Southeast Pacific Ocean

** translated from the original Spanish*

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INTRODUCTION

In the early 1990s the countries of the Southeast Pacific adopted a commitment to improve marine fisheries management, and compliance was to be reviewed ten years later. For this purpose, FAO asked several experts in the field to prepare documents related to the current status of fisheries management in the respective countries (Chile, Colombia, Ecuador and Peru), which served as the bases for this review.

The coasts along the Southeast Pacific extend from 7° N to 57° S, within FAO's statistical region 87; the total extension of the exclusive economic zones (EEZs) is larger than the surface of the countries in the subregion, (Table 1). In this vast area there is a tremendous variety of fisheries species, ranging from those native to tropical waters such as tuna and *Peneaidae* shrimp, to sub-Antarctic species such as southern hake and deep-water southern cod.[1] Industrial fisheries using modern fishing technologies coexist in an unstable balance with poorly organized artisanal fisheries with much lower levels of technology.

REGIONAL POLICY FRAMEWORK

The countries within the region illustrate a variety of situations that define their management framework. In Peru, for instance, the quality of the resources fished has been defined in the Constitution, which states that "resources are the heritage of the Nation and the State has a sovereign right to their exploitation." Therefore, "the State promotes the sustainable use of the natural resources and is obligated to promote the conservation of biological diversity and of protected natural areas." In its legislation, Peru defines fisheries management differently from FAO in its Technical Guidelines for Responsible Fisheries. While FAO addresses a process aimed at ensuring resource productivity and achieving other objectives, Peru interprets management as the set of norms and actions that regulate fisheries. Reducing management to norms and actions only may lead to rigidity and greater emphasis on the formal aspects of monitoring, control and surveillance, as occurred in Chile when this definition was incorporated in the management plan for a fishery.

Despite the fact that problems deriving from overexploitation of the resources of the highest economic value emerged in the 1970s, marine fisheries management

TABLE 1
Coastline, Surface and EEZs of Southeast Pacific countries

Country	Coastline (km)	Surface (km²)	EEZ ('000 km²)
Chile	5 300	757	2 229
Colombia	3 208	1 142	880
Ecuador	2 859	256	1 060
Peru	3 080	1 285	1 030
Total	**14 447**	**3 440**	**5 199**

[1] FAO name: Patagonian toothfish (FAO, 1982)

TABLE 2
Fisheries management framework

Country	Legislation		Management	
	Main	Modifications	Body responsible	Objectives
Chile	Ley de Pesca y Acuicultura (1991)	2000: establishment of the LMCA[1] regime for industrial fisheries. 2002: Extension of regime until 2012; artisanal fisheries are included.	The Undersecretariat of Fisheries	To rationally use natural resources and the environment (conservation); economic efficiency of fisheries[2]
Colombia	Estatuto General de Pesca (1993)	None.[3]	Instituto Colombiano de Desarrollo Rural (INDECOR)	To ensure sustainable use of resources
Ecuador	Ley General de Pesca (1974)	1995, 1989,1998: Conservation and sustainable development of the Province of Galapagos.	Undersecretariat of Fisheries Resources	Not defined
Peru	Ley General de Pesquería (1971)	Ley General de Pesquería (1988) Ley General de Pesca (1992): incorporates principles of the Code of Conduct for Responsible Fisheries.	Vice Ministry of Fisheries	To use hydrobiological resources responsibly; optimize economic benefits; preserve the environment; conserve biodiversity

[1] Maximum Catch Limit per Vessel Owner (LMCA) = Individual Transferable Quota
[2] The objective of economic efficiency in fishing operations has been permanently used by the Fisheries Authority to manage fisheries, despite the fact it has not been considered in the legislation.
[2] Commitments acquired in international agreements are incorporated in fisheries regulations through resolutions and agreements of the Fisheries Authority.

