shrimp and scallops grounds trying to establish ecological baselines. Initial studies in shrimp grounds suggest that trawling did not appear to change the granulometric composition of the sediments and that benthic survival is high. Echinoids and polychaetes were found to be the most damaged species in the fishing nets.

*Effects of Fishing on Species Diversity*

*Over fishing*

Even though over-exploitation is the most serious threat to biological diversity at the species level, it seldom results in extinction. Generally, low population levels tend to make harvesting unprofitable easing the fishing pressure and allowing the stocks to recover. Nevertheless, collapsed stocks may take several years or even decades to recover.

The over-exploitation of commercially valuable species can be troublesome since idle fishing effort may move into other fisheries. If left unchecked displaced fishing effort, can proceed into a sequential pattern of over-exploitation. In the case, of the hake fleet some effort has been transferred into the hoki fishery. In 1998 hoki landings increased by 125 percent respect to 1997 levels.

*By-catch or incidental catch*

Many marine species such as marine mammals and seabirds are rarely the target of commercial fishermen, but often constitute a significant share of their catch. By-catch occurs because of complex technological and biological interactions. The non-selective nature of many fishing gears and the presence of many species in mixed-species aggregations results in significant by-catch interactions when targeting a particular species or species group. If the by-catch is not marketable is discarded, unless discarding is forbidden.

*Discarding*

Discarding is a widespread feature of commercial fisheries operations around the world. FAO estimates that commercial fleets around the world discard approximately 20 million tons, about 25 percent of the reported annual production from marine capture. Discarding is driven to a large extent by regulatory and market factors. Management regulations such as minimum sizes, prohibited species, and quotas increase

---

38 Information on marine mammal and seabird entangelments is presented in a later section.
the incentive to discard when the gear is non-selective. Similarly fishermen will tend to discard the low value component of the catch and retain the higher value component. The limited holding capacity may also act as additional incentive to discard.

Discarding of hake by the shrimp fishery remains one of the significant management challenges. Juvenile hake are often discarded because of its low value. In 1997, it was estimated that approximately 20,000 tons of hake were discarded representing about 3.4 percent of the reported hake landings and 5 percent of the hake TAC. Similarly there is substantial discarding within the hake fleet. For instance, the freezer and factory fleet declared catch report catch represents 61.9 percent of the actual catch. A significant share of the percentage difference is believed to be discarded. The ice trawl and freezer and factory fleets are also known to fish in areas with high juvenile concentrations. Efforts are currently underway at the INIDEP to minimize by-catch problems in the shrimp and hake fisheries. Presently, the INIDEP is improving the design of shrimp and hake exclusion devices, known as DISELLA II and DEJUPA.

Large amounts of organic matter that result from discarding or processing at sea (offal) may cause changes in the structure and diversity of marine communities, favoring the proliferation of scavengers. Preliminary studies in the shrimp fishery indicate that discarding has no impact on the bottom floor chemistry. Organic matter (carbon and nitrogen) levels remained within the normal range. The presence of scavengers, mainly crabs and asteriods, however, was noticed in the most frequently trawled areas.

**Marine Mammals and Seabirds**

The overall impacts of commercial fishing activities with regard to marine mammals and seabirds are largely unknown. However, the increased level of exploitation, particularly in Patagonia, has augmented the awareness of potential interactions between marine mammals and seabirds with fishing operations.

Incidental catches of marine mammals such as Dusky, Peale, Burmeister, Commerson dolphins, spectacled porpoises and southern sea lions have been reported to have taken place during trawling, gillnetting, and jiggling operations. Similarly, several seabird species such as albatross, cormorants, penguins, petrels, seagulls, and terns have been reported to have been taken by commercial fishing operations, primarily longlines but also trawlers to a lesser extent.

**Effects of Fishing on Genetic Diversity**

Fishing activities by selectively removing older and larger organisms can potentially alter the genetic makeup of exploited populations. Detecting changes in the genetic structure caused by harvesting can be problematic because natural fluctuations in the environment naturally change life history traits. Also, many species exhibit compensatory responses to increased exploitation rates.

Fishing one stock at a higher rate than another may result in the loss of another less productive stock without putting the specie itself at risk. Short-fin squid stocks (*Illex argentinus*), for instance, are characterized by low levels of genetic diversity but marked population differentiation within the species' geographical range. High exploitation rates could potentially reduce squid's genetic diversity by driving rare alleles to or close to extinction. Localized exploitation could also reduce the genetic variability of populations to a "population bottleneck". Population bottlenecks occur when the current levels of genetic diversity are limited to a few survivors.

Fishing activities may also lower the total reproductive output. Fishing activities by targeting spawning aggregations where older and more diverse individuals return earlier and remain longer (compared to younger individuals), the older individuals become more vulnerable. Thus, potentially lowering the
population’s age at first maturity. Reproduction at smaller sizes lowers population’s total reproductive output.

**Management Tools to Conserve Biodiversity**

The mitigation of biodiversity loss is a complex problem. Uncertainties regarding the status and abundance of stocks, multi-species interactions, effects of environmental variability and change, habitat degradation, among others, make biodiversity conservation a formidable challenge. Nevertheless, there are many benefits to be realized by adopting more encompassing and cautious management strategies.

The solution to biodiversity loss requires a multidisciplinary approach that includes biological, economic, and social components. Understanding the direct and indirect contribution biodiversity to fisheries production is key as it allows stakeholders to engage in a constructive debate and guide them to pragmatic approaches that result in sustainable fisheries.

From a policy perspective, there are several tools available to minimize the negative impacts of harvesting activities. These include:

- Encourage the use of gear modifications or practices that minimize by incidental catches of marine mammals and seabirds. In this respect, FAO is currently developing guidelines and proposing technical measures to reduce the incidental catch of seabirds by long lines;

- Develop area and season closure strategies that consider animal’s behavior, seasonality, and gear type. For instance, young sea lion males have a higher propensity to get entangled because of their foraging behavior. Similarly, seabird bycatch rates may be higher when they concentrate to breed;

- Establish marine reserves or protected areas;

- Encourage the use of biodegradable gear components to minimize ‘ghost fishing’;

- Provide financial incentives to adopt environmentally friendly gear modifications or practices;

- Promote the certification of sustainable fishing practices and eco-labeling of seafood products;

- Establish property rights over non-commercial marine living resources such as marine mammals. This would create an economic incentive for fishermen to minimize its by-catch.
Appendix: Theory and Experience with Rights-Based Fisheries Management

This appendix (i) reviews the shortcomings of open access situations, (ii) describes the theoretical benefits of a rights-based management regime, and (iii) reviews international experience with implementation of rights-based management regimes.

Access Rights In Fisheries And Their Implications For Management

In order to compare approaches to fisheries management, it is useful to view fisheries resources as capital assets, which can render society a flow of benefits. The stream of benefits is determined by present harvest levels and their impact on the stocks, which in turn affect future consumption options. Harvesting at levels below the resource's reproductive potential will increase the capital and future consumption options. Conversely, exploitation rates above the resource's reproductive capacity will reduce the capital and reduce future consumption options. Therefore, fisheries' managers face the challenge of selecting the appropriate harvesting strategy (and thus, optimal stock size) over time. In order to achieve this goal, the manager must take into account society's discount rate or time-preference rate.

Economic theory holds that to maximize society's welfare, fisheries managers must set society's discount rate equal to the fish biomass' "own rate of interest". If the value of the asset is growing faster than the opportunity cost of the rate of capital, then the owner of the asset should invest in it by allowing the stock to increase. On the other hand, if the opportunity cost of the rate of capital is greater than the asset's value, then the owner should dispose of part of or the whole asset until the discount rate equals the biomass' own rate of interest.

