East Central Pacific Ocean

** Translated from the original Spanish*

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May 2005

INTRODUCTION

This summary of the state of marine capture fisheries management in the countries of the Eastern Central Pacific region is part of FAO's State of World Marine Capture Fisheries Management (SOWMCFM) project, aimed at providing relevant information to national fisheries authorities, international organizations, fisheries managers and investors in order to improve fisheries management systems.

The information used in the preparation of this review has been extracted from the country reviews coordinated by FAO and prepared by consultants in each country in 2003 to feed the SOWMCFM project, from other national reports prepared by FAO in 2000, and from the consultant's experience in the Central American area.

The countries included in the Eastern Central Pacific region are: Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama. The physical characteristics such as size of territory, economic exclusive zone (EEZ) and Pacific coastline of the countries are described in Table 1.

REGIONAL FISHERIES POLICY FRAMEWORK

Considering that the major marine fisheries in the region are at maximum yield, overexploited or close to overexploitation, most of the countries have reoriented their fisheries policies towards compliance of management objectives in order to prevent collapse of their fisheries and the associated negative biological, economic and social consequences.

Between 1960 and 1980, all countries focused their efforts on promoting fishing activities and increasing capture of high commercial value species, particularly for export, which motivated increased fleet and processing plant capacity and the opening and consolidation of external markets. At the same time, the first government institutions responsible for fisheries management were created to foster the development of fishing activities and to research stocks in order to estimate potential harvesting volumes.

The shift in emphasis from promotion to management began in the 1990s, as result of the need to protect the most important fisheries and the aim to comply with global initiatives and mandates included in instruments such as the Code of Conduct for Responsible Fisheries (1995), the Agreement for the Implementation of the Provisions

TABLE 1
Physical characteristics of countries in the Eastern Central Pacific region

Country	Territory (km²)	EEZ (km²)	Pacific Coastline (km)
Mexico	1 964 375	3 149 920	8 475
Guatemala	108 889	9 910	* 253
El Salvador	21 041	91 900	332
Honduras	112 492	20 090	162
Nicaragua	130 700	304 560	* 305
Costa Rica	51 100	258 900	1 016
Panama	77 005	218 778	1 701

* Data calculated from geographic maps –Encarta 2002, the digital encyclopaedia

of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (1992) and the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (1993). In addition, since all Central American countries except Honduras capture tuna in their jurisdictional and international waters of the Eastern Pacific Ocean, they also follow the provisions and recommendations of the Inter-American Tropical Tuna Commission (IATTC), an organization to which they are members.

Despite awareness of these needs, in some countries, the fisheries authorities have included the above management objectives in their investment plans and programmes more as a result of governmental policies" than of "state policies",[1] which is a limitation to the formulation and execution of long-term fisheries policies.

The new orientation of policy objectives and the need to protect the most important fisheries motivated some countries to undertake processes to restructure or adjust their institutions and fisheries legislation, as well as to formulate medium-term plans using the precautionary approach in resource conservation, management and exploitation. Further, research has taken a multi-disciplinary focus, biological and socio-economic, for management purposes. Progress has been made in updating legislation, institutions and/or policies and plans in Mexico (1994), Costa Rica (1998), El Salvador (2000) and Guatemala (2002).

In this regard, Panama, Nicaragua and Honduras have made efforts for less than ten years, but they have not come to fruition because the new fisheries legislations have not yet been approved or the process was interrupted. In Honduras, the institutional, policy and legislative framework is currently being studied for modification, and in Mexico, the 2000 institutional adjustment reduced state capacity at the national level. In all cases, the main sources of inspiration have been the Code of Conduct for Responsible Fisheries and the Agreement of the United Nations on the Law of the Sea; models, experiences and progress made in other Latin American countries have also been evaluated.

Modification of the policy framework should also consider the new trend in Latin America to incorporate the fisheries and aquaculture sector within national agriculture, livestock and rural development policies. In general, fisheries and aquaculture management operate under the highest farming and livestock authority; fisheries activities are usually the main source of employment, hard currency and regional development. It is necessary to keep in mind, however, that fisheries management has specific characteristics and needs that must be dealt with in accordance with specialized mandates and initiatives studied at the global level.