TABLE 3
Non-fisheries legislation that may affect fisheries management objectives of the country

Country	Legislation	Effects
Chile	Ley de Bases del Medio Ambiente (1994)	Regulates discharge of residues from fisheries plants and transportation of raw materials from the landing site to the plant.
	Ley sobre Concesiones Marítimas	Regulates the establishment of management areas.
Colombia	Ley 93 (1993) Ministerio de Recursos Naturales	Improves environmental and natural resource management and conservation.
Ecuador	No information available	
Peru	Ley Orgánica de Gobiernos Regionales	Shares competencies with the central government in areas related to sustainable resource management and environmental improvement.

became an issue of relatively recent interest for governments in the region. Successive revisions of the original laws in the 1990s resulted in the enactment of fisheries laws with general management objectives relating to the use of resources, economic benefits, environment, and biodiversity (Table 2). This legislation was subsequently revised in an attempt to solve pending problems.

The fisheries legislation in Peru and Chile consider the development of management plans; exceptionally, management commitments are acquired by the countries through ratification of international agreements are included. Legislation frequently does not incorporate clear general principles to guide fisheries management, but rather, pays unnecessary attention to infractions and procedural aspects, which could be more appropriately addressed by regulations. This reduces the length of time of a law's usefulness since such laws cannot adequately deal with new management problems or prevent fishing authorities from rapidly taking the necessary actions. This is particularly serious in countries where the legislative process is excessively slow.

In general, there are few non-fisheries laws that can have an effect over the speed in achieving the objectives, explicit or implicit, guiding fisheries management. These laws refer to improving resource and environmental management and conservation, preventing contamination and obtaining concessions in coastal areas (Table 3).

LEGAL FRAMEWORK

In the region, fisheries management functions are usually under the responsibility of a ministerial department. Most fishery management bodies report directly to a ministry (vice ministry, undersecretariat, institute). All but Chile include a specialized group in their structures responsible for carrying out studies on fisheries management. In Chile, studies may be carried out by any technically competent group, including parastatal groups, that is able to do so at the lowest cost.

Monitoring, control and surveillance of fishing activities are part of the functions of the groups that administratively report to these organizations. They have field offices and personnel to carry out these functions. These offices are located in the most important landing ports, but most do not have the resources to cover all areas under their jurisdiction. In view of the physical limitations faced by staff in travelling, the countries' navies assist troubled offices in control and surveillance activities. This support is coordinated at the central level (through councils considered in the legislation or between ministries) or in an ad hoc manner between local navy authorities and the fisheries administration.

In most countries in the region, identifying infractions to the legislation is the responsibility of the fisheries administration and the judicial power is responsible for the application of all sanctions. In Peru, these two functions are undertaken by a branch of the fisheries administration, which is also responsible for issues relating to environmental conservation.

The legislation in all countries includes provisions pertaining to the environment, resource management and conservation, and coastal concessions, resulting in additional costs for fishers thus decreasing their profitability. In addition, Peru has enacted laws assigning more fishing resource management responsibilities to regional governments. The most stringent conditions imposed by this "non-fisheries" legislation on resource conservation, environmental care and coastal concessions will influence the selection of fisheries' management objectives and delay the management process if the environmental impact assessments (or similar studies) on fishing operations are taken into consideration.

STATE OF THE FISHERIES IN THE REGION

Marine capture landings in the region totaled over 13.6 million tonnes for 2002, playing a large part in the fisheries export value of almost US$4 billion. Despite the magnitude of the landings, marine fisheries contributions to the national economies are relatively low and fluctuate between 3 and 5 percent. The bulk of production came from Peru and Chile harvesting small pelagics, which were further processed into fishmeal for animal feeds and oils.

Catches are made by commercial (industrial and artisanal) and subsistence fisheries, but subsistence fisheries production is unknown. Recreational fisheries are almost

TABLE 4
Marine production and total exports (2002)

	Marine capture production ('000 tonnes)	Marine aquaculture production* ('000 tonnes)	Export quantity** ('000 tonnes)	Export value** (US$ million)
Chile	4 515	614	1 202	1 925
Colombia	110	12	73	166
Ecuador	318	62	272	701
Peru	8 743	5	1 856	1 068
Total	**13 687**	**693**	**3 403**	**3 860**
World percentage	**14%**	**2%**	**12%**	**7%**

* includes brackishwater culture
** includes all water bodies
Source: FAO FishStat Plus, 2004.