Open Access Regimes

In an open access fishery, there are no restrictions to entry, suggesting the absence of property rights (res nullis). In other words, the right to exploit the resource is free and open to all. While fishing in virtually all sea waters is governed by national or international rules and conventions, the failure to effectively monitor and enforce entry and harvest often results in a de facto open access regime. The open access nature of fisheries is the main reason for biological overexploitation and poor economic performance. In an open access fishery, the absence of exclusive rights prevents individual fishermen from "investing" in the resource (i.e., allowing it to reproduce and grow), since by doing so they run the risk of losing the fish to other fishermen. Thus, there is excessive present consumption of the resource that leads to a loss of future benefits, generating an inter-temporal misallocation of resources. The consequent "race-to-fish" also results in over-capitalization of the industry (inter-sectoral misallocation of resources) as fishing companies invest in faster and larger boats in order to maximize their harvest before pressure on the resource reduces the quantity and quality of the catch available in a given season.

---

39 Clark (1990) has shown that the fish biomass's "own rate of interest" consists of two parts, the marginal productivity of the biomass and the "marginal stock effect." The marginal stock effect (or harvesting cost corrective) captures how harvesting costs decrease as a function of increased fish biomass.

40 It is important to note that the optimal stock size is not necessarily below that of MSY level and largely depends on the relative weight of the components of the biomass's own rate of interest. High harvesting costs tend to increase the optimal stock size, whereas high marginal productivity of the stock tends to decrease the optimal stock size.

41 A common property resource, on the other hand, is controlled by a clearly defined set of users (res communes). A lake fishery where access is restricted to members of the neighboring community could be sought as a common property resource (Johnston, 1992). However, a common property resource with poorly defined or enforced access rights will result in a situation similar to open access.
To understand this concept, it is useful to draw from the classic textbook analysis of the open access fishery. This model is an abstraction of the real world situation, since it assumes the harvesting of only one species (i.e., it ignores multispecies interactions); a constant price (i.e., no market response to increased catches); a homogenous fleet; and an instantaneous adjustment of the fish stock to increased effort (i.e., fish stocks and effort reach equilibrium instantaneously). Nevertheless, it illustrates well the impact that an open access situation generates.

Figure 1 shows the total sustainable revenue curve, indicating the revenues that can be obtained from the fishery at every effort level. The total cost curve shows the harvesting costs at each effort level. Effort is the combination of vessels, labor, and time spent in catching fish. In the case of a sole owner of the resource, the maximum economic yield (MEY) is the harvest level that provides the highest economic returns, or rents. It is found at the effort level where the sustainable revenue curve and the total cost curves differ the most. This effort is the most efficient since the marginal cost of effort equals the marginal benefit of effort.

In the case of an open access fishery where it is not possible to restrict entry and appropriate the full economic returns, rents attract new entrants and increased effort. Economic theory predicts that fishermen will continue to fish until total revenues equal total costs. At this effort level, effort open access (Eoa), rents are completely dissipated, and there are no incentives to increase effort. Entry into Eoa occurs because fishermen only consider the private costs of harvesting and not the social costs. This is clearly a market failure, since the private cost of harvest is less than the social cost. The latter cost includes the opportunity cost of all resources used, including the fish.

Figure A1. Open Access and Maximum Economic Yield Scenarios

The open access nature of the fishery generates a series of externalities. Individual fishermen do not consider the impact their actions have on other fishermen, even though these actions may increase the cost to all fishermen. The most pervasive externality is the “stock” externality, when the entry of another fishing unit reduces the stock, increasing other fishermen’s harvesting costs. Similarly, crowding externalities occur when vessel congestion increases harvesting costs.
Public Policies to Address Market Failure

As explained above, the open access nature of many fisheries results in a misallocation of resources. To correct this market failure, intervention, usually governmental, is required. Moving away from an open access situation to a more efficient management regime can result in the generation of substantial rents, which were previously dissipated under the open access regime. Optimal management of a fishery, at least from an economic point of view, requires internalizing the externalities and ensuring that resources generate the maximum net economic benefits.

Limited Entry

Limited access regimes have generally been more successful at averting biological overexploitation, but have failed at preventing economic overexploitation. Although limited entry controls the number of vessels, it fails to control actual effort. Under limited entry, fishermen still have the incentive to expand their fishing power to catch as fast as possible. As long as earnings are positive, they continue to invest in bigger and more efficient vessels and equipment, which leads to excessive investment and rent dissipation.

Input Controls

Input controls, such as gear restrictions, and other restrictive regulations, by increasing the costs of fishing, can reduce catch to the level of MEY, but impose an inefficiency cost on society. The difference between the least cost approach and that required by the controls represents a waste of resources that could have been deployed in other activities. Of course, input restrictions can also be imposed in response to external effects of fishing practices that impose costs to society, which exceed the "inefficiency losses". However, as in the case of open access, market based, rather than "command and control" type solutions that internalize the external effects may offer opportunities to address the problem at lower cost to society.

Taxes

The imposition of a tax, which increases the cost of fishing, can, as in the case of input controls, reduce catch to the level of MEY. Unlike input controls, there is no loss of resources to society as the difference in costs imposed by the tax represents a transfer of resources from the taxed group, fishers, to the tax authority. However, the use of "Pigouvian taxes" presents several difficulties in practice. First, fishermen unanimously oppose them. Although economic rents would be maximized, these would accrue to the taxation agency. Fishermen would receive zero rents, or in some cases marginal fishermen would be eliminated. Secondly, setting the optimal tax would require management to be well informed regarding both the industry's cost structure and the biological characteristics of the stocks. Natural population fluctuations and technological innovation would require the authority to recalculate these taxes frequently (Clark, 1990).

The degree of government intervention will be determined by factors such as the size and heterogeneity of the group. (c.f. Olson (1965) and Kanbur (1992)).

It should be noted that license limitations can effectively control effort in highly selective fisheries (such as trap fisheries) where there is little room for technological improvement. However, this is an exception rather than the rule.

In figure 1, this would be represented by shifting or rotating the total cost curve up until it intersects the total revenue curve at effort level Emey.
Individual transferable quotas (ITQs) were first suggested in the early 1970's as a means of addressing the perverse incentives generated by open access and limited access regimes. The use of ITQs is a significantly different management approach, since it conveys the idea of a property right. An ITQ is a legally defined right to harvest a specified amount of an individual species (or group of species) in a given area, during a specific amount of time. The ITQs are not a right to the stock itself. These rights can be assigned either on a fixed quantity basis or as a percentage of the TAC. As a result of New Zealand's experience with fixed quantities, most countries allocate quotas as a percentage of the TAC.

Under a rights-based regime, fishermen are guaranteed a certain quota represented by the ITQ. This frees them from racing each other and allows them to maximize profits by operating more efficiently. The transferability of quota allows the creation of a market, where fishermen can either sell or rent their quota to others. In well-behaved markets, quota will go to the most profitable producers, thereby allowing the less efficient producers to exit the fishery. In other words, ITQs allow fishermen wishing to exit the fishery to do so with a substantial compensation. ITQs like vessel buybacks act as a transfer payment to fishermen. They do not, however, require an actual outlay from the government as buybacks do.

Benefits of Rights-Based Management Regimes

The establishment of an exclusive rights regime has powerful repercussions on the entire fishery. Among the most important is the generation of rents, much of which was dissipated under other management regimes such as limited entry programs (and/or open access regimes).