The government has organizations in each of the seven countries responsible for formulating and implementing fisheries policies. The objectives of these policies and the responsible organizations in the region are shown in Table 2.

FISHERIES LEGAL FRAMEWORK

As in the case of formulating policy, the legal framework to regulate fisheries in the Central American countries has been updated to varying degrees. Some laws date from the 1940s and 1960s, while others were enacted after 2000.

The fundamental difference between both types of legislation is found in their orientation. The old laws largely emphasized promoting the development of fisheries

[1] State policies respond to medium- and long-term development needs and structural issues that traverse individual government tenures, while governmental policies are formulated by each President of the Republic and respond to the objectives outlined in the development plans proposed for their period of government.

TABLE 2
General objectives of national fisheries policies and their governing and executing organizations

Country	Fisheries policy objectives	Policy governing body	Policy executing body
Mexico	There is still no specific fisheries policy. The objective of the SAGARPA policy is to foster the economic development of the sub-sectors in its charge.	Secretariat of Agriculture, Livestock, Rural Development and Food (SAGARPA)	National Fisheries and Aquaculture Commission (CONAPESCA) for management and National Fisheries Institute (INP) for research
Guatemala	Hydro-biological resources development policy: Achieving responsible sustainable development of fisheries and aquaculture.	Ministry of Agriculture, Livestock and Food (MAGA)	Fisheries and Aquaculture Management Unit (UNIPESCA)
El Salvador	National Fisheries and Aquaculture Policy: Strengthening the bases for fisheries and aquaculture management to achieve sustainable development within a short-, medium- and long-term strategic framework.	Ministry of Agriculture and Livestock (MAG)	Fisheries and Aquaculture Development Centre (CENDEPESCA)
Honduras	The fisheries policy integrates the general government policy: Developing fisheries to obtain hard currency, as a source of employment and of a nutritional diet for Hondurans.	Secretariat of Agriculture and Livestock (SAG)	General Directorate of Fisheries and Aquaculture (DIGEPESCA)
Nicaragua	National Fisheries and Aquaculture Policy Decree 100-2001: Achieving sustainable harvesting of fisheries and aquaculture through their optimum use, promoting non-traditional fisheries, preserving the quality of the environment and ecosystems that support them, and researching the benefits for the economic actors involved.	Ministry of Development, Industry and Trade (MIFIC)	National Fisheries and Aquaculture Administration (ADPESCA)
Costa Rica	Even though no fisheries policy has been formulated, the new management objectives were included in the law that created INCOPESCA (1994), the proposal for restructuring the fisheries legislation (1999), and in the ratification of international agreements.	Ministry of Agriculture and Livestock (MAG)	Costa Rican Institute of Fisheries and Aquaculture (INCOPESCA)
Panama	Even though no fisheries policy has been formulated, the new management objectives were included in the creation of AMP, as well as in some new regulations for the 1959 legislation.	Panama Maritime Authority (AMP), dependent from the General Directorate of Marine and Coastal Resources (DIGEREMA)	Panama Maritime Authority (AMP), under the General Directorate of Marine and Coastal Resources (DIGEREMA)

with a conservationist approach and in some cases simultaneously regulated other activities such as hunting for marine or land species.

On the other hand, the more modern fisheries laws have incorporated new management and sustainable harvesting concepts. Similar to the formulation of policies, the main sources of inspiration have been the Code of Conduct for Responsible Fisheries, the Law of the Sea, the United Nations Agreement for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (including the IATTC mandates) and the United Nations Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas.

The countries where legislation has not been updated despite the efforts made in their respective executive and legislative powers, have enacted norms (decrees, agreements or resolutions issued by the fisheries institutions) to fill the legal gaps and implement some management measures necessary for ensuring sustainable fisheries, complying with international mandates and following global initiatives.

This frequently results in basic norms not being consistent with more recent regulations (including some norms issued to fill in the spaces of old laws still in force.