TABLE 5
Marine fisheries landings by sub-sector ('000 tonnes)

Country		Landings			
	Year	Industrial	Artisanal	Recreational	Total
Chile	2002	3 320	1 195	n.a	4 515
Colombia	2001	104.2*	5.4*	n.a	109.7
Ecuador	2002	n.d.	n.d.	n.d.	318
Peru	2001	7 636*	320*	n.a	7 956

* estimated
n.a. = not applicable
n.d.= no data

TABLE 6
Number of fishers in three main industrial and artisanal fisheries ('000s)

Country	Industrial	Artisanal
Chile	2.0	38.0
Colombia	1.6	13.0
Ecuador	3.3	50.4
Peru	19.0	37.0

TABLE 7
Composition of landings of the three main industrial and artisanal fisheries ('000 tonnes)

Species/ groups	Chile		Colombia		Ecuador		Peru	
	Artisanal	Industrial	Artisanal	Industrial	Artisanal	Industrial	Artisanal	Industrial
Year	2002		2001		2000		2001	
Fish					7.6		190	
Anchoveta	350	1 176						6 400
Tuna				72	25	172		
Mackerel		326						
Jack mackerel		1 480				6		723
Sardine	311							
Small pelagics			2	28		417		
Hake								125
Shark					3.6			
Shellfish							60	
Benthonic			2					
Shrimp				2				
Crustaceans			1					
Sea urchins	60							

non-existent in the area. Subsistence fisheries occur along coastal areas in calm tropical waters. Their significance to local economies has decreased in recent decades as a result of migration to population centres, new locally paid sources of employment and the extension of fish-buying networks. In general, industrial and artisanal fisheries compete for the use of fishing areas and resources, causing frequent conflicts among the fishers of both sectors.

Despite the limitations of artisanal sector statistics in most countries, it is evident that their impact on most national fisheries by volume landed is relatively low (4 to 5 percent). However, in Chile, landings represent more than 25 percent of the total (Table 5). The contribution figures of the artisanal sector can be misleading since they only relate to volume landed. Their contribution to the economy is much higher when considering that they only capture high unit value species. The real importance of artisanal fisheries is that it contributes to employment and provides a secure source of food for the population and income for the less developed areas of the countries. Only one in every four fishers in the region works on board an industrial vessel (Table 6),

which is generally owned by a company. While fishing is not the only source of food for the fishers, it is their only source of income.

Fisheries targeting small pelagic fish are the most important in the region by volume (about 10 million tonnes), captured by industrial and artisanal boats. Other important fisheries include tuna, mainly targeted by industrial fleets, various mollusks and sea urchins captured by artisanal fisheries (Table 7) south of the equator. Except for the shrimp fisheries where landings have decreased in the last decade, all others have increased. The fall in shrimp landings has been accompanied by a reduction in the number of shrimp boats. This reduction has only taken place in Colombia, where the number of industrial boats operating has been cut in half in a period of three years and the industrial fleet has grown in the rest of the region.

Most industrial fisheries are over-exploited and therefore subject to various regulations. With rare exceptions, the level of exploitation in artisanal fisheries is unknown, but local fisheries have been found to be over-exploited.

MANAGEMENT ACTIVITIES[2]

The legal framework defines the state organization responsible for fisheries and identifies its functions in all countries. In most countries, however, fisheries administrations do not have a mandate to maintain healthy stocks by avoiding and reducing overexploitation.

The legislation in Colombia and Chile contemplates fishers' participation in the management process, which can be broad, restricted to specific cases only, or not considered at all, leaving the decision up to the administration to invite participants to a fishery. Actions to identify or define measures can be initiated by the administration or by organized groups of stakeholders, as provided in the legislation. In Ecuador and Chile, the administration only acts in response to pressure exerted by the fishers.

The percentage of fisheries subject to specific regulations has increased in the last ten years, currently reaching 20 to 50 percent. Peru is the only country where the regulations are part of management plans prepared specifically for individual fisheries.

The measures implemented pertain to the most important capture fisheries (Tables 8 and 9). The use of regulations aimed at specific stocks is not very frequent and their identification has only been successful for a few of the resources that support the main industrial fisheries. The state of the resources or stocks that support the most important fisheries is periodically evaluated by state or parastatal institutions responsible for this function. Most major resources are over-exploited and some have collapsed; minor resources, in general, are under-exploited or untouched.