While the generation of rents is a highly visible consequence of a well-implemented rights-based regime, government generally adopts ITQs as an instrument to achieve specific societal goals such as resource conservation and improved industry profitability and efficiency. Social welfare concerns, though rarely a direct factor in the decision to introduce ITQs, often are addressed through the application of the rights-based management regime.

Resource Conservation

Rights-based management regimes are expected to promote good resource conservation, provided that management has adequate biological information, technical expertise, and political will to set the total allowable catch properly. A recent OECD report observed that in 24 of 31 fisheries under rights-based management, catches were at or below the established TAC. Unfortunately, poor biological information led to setting the TACs too high, which caused declines and, in some cases, near collapses in stocks (OECD, 1997). The same study found that recurring quota overages in the Canadian sablefish, halibut, and geoduck fisheries ceased after the introduction of ITQs. Poor monitoring and enforcement was identified in those fisheries where quota overages continued even after the implementation of rights-based management.

For the purposes of the following discussion, we will only focus on individual transferable quotas (ITQs). We do recognize, however, that there are other forms of rights-based management regimes such as TURFs (territorial user rights), which are beyond the scope of this piece.

The designers of the New Zealand ITQ management regime envisioned that changes in the TAC could be accommodated by buying and selling in the quota market. Unfortunately, they underestimated the frequency and cost of the required interventions, which eventually forced the government to switch from a quantity based quota to one that was set as a percentage of the TAC. Percentage based quotas have several advantages over quantity based quotas. First, they free the managing authority from intervening in the market to stabilize the TAC by buying and selling quotas. Second, the proportional share of the TAC provides quota holders with a greater incentive to protect the resource and support management and research.
The use of ITQs, however, can be problematic in multispecies fisheries where fishermen cannot effectively target species to match their quota holdings. By-catch problems have reportedly continued after the introduction of ITQs in many multispecies fisheries like the Australian south east fishery, Canadian Atlantic groundfish fisheries, New Zealand flatfish fisheries, and Netherlands sole and plaice fisheries (OECD, 1997). Another area of concern, at least from a biological perspective, is the problem of discarding and highgrading. Since fishermen own the quota, there is an incentive to keep the most valuable fish to count against quota and to discard the less valuable fish.

Squires et al. (1996) suggest that international evidence on increased discarding, by-catch, and highgrading under a rights-based management regime is mixed. Problems of by-catch, highgrading, discards, and quota overages have been documented in the Australian southeast fishery and the New Zealand ITQ fisheries. However, the discard problem is not considered severe in New Zealand. Highgrading problems have also been recorded in the Wisconsin lake trout and Ontario walleye ITQ fisheries (Muse and Schelle, 1989; Muse, 1989). On the other hand, the Australian bluefin tuna fishery and San Francisco Bay herring roe fisheries do not appear to have a significant highgrading problem (Annala, 1996; Sutinen et al., 1992). Arnason (1993) has reported that Iceland's multispecies demersal fisheries do not seem to experience major discarding and highgrading problems. However, Palsson (1993) has recently challenged this point. Boyd and Deewes (1991) note that discarding, highgrading, and by-catch problems exist regardless of whether a fishery is managed using rights-based management.

Broader biodiversity conservation concerns - downstream impacts on food supply and inadvertent impacts of fishing activities on non-commercial species and habitat - are usually addressed by direct government action. The estimation of TAC should contemplate the needs of the broader biological community as well as the need to conserve stocks at economically optimum levels. In New Zealand, conflict has arisen between industry, which wants to assume full control of the QMS including research, establishment of TAC and monitoring and enforcement, and government, which wishes to retain sufficient participation to ensure that broader environmental concerns are addressed. Damage to habitat and non-commercial species from fishing activities generally requires limitations on fishing practices, including area, season and gear restrictions.

An alternative to direct government control through TAC reduction is the retention or purchase of “biodiversity quota shares” by government, official international and non-governmental organizations (NGOs) that would not execute the associated catch rights. This mechanism can transfer the cost of addressing the broader conservation concerns from fishermen to government (representing national society more broadly), NGOs (representing national and international donors who place a particularly high value on biodiversity) and international organizations (to the extent the impacts are of transboundary or global significance)\(^47\). As in the case of ITQs generally, biodiversity quota shares raise issues of initial allocation policy and transferability restrictions.

**Profitability and the Race to Fish**

According to theory, the assignment of an exclusive and durable fishing right will encourage fishermen to maximize profits by better matching their fishing practices to respond to market demand. Since fishermen do not have to race each other, they can plan to land their fish when market conditions are most favorable, thereby preventing market gluts. Since fishermen are subject to quota catch limits, they usually try to

\(^47\) This approach is similar to that used for publicly and privately supported purchase of critical terrestrial habitat and, more recently, purchase of freshwater rights by environmentalists and sports fishermen to ensure sufficient downstream flows to support fish stocks and populations of other fauna and flora (c.f.: Huber, et. Al. 1997).
maximize profits by improving their harvesting and handling methods so as to supply better quality and higher priced fish.

International evidence supports the view that industry has increased profits under ITQ programs. Higher profits have been documented in many ITQ fisheries in Canada, Iceland, New Zealand, United States, among others. Grafton (1996) has argued that isolating the profitability due to ITQs alone is often impossible because of improved market conditions or increased profits. Nevertheless, Geen and Nayar (1989) estimated that moving from an open access regime to a rights-based regime in the southern bluefin tuna would result in an annual sustainable economic profit of A$ 6.5 million. Arnason (1992a) reports that in the first year of the demersal ITQ program, benefits from reduced effort were estimated at US$ 14 million, while benefits from improved quality of catch reached US$ 6 million. Grafton (1992b) observes that the value of sablefish licenses quadrupled following the introduction of individual vessel quotas. The coupling of licenses with quotas reflected the higher value of the quota.

Evidence suggests that the introduction of ITQs significantly reduces the race to fish (Muse and Schelle, 1989, Sutinen et al., 1992, OECD, 1997). In most cases, the incentive to race has been minimized. The few cases where race to fish was not eliminated had to do with uncertainty over whether fishermen could land their entire quota. In some European fisheries, like the Netherlands sole and plaice and Norwegian cod fisheries, the race to fish continued because of fear that the fishery would be closed as the national quota was filled even though all individual quotas had not been filled. In the New Zealand flatfish fishery, race-to-fish episodes occur when abundance is low (OECD, 1997). Race to fish was also a problem in the Ontario Lake Erie fishery during the first year. This was caused by the uncertainty over whether fishermen would lose their unused quota. As soon as this concern was removed, fishermen began spreading their catches over the season (Muse and Schelle, 1989). The use of time or area closures independent of the attainment of the TAC may be a factor in the persistence of race to fish (OECD, 1997).

Deewes (1998) observes that in the British Columbia halibut fishery, the extended fishing season allowed processors to sell 94% of the product as fresh, compared to 42% before the implementation of individual vessel quotas. There was also a 55% ex-vessel price gain associated with individual vessel quotas compared to Alaska open access fishery. In Australia, operators are taking a larger proportion of Southern bluefin tuna by longline rather than trawl or poling methods. The longlines catch larger and more valuable tuna for the Japanese sashimi market (Campbell, et al., 1996).