TABLE 3
Fisheries legislation and updates for countries in the Eastern Central Pacific

Country	Fisheries legislation in force	Fisheries legislation derogated	Date of attempts to update the law
Mexico	Federal Fisheries Law, enacted in June 1992 and amended in January 2001.	In 1925, 1932, 1938, 1948, 1950, 1972 and 1986.	Fisheries legislation has been updated.
Guatemala	Fisheries and Aquaculture Law, Decree 80 of December 2002.	Government Decree 1235 of 1932.	Fisheries legislation has been updated.
El Salvador	General Law for the Management and Promotion of Fisheries and Aquaculture of December 2001.	Fishing and Maritime Hunting Law of 1955. Fishing Activities General Law of 1981.	Fisheries legislation has been updated.
Honduras	Fisheries Law, Decree 154 of 1959.	No prior legislation.	1986, 1991 and 2002.
Nicaragua	Fisheries Law of 1961.	No record of prior legislation.	1983, 1993, 1995, 1998 and 1999.
Costa Rica	Fishing and Marine Hunting Law 190 of 1948, supplemented by Law 7384 of 1994 that created INCOPESCA.	No prior legislation.	1998
Panama	Law Decree 17 of 9 July 1959, supplemented by Law 7 of February 1998 that created the AMP.	No prior legislation.	No attempts have been made to modify the Fisheries Law, but decrees have been issued for specific fisheries matters.

This explains the reason for which countries have expressed an urgency to update and unify their fisheries legislation. To this effect, and from the perspective of international cooperation, El Salvador received assistance from the Regional Fisheries Development Support Programme for the Central American Isthmus (PRADEPESCA) and Honduras from the Organization of the Fisheries and Aquaculture Sector of the Central American Isthmus (OSPESCA).

It should also be noted that the countries that have already updated their fisheries legislation also issue regulatory (or supplementary) norms for particular matters that in general do not require authorization from the legislative power, but rather from the governing and/or executing authority for fisheries policy.

In all cases, the fisheries legislation is supported or supplemented by other national norms regulating terms such as environmental management, water, protected areas, national parks, other natural resources and endangered species. Other regulations pertain to merchant marines, vessel flagging, navigation of national and foreign fishing vessels in jurisdictional waters, international trade and sanitary standards for the sale of fisheries products.

It should be noted that one of the factors that contributed to facilitating the process of updating the legislation was the participation granted by the governments to investors, industrial and artisanal fisheries and aquaculture representatives, and other stakeholders from the public and private sector, since discussion and agreement on new regulations results in easier acceptance and application. Table 3 shows the fisheries legislation for each country in the region as well as their attempts to update it.

FISHERIES STATUS

All of the countries in the region have industrial and artisanal fisheries in the Pacific, except for Honduras, which has industrial fisheries in the Atlantic only, which indicates that the Honduran portion of the Gulf of Fonseca concentrates on artisanal fisheries and cultivation of marine shrimp.

Fisheries activities increased in the 1950s with the harvesting of resources such as shallow water shrimp (mainly genus *Litopenaeus, Trachipenaeus and Xiphopenaeus*), which are still captured although they are overexploited or at maximum exploitation in most of the countries of the region. Other resources of historic importance are finfish (pelagic and demersal) and small pelagics (sardine, anchoveta and herring), although the anchoveta fishery in Mexico collapsed in the early 1980s.

In the 1980s, industrial tuna fisheries began to develop in the region, a very important resource in the international market. Due to fisheries' biological, economic

BOX 1

Tuna fisheries in the Eastern Pacific Ocean

The Inter-American Tropical Tuna Commission (IATTC) was established by an international convention between the governments of the United States and Costa Rica in May 1949 as the organization responsible for the conservation and management of tuna and other species captured by tuna fishing vessels in the Eastern Pacific Ocean (EPO). IATTC also has important responsibilities in the execution of the Agreement for the International Dolphin Conservation Program (AIDCP) and acts as its Secretariat. The member countries are: Mexico, Costa Rica, El Salvador, Guatemala, Panama, Nicaragua, Ecuador, Peru, Venezuela, United States, Spain, France, Japan and Vanuatu.