One example is the small pelagic fishery in Peru and Chile, with a combined total average catch ranging from 12-15 million tonnes per year. Both countries have declared these fisheries "fully exploited". As a consequence, entrance of new vessels has been closed and global annual quotas have been established, along with several other measures. The main purpose of these measures has been to protect recruitment and yields.

The primary objective of most measures used is to control the size of the resource captured. The only prohibition related to fishing gear pertains to the use of trammel nets in the tropical area by artisanal fishers due to their destructive power over valuable coastal resources. Despite all countries in the region using management measures limiting access to fishing, only Chile has advanced in the search for economic efficiency through individual and transferable catch quotas. In pursuing this objective, this country is implementing this technique for resources and fisheries that do not fill the

[2] Management, as understood in most countries, has a more restrictive definition than that used by FAO. In general, it refers only to the application of defined legal norms and rarely to all aspects considered in a management plan.

TABLE 8
Management techniques used in the Southeast Pacific industrial fisheries

Instrument	Chile	Colombia	Ecuador	Peru
Spatial restrictions (areas and closures)				
Protected marine areas				X
Nursery area closures	X	X		X
No-take zones				
Marine reserves where fishing is sometimes allowed				
Other temporary area closures for specific purposes	X	X	X	X
Temporal restrictions				
Defined fishing season(s)			X	X
Defined number of days fishing				
Defined number of hours per day fishing				
Defined number of hours fishing		X		
Gear restrictions				
Vessel size		X		X
Engine size		X		X
Gear size		X		X
Gear type		X	X	X
Size restrictions (min., max.)				
Participatory restrictions				
Licences	X	X		X
Limited entry	X	X	X	X
Catch restrictions				
Total allowable catch (TAC)	X		X	X
Vessel catch limits	X			
Individual vessel quotas	X			
Rights-/incentive-adjusting regulations				
Individual effort quotas				
Individual fishing quotas		X		
Individual transferable quotas	X			
Individual transferable share quotas	X			
Group fishing rights (including community development quotas)				
Territorial use rights				
Stock use rights				
Taxes or royalties	X	X		X
Performance standards				

requirements for their application. It is still too soon to evaluate the results of this "universal" application.

With the exception of individual transferable quotas, most of the measures have been in force for the past ten years. Their application has certainly contributed to stopping resource deterioration, except in a few specific cases.

The most evident limitation to more effective fisheries management has been the lack of policies to guide fisheries administrations and their limited vision of what management means. In many cases management has therefore been reduced to the identification, implementation and surveillance of unrelated norms. Other restraints include institutional changes affecting these administrations, limited resources to finance-related activities (research, monitoring, etc.) and finally, although no less important, attempts to manage fisheries based solely on administrative criteria.

The focus, approach, management orientation, and background of human resources of most administrations have been based on biology, with very little concern for economics and sociology. As a consequence, research on the economic, sociological, and anthropological aspects of fisheries in most countries' fisheries administrations is scarce and the main orientation of research and policies has been resource-based. Much needs to be done in terms of capacity building before a more holistic approach to fisheries management can be effectively taken.

TABLE 9
Management techniques used in Southeast Pacific artisanal fisheries

Instrument	Chile	Colombia	Ecuador	Peru
Spatial restrictions (areas and closures)				
Protected marine areas				X
Nursery area closures				X
No-take zones				
Marine reserves where fishing is sometimes allowed				X
Other temporary area closures for specific purposes	X	X		X
Temporal restrictions				
Defined fishing season(s)	X		X	X
Defined number of days fishing				
Defined number of hours per day fishing				
Defined number of hours fishing				
Gear restrictions				
Vessel size	X	X		X
Engine size		X		
Gear size		X		X
Gear type	X	X	X	X
Size restrictions (min., max.)	X			
Participatory restrictions				
Licences	X		X	X
Limited entry	X			
Catch restrictions				
Total allowable catch (TAC)	X			
Vessel catch limits				
Individual vessel quotas				
Rights- / incentive-adjusting regulations				
Individual effort quotas				
Individual fishing quotas	X			
Individual transferable quotas				
Individual transferable share quotas				
Group fishing rights (including community development quotas)	X			
Territorial use rights		X		
Stock use rights	X			
Taxes or royalties	X			
Performance standards				