**Capacity and Effort Reduction**

One of the expected outcomes of rights-based regimes is the rationalization of the fleet, leaving the quota in the hands of the most efficient fishermen. The removal of excess capital will depend on several factors such as the amount of initial quota allocated; the malleability of capital; opportunities outside the fishery; vessel markets for those wishing to sell and exit the fishery; transferability rules; and availability of credit. In fisheries where earnings outside the fishery covered by ITQs are low, the vessel owner will probably continue fishing with an old boat as long as it covers its variable costs. Therefore, significant changes in fleet size and structure may take longer as vessels reach the end of their economic lives (Geen et al, 1990). Conversely, if there are significant earning possibilities in other fisheries, the structural change under ITQs will be faster (Grafton, 1996).

The rapid structural adjustment in the Australian southern bluefin tuna fishery (70% reduction in 2 years) resulted in part from the ability of the Western Australian fleet to move into other fisheries (Geen and Nayar, 1989). The departure of the New South Wales operators was due to heavy losses from previous years; decline in abundance in that area; and the ability to fish elsewhere (Geen and Nayar, 1989). The South Australians, on the other hand, stayed in the fishery because they recognized the potential profits from harvesting farther offshore to catch larger fish for the sashimi market. Also, their large specialized
tuna boats had few alternative fishing opportunities, and they had high equity ownership that allowed them to raise sufficient capital to purchase additional quota (Geen and Nayar, 1989). Another example of rapid restructuring is the vertically integrated American surf clam fishery. Following the implementation of ITQs, processors substituted the ownership of quota for ownership of vessels as a means of securing raw material. This led to a reduction of the fleet size by 54% in the first two years of the ITQ program. In the Canadian British Columbia fishery, the number of vessels dropped from 46 to 23 following the implementation of ITQs.

In the Australian South-East fishery, however, the implementation of ITQs did not lead to a significant drop in the number of vessels in the fishery, although some offshore boats were able to amalgamate their quotas into fewer vessels (Campbell, et al., 1996). The newness of the program and limiting quota transfer to annual leases, rather than allowing them to become permanent, inhibited long term capital decisions. Small initial allocations and low TACs contributed to the fishermen’s limited ability to engage in trading either to increase their quota holdings or to exit the fishery (Staples and Tilzey, 1995). In the New Zealand inshore fisheries, however, the number of vessels increased. Clark et al. (1988) point out that at the time New Zealand companies were purchasing squid-jigging vessels to participate in the squid fishery. In Iceland, herring catches tripled between 1977 and 1990. The fishing effort decreased by 20% after the introduction of ITQs, however. Iceland demersal fisheries, on the other hand, were virtually unchanged following the introduction of ITQs, largely because of the existence of an effort quota option. Under this effort quota option, fishermen were allowed to compete against each other (Arnason, 1993).

**Fiscal Impact**

Introduction of ITQs is generally expected to have a positive fiscal impact. Fiscal receipts can be increased through several mechanisms: (i) initial sale of quota; (ii) taxation of quota transfers; (iii) annual access fees and industry levies; and (iv) taxation of increased industry profits. In Chile, the auctioning of their ITQ rights is expected to generate US$ 2.8 million in 1999. The export value of these fisheries is approximately US$ 244 million.

Fiscal expenditures, though they may increase in the short-run as the registry, and monitoring and enforcement capacity are installed, they should decline over time as the private sector takes over a number of these functions as profitable opportunities (e.g.: registry) or out of interest in assuring security of the property right (e.g. monitoring and enforcement). Fiscal expenditures as a percentage of the value of the fisheries vary widely across countries. In Iceland expenditures comprise about 4.5 percent of the landed value, whereas in the United States expenditures encompass 50 percent of the landed value. Monitoring and enforcement expenditures account for about 3-4 percent of the landed value in Iceland whereas in the United States account for approximately 22.2 percent of the landed value (i.e., Coast Guard alone, see Andersen et al, 1998).

In addition to these expenditures, many countries have incurred significant costs during the initial phases of QMS implementation particularly in the fleet re-structuring and social mitigation areas when stocks were overexploited. In New Zealand, for instance, the poor conditions of several of its fisheries forced the Government to spend over NZ$ 45 million in a quota buy-back scheme during first year alone. Nevertheless, this large fiscal outlay could be recovered through annual levies on the remaining operators of the fishery as is done in New Zealand and Iceland. In both cases, governments considered the costs of financing the adjustment to be significantly lower than those associated with collapsed fisheries.

---

48 This includes federal waters only. Andersen et al., 1998 estimated that including catches in state waters, total government expenditures in the United States would represent 30 percent of the landed value.
Social Consequences

Despite their potential benefits, rights-based management systems are often opposed due to expected employment losses resulting from reduced fishing effort and rationalization of the harvesting and processing sectors. In many cases, the introduction of ITQs is an effort to save an already severely depleted fishery, which would require substantial effort reductions under any management regime. Rights-based management regimes, to the extent they help avert a complete collapse of the fishery, save employment.

In the Canadian northern cod fishery, failure to introduce effective resource management systems resulted in complete collapse of the fishery which in-turn led to high unemployment in the harvesting and processing sectors. Despite closure of the fishery since July 1992, the fishery has not recovered. Many fishing communities have collapsed, and a series of social assistance programs to support affected families have cost taxpayers billions of dollars: In Iceland, the North Atlantic herring fishery, which collapsed in the late 1960's, did not recover until the early 1990's. In the United States, the New England groundfish stocks have failed to recover, generating annual losses of hundreds of millions of dollars.

The rationalization of fleets is expected to reduce employment in the harvesting sector as the fleet adjusts to its optimum size. However, for those remaining in the fishery, incomes are expected to be higher and more stable. Drops in crew size have been reported in the British Columbia halibut, sablefish, and geoduck fisheries, American surf clam fishery, and Lake Erie fisheries (Muse and Schelle, 1989, Squires et al., 1995, Dewees, 1998). In the first year of a rights-based regime in the BC halibut fishery, crew employment dropped by 20 percent; in the Lake Erie fishery it dropped by 22 percent (Squires et al., 1995, Cowan, 1990). McCay et al. (1995) estimated a decline in labor of about a third in the first two years following introduction of ITQs in the surf clam fishery. New Zealand, on the other hand, had a 30 percent increase in both at-sea and onshore employment. This was largely due to the development of their offshore resources (Sutinen et al. 1992).

In many fisheries, crew income has decreased as the cost of leasing or buying quota is deducted from their share (McCay, 1995, Eypörsson, 1996). In contrast, Sutinen et al. (1992) document that there has been an increase in the average income in Atlantic Canada’s groundfish and shellfisheries. Increased wages were also reported in the Canadian geoduck fishery (OECD, 1997).

In spite of drops in harvesting sector employment, there may be gains in the processing sector. Extending the fishing season will likely increase processing employment. In the British Columbia halibut fishery, the number of small processing firms increased from 57 to 69. This reflected the reduced need for large freezing capacity to handle market gluts caused by previous fishing derbies (Dewees, 1998). Gardner (1988) reports that following the implementation of Enterprise Allocations, production shifted to higher valued and labor intensive products such as fresh and frozen fillets. Labor hours per ton of fish harvested increased from 30 in 1984 to 36 in 1987. In the Canadian sablefish fishery, however, there were fewer processing plants following the implementation of ITQs. This may be due partly to more freezing at sea (OECD, 1997).

Industry Concentration

A common concern with regards to rights-based management regimes is that transferability of ITQs will lead to the concentration of quota shares with a few holders. The concentration of quotas may be

---

49 Allocation of ITQ to integrated fishing enterprises – harvesting and processing – rather than just fishers.
Argentine: Towards Rights-Based Fisheries Management

problematic if it results in monopoly or monopsony power by the quota holder. Although the introduction of ITQs usually has resulted in increased quota concentration, there is little empirical evidence on the impact, if any, that quota concentration has on market share. The problems associated with quota concentration seem unlikely to be a significant problem in countries like Argentina, which as exporters of fish commodities, are price takers in international markets, and have open economies. Any attempt to increase the fish price domestically (i.e., above the international price) will likely attract foreign competitors into the local market, thereby driving prices down.