EPO, defined by the AIDCP and the Commission's Yellowfin Regulatory Area (CYRA), extends from the United States (the State of California) to northern Peru. The main resources captured in this area are yellowfin tuna (Thunnus albacares), skipjack (Katsuwomus pelamis), bigeye (Thunnus obesus) and bluefin (T. orientalis). Other target species are albacore (Thunnus alalunga), black skipjack (Euthynus lineatus) and bonito (Sarda orientales).

95 percent of the tuna fleet consists of purse seiners and 5 percent, longliners. Since 1999, IATTC has measured vessel carrying capacity by volume (cubic metres) rather than weight (metric tonnes), because fish-loading density in a well may vary (making weight measurement a subjective variable), while volume is a more accurate measurement. Should no accurate information be available regarding a vessel's well volume, a conversion factor of 1.171 tonnes = 1 m^3 is used. It is estimated that the fleet operating in the EPO has a total well volume of 189 000 m^3, for an average of 933 m^3 per vessel. Accordingly, IATTC has classified the vessels into six categories.

It is important to point out that since 1990, the US canning industry decided not to buy tuna captured on trips where dolphins were caught along with tuna, which resulted in many US vessels leaving the fishery. According to total well volume, fleet composition is as follows: Mexico (25 percent), Ecuador (25 percent), Venezuela (17 percent), Spain (6 percent) and Panama (5 percent). In other words, the well capacity of 90 percent of the fleet is over 425 m^3 per vessel.

In 2001, tuna landings in countries of the region totalled 589 762 tonnes, distributed as follows: Ecuador (39 percent), Mexico (23 percent), Colombia (8 percent), Venezuela (6 percent), Costa Rica (5 percent), and Peru (0.5 percent). The remaining 18.5 percent was landed in the United States, Spain and Vanuatu. Regarding fleet composition, of the 215 vessels that operated in the EPO during the year, 39 percent had Central American flags, as follows: Mexico (64 vessels), Panama (10 vessels), Guatemala (4 vessels), Honduras (3 vessels), El Salvador (2 vessels) and Nicaragua (1 vessel).

With regard to bycatch, it should be noted that AIDCP was established through an IATTC resolution in 1999 to progressively reduce incidental mortality of dolphins associated with tuna fishery, through annual mortality limits of these marine mammals, making fishing for yellowfin tuna an environmentally appropriate activity. Implementation is based on the precautionary approach featured in the FAO Code of Conduct for Responsible Fisheries and the Agreement of the United Nations on Straddling Fish Stocks and Highly Migratory Fish Stocks. In order for a country to export tuna captured in EPO, it shall have an AIDCP Dolphin Safe Certificate issued by the competent national authority verifying the Dolphin Safe status of the tuna, pursuant to the definition in the AIDCP Tuna Tracking and Verification System.

Finally, it is important to mention that at the IATTC Bycatch Working Group meeting held in January 2004 in Kobe (Japan), OSPESCA presented a statement of intent on behalf of the Central American IATTC member countries expressing their commitment to minimize the bycatch of sea turtles in the purse seine fishery within EPO, an issue that is still under review.

Source: Inter-American Tropical Tuna Commission (IATTC); www.iattc.org

and commercial importance, the IATTC had been created 30 years before, in 1949, and all Central American countries with coasts on the Pacific are members, except Honduras. The initial objective of IATTC was to study bonito and yellowfin tuna, but was expanded to include other straddling and highly migratory resources of high commercial interest. The following case study (Box 1) illustrates this point.

Regarding artisanal fisheries, most of the catch consists of finfish (coastal demersal and pelagic species), shrimp and some coastal crustaceans and mollusks, extracted using trammel nets and, to a lesser extent, hooks and lines. Due to the crisis in the shrimp fishery, artisanal fishers often target high-value fish species such as snappers and groupers, which leads to conflicts between artisanal and industrial fishers competing for access to the same resources.

With regard to the harvesting level in the fisheries, it is estimated that about 80 percent of the resources of greatest commercial interest in the Eastern Pacific (except tuna) are fully exploited or overexploited, and management plans have been implemented or are being developed to prevent collapse of the fisheries, as has been the case in Mexico and Honduras. The most exploited resources in the region are shallow water shrimp (genus Litopenaeus), sharks (mostly in Mexico and Guatemala, which have joined efforts to research the resource), and particularly in Mexico, grouper and octopus are at maximum exploitation level.