COSTS AND FUNDING OF FISHERIES MANAGEMENT

There is no detailed information available for knowing the real costs of the various activities that comprise fisheries management or to estimate the portion of them paid from state funds. The costs to manage fisheries in Colombia, Ecuador, and Peru are fully financed by annual state budgets; however, in Chile, 70 percent of the fisheries authority funds for 2002 were self-generated. State funds finance the studies required by management and related activities such as implementation and monitoring of fisheries regulations and day-to-day management. The legislation allows recovering these costs from payments for fishing licences, but collections are not sufficient to fund them completely. Although management costs have increased in recent years, mainly due to increased surveillance of fishing regulations and their effects, state funds have noticeably decreased in almost all countries.

A biological orientation in allocating national research funds can be noted. For example, in Chile, where a relatively large national fisheries research fund is allocated on a bidding basis every year among professionals and research institutions, not more than 5 to 10 percent of funds are allocated to projects of a non-biological nature.

IMPLEMENTATION OF GLOBAL FISHERIES INITIATIVES AND MANDATES

The extent of ratification of international agreements relating to fisheries and conservation by the countries is relatively low; none of them considers mechanisms

TABLE 10
Participation in international agreements

Country	UN Law of the Sea Convention		UN Fish Stocks Agreement*		FAO Compliance Agreement**	
	Signed	Ratified/acceded	Signed	Ratified/acceded	Signed	Ratified/acceded
Chile	1950	Acceded 1997	1997	Acceded 2002	No	
Colombia	1982	Acceded	1993	Acceded	1993	Acceded
Ecuador	No	Underway	No	-	Yes	Ratified
Peru	No	-	No	-	Yes	Acceded 2001

* United Nations Convention on the Law of the Sea: Agreement for the Implementation of the Provisions of the Convention relating to the Conservation and Management of 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

TABLE 11
Implementation of International Plans of Action (IPOAs) through the development of National Plans of Action (NPOAs)

Country	Management of Fishing Capacity		Reducing Incidental Catch of Seabirds in Longline Fisheries	Conservation and Management of Sharks	Prevent, Counteract and Eliminate Illegal, Unregistered and Unregulated Fishing
	No. of assessed fisheries	NPOA	NPOA	NPOA	NPOA
Chile	12	Yes	Yes	Yes	Yes
Colombia	2	1993	No	Underway	Since 1992
Ecuador	n.d.	Yes	No	Yes	Yes
Peru	6 marine, 1 inland	Yes	Yes	No	Underway

n.d. = no data

to incorporate such initiatives and mandates in their national legislation. In the best of cases, the commitments acquired in international meetings serve as guidelines for the Fisheries Administrations to be included in decrees, agreements, or other types of lower-ranking administrative decisions. Given the lack of funds available to the administrations, only Peru has taken significant actions relating to some of the Plans of Action (Reducing Incidental Catch of Seabirds in Longline Fisheries, Management of Fishing Capacity and Conservation and Management of Sharks).

PARTICIPATION IN REGIONAL FISHERIES MANAGEMENT ORGANIZATIONS

There are several regional or supra-regional organizations involved in the conservation of fisheries resources: the Inter-American Tropical Tuna Commission (IATTC) (tuna and tuna-like species),[3] the Commission for the Conservation of Antarctic Marine Living Resources (CCMLR) (Antarctic species)[4] and the Permanent Commission for the South Pacific (CPPS)[5] (EEZ resources). All countries in the region are CPPS members, but country participation in IATTC or CCMLR depends on their having fisheries in their geographic area of coverage or on their foreign policy. Country compliance with the agreements of these organizations is affected by the same limitations as those of the global agreements mentioned above.

SUMMARY AND CONCLUSIONS

The Southeast Pacific is a very large area extending from the tropics to areas near the Antarctic continent, where industrial and artisanal fisheries capture a variety of

[3] The Inter-American Tropical Tuna Commission (IATTC) was established in 1950 for the conservation and management of tuna and tuna-like species in the Eastern Pacific Ocean.
[4] The Convention for the Conservation of Marine Living Resources (CCMLR) entered into force in 1982 for the conservation of living resources in the Antarctic Ocean.
[5] The Permanent Commission of the South Pacific (PCSP) was created in 1982; its functions include coordinating activities for marine resource conservation within the EEZ.