Another concern associated with quota concentration is that small-scale fishermen will be eliminated in favor of corporate fishing enterprises. Sutinen et al. (1992) report that in the Newfoundland cod fisheries and the Australian pearl oyster fishery, rights-based regimes favored smaller operators. Dewees (1998) documents that while there has been some consolidation in the Canadian and American (Alaskan) halibut fisheries, quota is mostly owned by small-scale operators. (There are, however, concentration caps in this fishery.) Furthermore, a recent report on OECD countries showed little evidence of the elimination of small-scale operators following the introduction of ITQs.

It is important to note that the extent of quota concentration will depend on the most efficient industry structure for that particular fishery. Larger boats are not necessarily the most efficient ones. Grafton (1992b) argues that under the extended fishing seasons brought about by rights-based regimes, larger and faster boats may become less desirable. These boats, previously needed under race-to-fish situations, have higher fixed costs than do smaller and older vessels. He found that in the British Columbia sablefish fishery, smaller and older longliners had a higher profit per unit of sablefish than did the larger trap vessels.

ITQs, by facilitating access to credit for small operators, permits them to undertake investments to improve their relative efficiency. In many fisheries, particularly in developing countries, small operators do not have access to credit as they lack acceptable collateral for loans. Most banks will not accept fishing boats to guarantee a loan due to the difficulty in executing – repossessing and selling – the collateral. Large firms with significant shore-based assets and access to international finance through their holding companies or diversified activities are therefore at a competitive advantage in their ability to rapidly adapt new technology to gain efficiency or adjust to changing conditions and regulations. In New Zealand, quota is considered superior collateral to fishing boats as its market value is more easily determined, it does not depreciate as rapidly, if at all, and it is easier to store and sell in the event of foreclosure.

International Experience with Implementation of Rights-Based Management Regimes

A Quota Management System (QMS) refers to the set of activities required to implement a rights-based management regime. From the limited perspective of the participants in the fishery(ies) under rights-based management, the objective of the QMS is to maximize the value of the ITQ shares. This implies ensuring the highest sustainable, discounted revenue stream. In the case of highly competitive markets

---

50 The American surf clam industry, for instance, was and continues to be a vertically integrated industry. Since the implementation of ITQs, there has been an increase in quota concentration. Between October 1990 and March 1992 the share of the three largest ITQ holder increased from 51.3 percent to 58.1 percent. This was due to processors' replacing ownership of vessels for ownership of ITQs as a means to secure raw material (NOAA, 1996). In New Zealand, vertically integrated companies landed two-thirds of the fish prior to the implementation of ITQs. In 1989, the top ten vertically integrated companies held 82 percent of the quota. In recent years, however, their holdings dropped to 68 percent (Dewees, 1998). Following the implementation of ITQs in the Australian southern bluefin tuna fishery, the quota held by South Australian operators increased from 66 percent to 87 percent between 1984 to 1995 (Campbell, Battaglene, and Brown, 1996).
such as hake and hake products, in which Argentina has a relatively small market share, this revenue stream will be determined largely by catch-levels.

Of course, to the extent private and social discount rates vary, and the actions of fisherman within the rights-based regime have effects which are not internalized within the ITQ market, the quota value maximizing objective of QMS may have to be constrained to address issues which are in society’s general interest. In addition, aspects of rights-based regimes which are efficiency neutral may have important distributional implications which governments may wish to see reflected in the decisions of the QMS authority.

The critical activities normally associated with QMS can be summarized as: definition of quota rights, allocation of quota rights, market for quota trading; rent extraction; cost recover; and mitigation of social impacts.

**Definition of ITQs as Property Rights**

The laws, regulations and implementation structures established by government effectively define the property rights represented by ITQs. The ability of the rights-based management system to achieve the expected benefits depends on how well these property rights are defined. Well-defined property rights provide owners of ITQs with strong incentives to utilize the fisheries resource sustainably. The main characteristics of an efficient property rights structure are universality, exclusivity, duration, transferability, divisibility and enforceability.

**Universality**

Universality refers to complete assignment of property rights to cover the entire resource. In the case of a fishery, this requires that the rights are fully assigned – more easily carried out under a percentage, rather than quantity-based quota – and are unambiguous in terms of what rights they convey. These issues are generally addressed by government in the legal definition of quota rights and the QMS.

**Exclusivity**

The exclusivity of the right, that is the extent to which the benefits and costs associated with the right accrue only to the owner, is important since it creates the incentive for each fisher to act as a benefit-maximizing resource manager. To the extent the property right is exclusive, fishers do not dispose of their quota shares based on the anticipated actions of others. This in turn reduces the incentive to “race to fish” and to over-investment in the resource while encouraging stewardship of the resource. Fishers therefore have a direct interest in ensuring that all quota holders respect their limits. Thus, issues of over-catch and by-catch must be addressed as part of QMS implementation. An OECD document (1997) reports that in the Netherlands’ sole and plaice and in Norway’s cod fisheries, the “race to fish” continued (in ITQ fisheries) because of fear that the fishery could be closed as the national quota was met even though all individual quotas had not been filled.

**Duration**

An important characteristic of an ITQ is the duration of the right. The duration of the harvesting right is critical to ensure the economic effectiveness of the ITQ regime. Most rights are assigned with the expectation that they will be permanent. In 1996, New Zealand’s Parliament established ITQs as perpetual property rights, which are registered, secure, and usable collateral. In contrast, Chile assigns ITQs for 10 years.
Permanent or long-term rights are preferred because they encourage long-term planning and investment, allowing the fishing capital to adjust to socially optimal levels. They also reduce uncertainty caused by changes in the “rules of the game” and provide incentives to invest in the resource. Muse and Schelle (1989) observe that while long term rights may provide the greatest potential for fleet adjustment and efficiency gains, there may be some benefits to creating short-term rights, at least initially. Short-term rights may be helpful in reaching compromises on initial allocation, maintaining the existing fleet configuration for distributional issues, and providing the industry with the opportunity to examine the program before committing to it permanently. Many Canadian fisheries implemented interim QMS programs that eventually became permanent. Iceland’s demersal fisheries also had an interim program which to muster industry support offered the option of effort quotas instead of a catch quota. Effort quotas were eventually abolished in 1990.

Transferability

As mentioned earlier, theory holds that as long as fishing rights are transferable, the initial distribution of rights has little significance on the long term performance of the ITQ regime. In overexploited fisheries, the ability to transfer quota rights is essential, since it allows fishermen to retire capital and labor, thereby reducing the over-capacity of the fishery. Without the ability to sell or buy quota, the profitability of the fishery will be stagnant. Less efficient fishermen will remain in the fishery, preventing the more efficient from obtaining a larger share of the quota. Transfers not only increase the profitability of the entire industry but also allow marginal fishermen to exit the fishery by selling or leasing their quotas. Similarly, transfers allow the entry of newcomers who want to buy into the fishery.

Although the economic benefits from increased transferability have long been recognized, many ITQ managers have instituted a series of restrictions on transferability as a means to address concerns of ownership concentration, employment loss, and coastal communities’ divestiture.