In general terms, finfish (mainly snappers and groupers) have high development potential for industrial as well as artisanal fisheries. Some vessel owners and fishers from Panama, Costa Rica, Nicaragua and Guatemala have already reconverted their vessels to a new target species, focusing on finfish rather than shrimp.

Recreational fisheries are not recorded in Central America and most countries have no capture statistics since the fish often have to be returned alive to the sea and the sale of the product of this fishery is not authorized. Costa Rica is possibly the only country where marine catch and release fishing has become significant in the past five years, because international events are held there to promote tourism. The main target species are marlin (black, blue and striped), swordfish, sailfish and *mahi mahi*.

In summary, the most important resources for industrial, artisanal and recreational fisheries in the Eastern Central Pacific Ocean for the countries in the region are shown in Table 4.

According to available data from Mexico, El Salvador and Nicaragua for 2002 and 2003, fisheries represent an average of 0.8 percent of the Gross Domestic Product (GDP) and no more than 6 percent of production within the farming and livestock sector.

It should be noted, however, that because of the general system of national accounts, macro-economic authorities of the countries often consolidate data relating to the

TABLE 4
Industrial, artisanal and recreational fisheries in the Eastern Central Pacific Ocean

Country	Industrial fisheries	Artisanal fisheries	Recreational fisheries
Mexico	Sardine, tuna and shrimp	Giant squid, shark and shrimp	Striped marlin, blue marlin, sailfish, mahi mahi and pez gallo
Guatemala	Tuna, shrimp and shark	Shark, shrimp and mahi mahi	Swordfish, mahi mahi and sailfish
El Salvador	Tuna, prawn and other shrimp	Finfish, shrimp and other crustaceans	Mahi mahi, sailfish, marlin and swordfish
Honduras	Industrial fisheries only occur in the Atlantic, targeting shrimp, lobster and conch	Meagre, snapper, jack mackerel, shrimp, shark, ray and rock crab	Swordfish, sailfish and shad
Nicaragua	Shrimp and finfish.	Finfish, lobster and shrimp	No data on this fishery since it is not common in the country
Costa Rica	Tuna, shark, other major pelagics and shrimp	Coastal pelagic and demersal species	Billfishes, mahi mahi, wahoo and tuna
Panama	Anchoveta and herring, snappers and groupers and shrimp	Finfish, coastal crustaceans and mollusks	Sailfish, mahi mahi, yellowfin tuna, striped marlin, black marlin, blue marlin and swordfish

TABLE 5
The value and volume of main fisheries in the Eastern Central Pacific (2001/2002)

Country	Industrial fisheries		Artisanal fisheries		Recreational fisheries	
	Volume (MT)	Value (US$ '000)	Volume (MT)	Value (US$ '000)	Volume (MT)	Value (US$ '000)
Mexico	640 173	290 314	51 507	92 220	18 000*	60 000
Guatemala	71 708	n.a.	21 840	n.a.	n.a.	n.a.
El Salvador	18 873	23 405	11 262	14 265	10	20
Honduras	Non-existent	Non-existent	4 069	3 521	n.a.	n.a.
Nicaragua	1 152	4 700	2 487	11 030	n.a.	n.a.
Costa Rica[2]	54 879	49 440	3 177	11 930	n.a.	20 000
Panama	238 390	99 278	27 212	58 513	n.a.	n.a.

Note: n.a. = not available

[1] In Costa Rica, Instituto costarricense de la pesca y acuicultura (Costa Rican Fishing and Aquaculture Institute) (INCOPESCA) modified the methodology of collecting Pacific artisanal fisheries statistics after 2000. Some commercial longliners were previously included but currently only coastal pelagic and demersal species, bivalve mollusks, gastropods and some crustaceans are included.

contribution of fisheries and aquaculture into a single item, and given the global behaviour of these two activities, it can be inferred that in the last ten to 15 years, aquaculture has had a more significant growth than fisheries.

According to the information provided by the countries for 2001 or 2002, the value and volume of their main fisheries are shown in Table 5.