TABLE 12
Participation in regional fishery bodies

Country	ICES	WECAFC	APEC*	CPPS	IATTC	CCAMLR	OLDEPESCA
Chile	C		M	M		M	
Colombia		M		M	C		M
Ecuador				M	M		M
Peru	C		M	M	M	P**	M

APEC – Asia-Pacific Economic Cooperation
CCAMLR - Commission for the Conservation of Antarctic Marine Living Resources
ICES – International Council for the Exploration of the Seas
OLDEPESCA- Latin American Organization for Fisheries Development
WECAFC –Western Central Atlantic Fishery Commission
M – Member; C– cooperates but is not a Member
* APEC Fisheries Working Group
** State Party to the Convention but not Member of the Commission

species. The most important fisheries target small pelagic fish, tuna, various shellfish and sea urchins. Total landings, increasing in the last decade, have been over 12 million tonnes in recent years, but their value does not significantly impact the economy of the individual countries.

Individual participation of fishers in the capture, inherent to artisanal fisheries, does not exist in industrial fisheries where companies carry out the activities. The contribution of artisanal fisheries to total landings is low in general, with the exception of Chile, where it represents 25 percent of total catch. Their importance is higher when considering that their landings consist of high-value species and contribute to employment and income in less developed areas and to food security.

The fishing sector in all countries is regulated by an organization directly under a ministry, which is therefore relatively high in the state hierarchy. The functions of the organization include dictating measures to regulate fishing, implementing them, ensuring compliance, and monitoring and evaluating their effects, as well as carrying out the necessary studies to identify or improve regulations. Only Chile does not have in its state fisheries structure an institute responsible for these studies; it opens bids for work contracts among groups with the appropriate competencies. This type of arrangement does not ensure permanent and consistent delivery of good level advice. In general, all organizations responsible for the fishing sector lack sufficient funds to adequately carry out their tasks.

Due to the lack of appropriate information, little is known about the level of exploitation by artisanal fisheries. Overfishing in industrial fisheries became apparent some decades ago and some regulations were introduced in an attempt to stop resource deterioration, but these were not able to prevent the collapse of some resources. This was followed by the first fisheries laws in the 1970s and replaced by others in the 1990s, with general objectives relative to resource use, environment, biological diversity and management by the state structure responsible for the fisheries sector.

Only Colombia recognizes clearly the condition of the "common good" of the fisheries resources in its legislation. *Countries' basic fisheries law do not contain clear and permanently valid principles to orient fisheries management. As the fisheries legislation in force has been a response to solve particular problems of particular fisheries* a short lifespan for the law is expected. This is a serious limitation to adequate management in countries where legislative processes are extremely slow.

The extent of fishers' participation in the management process varies greatly from country to country. The legislation may not consider it, allow it in specific cases or permit broad participation. The only common feature among these possibilities is that management reacts to fishers' pressures.

The norms that regulate fisheries exploitation have been in force for more than ten years and apply to the most common species. Most of these measures attempt to

control the size of the stock; very few control effective fishing effort, and even less strive to improve fisheries profitability. Few types of fishing gear are prohibited. The introduction of measures to improve the economic efficiency of fisheries has been carried to the extreme and the measures are applied to resources and fisheries that do not have the minimum technical requirements to ensure positive results. Given the constant changes to fisheries norms, it is still too soon to evaluate their impacts over the resources and the fisheries.

Management is financed totally from state funds. Although it is impossible to determine the costs due to the aggregation of available information, it is known that they have increased in the last ten years due mainly to greater monitoring and surveillance requirements in the fisheries. Funding to cover these requirements is extremely difficult since the value of fishing licences covers only part of management costs and management funds have decreased in the same period.

Despite participation by the countries in intra-and supra-regional activities related to the conservation of living marine resources and fisheries management, compliance with international agreements is low; only Peru incorporates into its legislation the principles of the Code of Conduct for Responsible Fisheries. The fisheries legislation in force rarely incorporates the commitments for lack of local facilitation mechanisms. Rather, to implement some of the commitments, lower-level instruments are used (decrees, agreements, rulings). Only Peru is effectively carrying out the work included in the plans of action.

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