To address these concerns, many countries have imposed restrictions on the amount of quota that any individual or company can own. New Zealand, for instance, set limits at 35% of its offshore quota and 20% of its inshore fisheries. There are no overall limits for those companies that own quota in both inshore and offshore fisheries provided they do not surpass either sector limit. This limitation, however, has not prevented an increase in the quota holdings of the 10 largest companies from 58% in 1986 to 66% in 1988 (Muse and Schelle, 1989). Chile does not allow individuals to own more than 50% of the quota bought through the auction process (Peña-Torres, 1997). In Alaska, no one can own or control more than 1% of the combined sablefish shares for the Gulf of Alaska and Bering Sea and Aleutians. For halibut, the cap varies between 0.5% to 1.5%, depending upon the area from which the halibut is harvested (Pautzke and Oliver, 1997). Dewees (1998) reports that in 1991, because of concerns about concentration, the British Columbia halibut fishery had transferability restrictions on the individual vessel quota system (IVQs). However, since 1993 these restriction have been relaxed as the industry becomes familiar with the new system and has had time to think through its participation decisions (Dewees, 1998).

Another potential mechanism for controlling industry concentration and the decline of fishing communities is to limit transferability between regions and fleets. In Iceland, for instance, transfers between regions have to be authorized by the Ministry of Fisheries (Arnason, 1994b). Grafton (1996) reports that net loses in landings have been observed in urban areas and gains have accrued to smaller fishing villages. Other countries, like New Zealand, have no limits on transferability between regions (but they do limit concentration). Pautzke and Oliver (1997) report that in the American sablefish and halibut fisheries quota shares were fixed between the different gears out of fear that the larger vessels would dominate the quota at the expense of smaller vessels, many of which where located in remote coastal areas. Despite the apparent lack of any empirical studies describing the impact of this “tiered” mechanism
(probably due to the newness of the program), it is unlikely that this mechanism will maximize the benefits from these fisheries.

An alternative to limits on transferability is to assign quota to communities (Community Development Quotas or CDQs) as part of the initial allocation process. CDQs allow communities to make the economic trade-off associated with restrictions on transferability of their quota shares and to earn rents through sale or lease of the quota which can be used for development of fishing or alternative industries.

**Divisibility**

The divisibility of the quota right is critical (as long as it is transferable) since it allows fishermen to adjust their operations to the most efficient size. It also reduces the “cost of uncertainty” as fishermen can adjust their operations and quota holdings to match a variable TAC.

**Enforceability**

Effective monitoring and enforcement are essential components for the success of a QMS. Effective enforcement requires reliable monitoring of catch to detect violations and sufficiently severe sanctions to provide an effective disincentive to potential violators. Monitoring and enforcement must prevent harvesting by non-quota holders and ensure that quota holders do not exceed their quota allotment. The cooperation of the industry largely depends on its participation in all phases of the QMS implementation and management. Enforcement costs and difficulty increase significantly as industry support wanes (Squires et al, 1996).

International evidence suggests that monitoring and enforcement costs increase significantly following the introduction of ITQs. However, caution should be exercised in trying to discern costs that accrue to the introduction of a QMS rather than to enforcement alone. The cost of monitoring will increase because of the requirement to maintain up-to-date information on each quota holder. However, the higher costs can also reflect the failure to carry-out effective monitoring and enforcement prior to the QMS. Industry support is necessary to achieve good compliance. As enforcement costs and difficulty generally increase in relation to the number of landing sites, Argentina has an advantage in that five ports account for almost 90% of all landed catch.

A more complicated enforcement issue is the susceptibility of the system to corruption and judicial intervention. Poorly paid and supervised inspectors can be easily bribed to underreport catch. Long appeals processes can undermine the effectiveness of punitive fines and other enforcement actions. Designing appropriate incentive schemes for monitoring and enforcement personnel as well as for holders and non-holders of ITQs is one of the most challenging aspects of QMS implementation.

The international experience has varied considerably from country to country. In the Netherlands, the high cost of enforcement was a major reason for returning to inputs controls. One hundred inspectors were needed to monitor 600 vessels (Cunningham, 1992a). The New Zealand ITQ system, on the other hand, did not significantly increase enforcement costs. Instead of focusing on at-sea operations and dockside monitoring, the New Zealand system relied on a “paper trial” scheme that traced landings from the fishing vessel through the processor to the market. The monitoring moved from conservation officers to accountants and investigators and “electronic surveillance” (Sissenwine and Mace, 1992). This model worked well in New Zealand since that country exports most of its landings. Industry has paid for increased monitoring and enforcement in many fisheries, such as the British Columbia geoduck and halibut and the Gulf of St. Lawrence trawl fisheries.
Allocation of Quota Rights

The rents "recovered" or transferred to quota holders through establishment of a rights-based management system often cause conflict, as they accrue entirely to the initial holders of the right. Thus, the initial allocation of quotas determines the initial winners. The initial allocation can be particularly difficult because government actions have to be perceived as fair and equitable by the industry. From an economic perspective, however, the initial distribution of rights has little long-run significance for the efficiency of the system or distribution of rights as long as the rights are transferable. Therefore, the initial allocation of fishing rights is largely a political decision, not an economic or biological one. Fisheries managers interested in establishing sound fisheries policies should deal with equity and fairness considerations during the initial allocation rather than through limitations on quota transferability.

There are many ways to allocate the ITQs initially; however, they are usually awarded gratis. Morgan (1995) classifies the initial allocation scheme into three main types: allocation by administrative decision, allocation by lottery, and allocation by auction.

Allocation by Administrative Decision

Administrative decision is the most widely used allocation method in fisheries. In most QMS, initial quotas rights have been apportioned among established fishing firms, taking into account their historical catch averaged over several recent years. This method is used most often because it reduces conflicts due to uncompensated expropriation of sunk capital rents (Pena-Torres, 1997). The administrative decision approach requires considerable discussion and analysis, since it usually results in an "allocation or grandfathering formula." The catch history is sometimes combined with other investment indicators, such as the size or capital value of a vessel, as proxies for the operator's commitment to or dependence on the fishery to decide the initial allocation.

The U.S. surf clam industry, for example, based its initial allocation 80% on catch history and 20% on vessel size (NOAA, 1996). The British Columbia halibut fishery, on the other hand, based its allocation 70% on catch history and 30% on vessel characteristics (Deewes, 1998). The Australian southern bluefin tuna was initially allocated using a formula based on the value of the vessel and catch history (Campbell, Battaglene, and Brown, 1996). Other fisheries, like the New Zealand inshore fisheries; Australian southeast trawler fishery; Canadian fisheries on Lakes Huron and Erie, and Wisconsin fisheries for yellow perch in Green Bay and chub in Lake Michigan relied solely on historical landings (Muse and Schelle, 1989). Equal shares have been used in the Southern Australia abalone fishery; herring roe fisheries in San Francisco Bay, Yakina Bay, and Sitka; Wisconsin trout fishery in Lake Superior; and abalone and geoduck fisheries of British Columbia (Muse, 1991). Argentina has decided to allocate its ITQs based on criteria which include the total amount of Argentine workers employed, investment in the country, catch history (eight years), and the absence of a infraction record.

Another alternative for allocating quota rights is to give them to institutions such as producer organizations. These institutions can allocate the rights among their members as they see fit, provided the aggregate catch remains within their allotted quantity. This approach has been used in the Netherlands and the United Kingdom. In the Netherlands, fishermen are allocated a share of the TAC. In the United Kingdom producer organizations have managed their quotas in a variety of ways. Some have permitted
Argentina: Towards Rights-Based Fisheries Management

their members to fish the quota on a competitive basis whereas others have allocated quotas to individual vessels. Some of those who were allocated individual quotas were allowed to transfer and sell their quota shares while others were not allowed to do so. In Canada, fishing rights (Enterprise Allocations) were given to corporations so that they could more efficiently utilize their vessels and processing plants instead of competing against each other.