The countries in the region with the largest marine fisheries production are Mexico, Panama, Guatemala[2] and Costa Rica, with shrimp, tuna and some major pelagics (snappers and groupers), followed by small pelagics (sardines, herrings and anchoveta) used to produce fishmeal and fish oil.

From another perspective, the data indicate that 89 percent of maritime production derives from industrial fisheries, while 11 percent comes from artisanal fisheries. In El Salvador, Honduras and Nicaragua there is a larger contribution from artisanal fisheries with high-value species such as shrimp, finfish and some crustaceans (lobster and rock crab) sold locally as well as in other regions of each country.

MANAGEMENT ACTIVITY

Since the most commercially important fisheries in the Central American Pacific have been subjected to intense exploitation and some even overexploited, the countries have gradually implemented new management measures to prevent further stock deterioration.

Fisheries authorities in the region know the management principles and apply them according to the needs of each fishery, usually issuing specific norms for them; however, most legislation do not define these principles although they provide a legal and administrative framework for managing marine fisheries. An exception is Honduras, whose fisheries law that does not make particular reference to management, although it is effectively exercised by General Directorate of Fisheries and Aquaculture (DIGEPESCA).

El Salvador is another exception, where its General Law for the Management and Promotion of Fisheries and Aquaculture of 2001 defines management as "the set of regulations and measures that allows establishing a management system for fisheries and aquaculture activities on the basis of up-to-date knowledge about its biological, economic, technological and social components." The country has a national fisheries

[2] This information for Guatemala is based on data provided by the national consultant and PRADEPESCA reports for 1994. These data were necessary because, according to the national reports prepared by FAO in 2000 and 2003, the country has weak capacities in collecting and analysing statistical data.

institution responsible for formulating and executing management policy in order to facilitate fisheries resource management that moves, is freely accessible, finite, and without a defined jurisdiction. In all countries of the region, these institutions are supported by the naval forces, maritime and/or environmental authorities in enforcing compliance with the legislation and the management measures.

Fisheries management objectives define how to improve fishers' socio-economic conditions in terms of food security, jobs generation and hard currency, and how to achieve maximum sustainable exploitation of fisheries resources. While these objectives should reflect the reasonable desires of the various stakeholders – taking into consideration the biological and ecological limitations of the resources – and most countries have the will to include them in their legislation management, only Costa Rica does so.

In all countries of the region, management decisions are made by the national fisheries authority, are frequently discussed with the stakeholders interested in each fishery subject to management approval, and other government parties, such as the maritime, environmental or foreign trade authorities, as appropriate.

Regarding **participation of management stakeholders**, it is common for industrial and artisanal representatives to take a consultative role in the process in, partially sharing the management responsibility. This means that participatory processes are not usually an official and necessary part of management in all marine fisheries and thus no provisions or procedures are routinely followed. El Salvador is the exception, since stakeholders significantly share the responsibility with the state and are an official and necessary part of the management process; for this reason provisions are routinely followed.

There are varying degrees of **transparency in the management process**, but in general, stakeholders (groups and associations) have access to the meetings where management proposals and measures are discussed. Their opinions, however, are not binding for decision-making. The state usually publishes all proposals and decisions in printed media (booklets and brochures), mail (postal and electronic), and once they become regulations, they are also published in the Official Journal of the country. In El Salvador and Nicaragua, transparency in the management process is a basic principle of the national policy, thus the level of participation and dissemination is high.

Frequently, there are **conflicts among the different types of fishers** targeting the same resources and fishing areas. Legislations in the region, with the exception of El Salvador and Nicaragua, do not contain specific mechanisms to solve these conflicts and therefore are not part of the marine fisheries management process. The most commonly used instruments to resolve or eliminate conflicts are: differentiated zoning for different users; allocation of resources to the various participants in the fisheries; and limited access to certain areas for some types of fishers.

Most conflicts arise in the shallow water shrimp fishery because industrial trawlers sometimes operate in coastal areas, that is, within the first five nautical miles. The catch of artisanal fishers are therefore reduced because their nets are often damaged and there is an increased risk of affecting shrimp stock larvae and juveniles.

Regarding **compliance and enforcement of fisheries management**, collaboration is common in the region between the institution responsible for fisheries management and the naval forces (Navy or Coast Guard), but in all countries the responsibility for supervising fisheries activities is with the fisheries authority that exercises management.

In some cases, there is also cooperation among other institutions, for instance, in Mexico, from the Federal Prosecutor for Environmental Protection and marine patrols organized by fishers, and in Mexico and Panama, from marine transportation organizations. In El Salvador, there is cooperation between the National Civil Police and the Maritime and Environmental Division. In Costa Rica, the Customs

TABLE 6
Control and surveillance mechanisms

Country	Vessel monitoring systems	On-board observers	In-port, landing site and on-board inspections	Capture information from sea in real time	Other instruments
Mexico	Yes	Yes	Yes	No	No
Guatemala	No	Yes	Yes	No	No
El Salvador	Yes	Yes	Yes	No	No
Honduras	No	No	Yes	No	No
Nicaragua	No	No	Yes	No	No
Costa Rica	No	Yes	Yes	No	No
Panama	Yes (satellite)	Yes	Yes	Yes	No

Directorate, which exercises its authority over foreign fleet, works with the Ministry of Environment and Energy, which oversees protected areas.

In all countries, the naval force patrols or supervises compliance with the regulations between 0 and 12 nm, but the fisheries institution is the competent authority to decide on and impose sanctions for infractions to the norms. The most commonly used control and surveillance mechanisms are shown in Table 6.

It can be concluded that vessel monitoring systems are used in the countries with industrial shrimp, small pelagic and finfish fisheries. All tuna fishing vessels over a 400-tonne capacity carry IATTC observers on board. In-port, landing site and on-board inspections are made for industrial and artisanal fisheries for control and statistical information purposes. Only Panama reports having a satellite monitoring system for its vessels, thus enabling real-time information regarding catches at sea.

On the other hand, there is a general perception that sanctions are not severe or costly enough to deter violations to the regulations, thus explaining that in the last ten years, infractions have increased. In addition, monitoring activities to detect them are not sufficient to prevent participants in marine fisheries from disobeying the regulations. An exception is found in El Salvador, where sanctions are costly and infractions have decreased in the last five years, although the possibility for detection is insufficient just as in the rest of the region (see Table 7 on fisheries sanctions).

At the international level, International Plans of Action (IPOAs) have been designed for four particular areas: (i) the reduction of bycatch of seabirds by longliners; (ii) the conservation and management of sharks; °(iii) management of fishing capacity; and (iv) the prevention, deterrence and elimination of illegal, unreported and unregulated

TABLE 7
Sanctions applied by countries for infractions of fisheries legislation

Country	Fines (first fineis low but increases if infraction recurs)	Revocation or suspension of fishing licence	Denied fishing for the rest of the season	Exclusion or expulsion from fishery	Other sanctions
Mexico	Yes	Yes	No	No	Confiscation of fishing gear and equipment.
Guatemala	Yes	Yes	Yes	No	No
El Salvador	Yes	Yes	No	Yes	Under design: moral sanctions in the new Code of Ethics for Fisheries and Aquaculture.
Honduras	Yes	No	No	No	No
Nicaragua	Yes	Yes	Yes	Yes	Confiscation of fishing gear and equipment.
Costa Rica	No	Yes	No	No	High fines if fishing in national parks and possible jail sentence for vessel captain.
Panama	Yes	Yes	No	No	For the tuna fleet: suspension of licence for captains and expulsion from the Agreement on the International Dolphin Conservation Program (AIDCP) list of qualified captains. No dolphin mortality limit.