The main advantage of allocation by administrative decision is that the authority involved has control over the individual quotas and can consider society’s interest. On the other hand, this method has several shortcomings. Christy (1998) notes that when a rights-based system is implemented, there are several problems related to the rents the system generates. Among these are the public resentment of large “windfall” gains falling into the hands of a few initial quota holders and the high price of the quota, which hinders access to the fishery except for those who have large capital resources. Dissatisfaction with allocation may lead to legal action against the authority, causing delays in implementing the scheme. Sutinen et al. (1992) observe that there is a strong need for establishing criteria for hearing appeals and ruling on requests for additional quota. In New Zealand, 1400 of 1800 initial allocations were appealed. An overly lenient Quota Appeal Authority ended up awarding ITQs far in excess of the highest annual landings of many stocks. Another problem with a scheme may be the anticipation it creates. The prospect of implementing an ITQ fishery may result in many fishing units distorting their harvesting practices to build a catch history, which eventually will be used in the allocation of quotas. This situation may be of particular concern in countries where ITQs are introduced on a gradual basis.

Allocation by Lottery

This type of allocation scheme has apparently not been used in fisheries. It was used, however, by the Federal Communication Commission (FCC) to allocate spectrum licenses during the 1980’s and by the US immigrant visa lotteries at the present time. The shortcoming is that no revenues accrue to the authority. The winners of the lottery receive all the windfall profits, as in the case of allocation by administrative decision (where quotas are allocated gratis). In the case of the spectrum lottery, many of the lottery winners were not genuinely interested in the industry and ended up selling their licenses to the highest bidder. As result, the FCC collected none of the estimated 46 billion dollars paid for the licenses. Another problem with the allocation by lottery scheme is that quotas may not match the fishing capacity of the winners. However, a quota market could correct this mismatch. Morgan (1995) notes that based on the experience of other industries, allocation by lottery is the least desirable option in fisheries.

Allocation by Auction

The auction of quotas is the most economically efficient way to allocate them since it distributes the quota to the most efficient producers. In theory, the price of the quota should capture the expected net benefits over the duration of the right. Thus, the most efficient producers will be able to bid more for the rights. An auction also minimizes transaction and information costs. Chile is apparently the only nation that has initially auctioned off its quotas. The country auctioned its red and yellow shrimp fisheries and deep sea cod fishery. Under Chilean law, ITQs are valid for only 10 years, and they depreciate at a rate of 10% a year. This allows the government to recuperate the quotas fully in 10 years. Unfortunately, there have yet been any empirical reviews of the Chilean ITQ experience.

Quota Markets and Trading

A well-functioning quota rights market is essential to the establishment of a rights-based management regime. In theory, well-behaved markets should convey appropriate price signals for the efficient allocation of scarce resources. These markets also provide information on the resource rent extracted. In
practice, however, markets may not function adequately due to information and transaction costs (Squires et al., 1995). Thin markets are another potential problem. These are markets with few participants and few transactions, which usually have high transaction costs. Thin markets tend to produce noisy price signals that discourage optimal long-term planning and investment. The use of frequent auctions may minimize monopolistic imperfections and improve market thickness (Noll, 1982). Chile, for instance, has periodic auctions of its ITQs to discourage oligopsonistic practices and at the same time establish benchmark quota prices for secondary markets (Bogo, 1994).

There is also the issue of capital malleability. In the short run, efficiency gains will be derived from a reduction in variable costs. Capital stock adjustments, however, will usually take longer. Thus, fishing vessels with limited opportunities elsewhere (and with sufficient quota) will likely remain in the fishery until the end of their economic life. A related issue in many overcapitalized fisheries is that the implementation of ITQs causes the value of vessels to drop as the fleets adjust to their optimum size. Fishermen may be reluctant to leave if the price of a quota right does not offset the perceived value of the “under-priced” vessel (McCay, 1995).

An additional consideration is that quota rights prices may be higher than supply and demand considerations would suggest. Fishermen may derive “non-market” benefits from fishing, such as job satisfaction and other social-cultural community values. This may lead them to perceive their costs substantially lower than the market would, resulting in a low exit rate (McCay, 1995).

Empirical evidence on the development and volume traded is mixed (Squires et al., 1995). Linder et al. (1992) report that a limited amount of transactions were observed in some New Zealand fisheries. Doherty (1992) found that the attachment of quotas to vessels in the British Columbia halibut fishery hindered the development of an ITQ market and trade. The Australian southern bluefin tuna fishery, on the other hand, experienced a substantial amount of trading. The quota is presently held by a small group of operators, however, which may reduce further trading (Squires et al, 1995). In the southern bluefin tuna fishery, trading was attributed to the exit of the New South Wales and Western Australian operators. The New South Wales operators departed because of heavy losses from previous years and the decline in abundance in that area, whereas the Western Australian boats exited because they had several alternative fisheries (Geen and Nayar, 1989). The South Australian operators, on the other hand, stayed in the fishery because they recognized the potential profits from harvesting farther offshore to catch larger fish for the sashimi market. Also, their large specialized tuna boats lacked other fishing opportunities, and their high equity ownership allowed them to raise sufficient capital to purchase additional quota (Geen and Nayar, 1989). Grafton (1996) notes that trading is more active when there are substantial differences in gears and vessels.

It is interesting to note that in some ITQ programs like the American surf clam fishery and in the Canadian under-65 mobile gear groundfish fishery, the buying-and-selling quota market shifted early on to a leasing market (McCay, 1995). McCay et al. (1995) have speculated that the development of the leasing market may be due to recognition of the potential incomes derived from retiring vessels or deploying them in other fisheries and leasing quota rights, or due to uncertainty about the value of the quota right over the long run.

Rent Extraction Mechanisms

To date, scant attention has been paid to the different means of extracting rents (Christy, 1998). Unlike other renewable resources, such as forestry, where resource users often pay a royalty on the volume of

---

52 This section draws heavily from Christy (1998).
logged trees, in fisheries there has been a general failure to prevent rent dissipation or to capture rents. This has been due in part to the priority of social objectives such as employment maximization over economic objectives such economic efficiency (Grafton, 1992a).

The various approaches to extracting rents include a fee on effort (such as a license fee); a royalty or tax on catch, gross revenue, and/or net revenue; a property tax; a tax on the transfer of rights; and auctions. The level of such fees could be determined by the management agency or through an auction. In theory an auction would allow the level to be determined automatically by the fishermen rather than arbitrarily by the management agency.

An examination of rent extraction alternatives should consider several factors: whether the rent fee is sufficient to cover the cost of management (including research, monitoring, and enforcement activities); whether the extraction of rent is sufficient to reduce the costs of access to appropriate levels; whether the rents should be extracted initially or on a continuous basis (in such a way that the rent extracted fluctuates with the value of the quota); and whether a level of rents extraction appropriate to encourage fishermen to accept and comply with the new program is enacted.

On the basis of these considerations, it is hard to see how either license fees or taxes on catch or on gross or net revenues could satisfy the above criteria. Unless there were annual adjustments of the taxes, only a tax on net revenues could reflect the change in the value of quota. This value will be difficult to monitor, as it has high information requirements. Detailed capital and operating cost information for each firm would be needed. Additionally, deductions from accelerated depreciation and investments write-off may provide a greater chance to avoid taxes (Grafton, 1992a).

The application of a quota tax is another option. Under this system, the value of quota is assessed on a regular basis and at a fixed percentage. From the standpoint of economic efficiency, both a tax on profits and a quota tax can capture the same amount of rent. However, if economic profits are viewed as an incentive for innovation, a quota tax may be preferable. This is because innovative fishermen may be able to capture all returns from any efficiency gains. These additional rents come from individual innovation and skills rather than economic rent attributable to the scarcity of the resource (Grafton, 1992a). A potential handicap of this approach is the difficulty of assessing the value of the fishing right. However, this mechanism may merit further research.

Another possibility is a capital gains tax on the value of the quotas; however, rents are likely to be most significant at the initial sale of the quota. Another limitation of this approach is that revenues would accrue to the general treasury and not the management agency.

A transfer tax (i.e., imposing a tax every time the right is sold) has also been advocated. The tax could be expressed as a percentage of the value. As in the case of a property tax, there is the danger of underreporting. Christy (1998) has suggested expressing this transfer tax as a percentage of the quota to overcome this underreporting difficulty.

Another option is to auction the quotas periodically, as does the Chilean ITQ system. Under this system quotas last for 10 years. Each year, a given percentage is deducted from the total quota holding and reverts to the management authority. This mechanism is the most efficient at capturing most of the rent, since the value of the quota reflects expected discounted benefits from the resource.

More recently, Christy (1998) proposed the use of Public Quota Share (PQS), where a certain percentage of the quota sold revert to the management agency. For instance, if 500 tons of quota are sold and the PQS is 40%, then 200 tons would be acquired by the management agency and 300 by the buyer. This regime will likely affect the market value of the quota. The buyer will presumably pay for 300 tons
worth, taking into account that at the subsequent sale of quota, the amount of quota transferred to the second buyer would be 180 tons, with 120 (40%) reverting to the management agency.

This scheme has several advantages: shares obtained by the management agency could be auctioned off to generate revenue; quotas may be withheld from the market to improve the health of the stocks or to allow adjustments in the TAC; government shares could be used for social development programs such as providing the quotas at low cost to disadvantaged communities the regime is easy to monitor and enforce and is a good tool to extract windfall gains and reduce quota prices for new entrants (although this may slow down the fleet rationalization process as fishermen wanting to exit the fishery will receive less compensation due to the lower value of the quotas); it reduces anticipatory or speculative investment in the fishery; and revenues could be used to cover management costs and provide society with some returns from its resource.

On the other hand, this regime has a series of shortcomings. First, the regime creates an incentive to lease rather than sell the quota. Secondly, there will likely be fierce opposition by the industry to any mechanism that extracts rents (due to the anticipation of receiving windfall gains and a past where the industry did not have to pay for the use of a “free” resource). In addition, there may difficulty in establishing an appropriate PQS. Also, if the management authority has too many quota shares, it may acquire market power. Similarly, it may be difficult for the management authority to determine the appropriate amount of research and enforcement costs. This difficulty may lead to an excessive expansion of its operations and authority. Lastly, it would be difficult to dispose of surplus rent. The management authority may want to retain as much rent as possible instead of turning them over to the general treasury (which, one hopes, would allow for an efficient allocation of public funds).

Cost Recovery

Many countries have moved towards cost recovery schemes as a means to recover management costs and adopt cost effective management practices. The goal and implementation of the program vary significantly among countries. In Australia, cost recovery is designed to recover management costs exclusively. The Australian fishing industry contributes approximately 75 percent of the budget for the management of domestic commercial fisheries. The fishing industry and government pay surveillance and enforcement costs equally. In contrast, the Canadian model collects some resource rents in addition to partially covering management costs. As mentioned above, the “economically correct” mechanism to collect resource rent is to tax the original quota holder since subsequent holders have already paid for the resource rent, which is capitalized in the value of the quota.

Another significant difference between the Australian and Canadian cost recovery programs is that the Canadian system uses a “blanket approach,” where revenues collected from the different fisheries go to a general management fund. Government does not attempt to assess the costs for each fishery. The Australian method, on the other hand, recovers costs on a fishery by fishery basis; that is, revenues collected from a particular fishery are only used to cover management costs for that fishery. This approach tends to increase the efficiency and cost effectiveness of management, as the industry scrutinizes the need, extent, quality, and cost of services rendered by the management agency.

---

53 Although the PQS system could also be applied to the leasing of quota, minimizing the leasing incentive.
Actions to Address Social Impacts

As discussed above, implementation of a QMS can result in both positive and negative impacts on employment in the fishing industry. In cases where implementation of ITQs is a response to severely depressed fish stocks, significant employment reductions can result from enforcement of short- to medium-term reductions in TAC, and from the longer-term rationalization of the harvesting and processing industries.

Social concerns, as well as political expediency, require that government should prepare assistance programs, which provide a limited-term safety net for displaced workers, as well as assistance in moving into complementary and alternative activities. A review of international experience with management of redundancies in the fishing industry suggests that assistance programs should be community-based, focused at the municipal level and developed in close coordination with local elected officials, municipal and community organizations (John 1994).

An alternative or complement to these programs is to provide ITQ shares to ship-board and land-based workers. However, this can be administratively quite complicated and in the absence of a functioning quota sale and lease market, can (i) result in workers, particularly those who lose their jobs, selling their quota shares at very low prices; and (ii) the fragmentation of ITQs in a large number of small units could impede utilization of the catch rights, adding to the problems of quota busting by farmers with uneconomic catch rights.

Alternatively, quota shares could be allocated to coastal communities to improve their economic and social well-being. If these Community Development Quotas (CDQs) are consolidated and managed by community representatives – be they official or traditional – the community can hire expert advisors to use the quotas effectively to ensure supply for local industry or to use the revenues of sale or lease of the quota to provide assistance to affected workers.

In 1992, the State of Alaska established a CDQ reserve that allocates 7.5 percent of the Pollock TAC to community organizations. The overall goal of the CDQ program is to provide a means for starting or supporting commercial seafood activities in western Alaska that will result in ongoing, regionally based commercial seafood or related businesses. Under the CDQ program, the CDQ reserve is allocated to community organizations with an approved Community Development Plan. Each community organization may either harvest its allocation itself or hire the harvesting services of a non-CDQ firm. Revenues from the CDQ program are used to achieve the overall goal of the program. Funds can be used for training, education, and job and infrastructure development. In 1995, Alaska initiated a CDQ program for halibut and sablefish ITQ fisheries. For halibut, between 20% and 100% of the TAC is set aside in the Bering Sea and Aleutian Islands subareas. In contrast, the sablefish CDQ reserve is 20% of the TAC of the Bering Sea and Aleutian Islands management areas. In the Chatham Islands (New Zealand), a community trust holds the quota and leases the ITQs to local fishermen.

Although information on the performance of CDQs is scant because of the newness of these programs, it appears that the programs have generated positive outcomes. Ginter (1995) reports that CDQ organizations collected US$53 million in royalties between 1992 and 1994 and that CDQ employment contributed between US$1,500 and US$ 35,000 to participants for 1 to 11 months’ of CDQ related work. Ginter (1995) also notes that although CDQ related work is a small percentage of the total number of jobs in the CDQ region, it seems to have increased the so call “basic” employment there (i.e., employment in

---

54 CDQ allocation of the pollock quota to community organizations ranged from 5% to 27% of the quota (Ginter, 1995).

---

55 Basic employment accounts for 11% of the total employment in the CDQ region (Ginter, 1995).
References


Argentina: Towards Rights-Based Fisheries Management


Argentina: Towards Rights-Based Fisheries Management