TABLE 8
Actions designed or implemented by countries in the region

Country	IPOA – Seabirds	IPOA – Sharks	IPOA – Capacity	IPOA – IUU Fishing
Mexico	No specific information available.	Official Mexican Norm - NOM029 to manage the conservation and exploitation of sharks was issued but derogated in 2002 (soon after issuance) due to opposition by representatives of artisanal and recreational fisheries and some NGOs.	There is no IPOA; however, the government began a fisheries capacities study. This was not completed by 2005, however, due to lack of budget, lack of political will, other fisheries management priorities, and analysis of commercial impacts given overcapacity of the infrastructure.	There is no IPOA, but vessels changing flags to avoid regional measures are not authorized to fish in national waters, to land in Mexican ports or for trans-shipment in national waters.
Guatemala	The country has no problems with this issue.	Measures have been established for exploiting the whole shark including fins.	There is no IPOA; however, the government began a fisheries capacities study, but it was not completed by 2005 due to lack of funding and of human resources to do the assessments.	There are no activities for this IPOA nor mechanisms to prevent vessels from changing flags to avoid regional assessment and control measures.
El Salvador	The country has no problems with this issue.	IATTC, El Centro de Desarrollo Pesquero (CENDEPESCA) and the National Fisheries and Aquaculture Scientific Consultative Committee (CCCNPESCA) conduct research on the resource. In addition, a regional project was presented to FAO on the issue.	A regional project was presented to FAO on the issue. The country has not started the capacity study on all fisheries nor was it completed by 2005 due to lack of budget, of information and of human resources, as well as other fisheries management priorities.	A regional project was presented to FAO on the issue. The origin, provenance, flag and products of vessels arriving in port. Are verified and registered.
Honduras	No measures have been taken regarding this IPOA.	No measures have been taken regarding this IPOA.	No measures have been taken. The country did not begin the capacity study of all fisheries nor will it be completed by 2005 due to low budget, lack of political will, of information and of human resources, as well as other fisheries management priorities.	No measures have been taken, but DIGEPESCA has the cooperation of artisanal fishers to denounce illegal, unreported and unregulated (IUU) fishing. Since there are no industrial fisheries in the Honduran Pacific, there are no vessels that may change flags to arrive in port.
Nicaragua	The country has no problem in this area since longline fishing is only artisanal.	Regulation AM 032-2001–Sharks prohibits: 1) fishing for sharks for finning and tailing and discarding it. 2) landing, transportation, storage and sale of fins without the carcass or certification of its use. 3) landing fins weighing over 5% of the total weight of sharks captured and on board.	The country already began a capacity study on all its fisheries and will complete it in 2005. Some measures: (i) Some fisheries have restrictions on the number of vessels. (ii) Most vessels have fishing gear of similar length; (ii)) The authorized fleet cannot increase in the lobster fishery.	Foreign fleets that may change flag to avoid compliance with regional measures do not arrive in the country.
Costa Rica	No measures have been taken regarding this IPOA.	Prohibition to land fins separated from the carcass for both national and foreign vessels. Finning is only allowed after vessels have arrived in the port.	(i)No new fishing licences can be issued for the Pacific, except for the foreign tuna fleet (purse seiners) to which licences are sold. (ii) Vessel register was updated in 2001. On the other hand, the country already began the capacity study of all fisheries but it will not be completed by 2005 due to lack of budget, of information and of human resources.	Since the only foreign fleet consists of tuna vessels, the country requires reporting captures by vessels, and reports are sent to IATTC and FAO. In general, measures taken are those adopted within the IATTC framework.

Country	IPOA – Seabirds	IPOA – Sharks	IPOA – Capacity	IPOA – IUU Fishing
Panama	No measures have been taken regarding this IPOA, but regional assistance has been requested from FAO to implement it by 2005.	No measures have been taken regarding this IPOA, but regional assistance has been requested from FAO to implement it by 2005.	(i)No flag for new longliners. (ii) No permission to export fishing capacity through fleet mobility. (iii) Keeping a register in m^3 of well capacity and managing this capacity in the register. The country has already begun the capacity study but it was not completed by 2005 due to lack of budget, of information, of political will and of human resources, as well as problems with the Merchant Marine register of vessels that need international fishing licences.	International fishing licences are issued. There is satellite vessel monitoring. Vessels must provide statistical data on capture authorized by Panama, as well as information on previous fishing permits, fishing logbooks for the past six months and compliance of sanctions imposed, if any. Fishing in the EEZ without a permit from Panama and the country concerned is prohibited.

fishing. To this effect, the actions designed or implemented by the countries in the region are as follows (Table 8).

It may be concluded from Table 8 that there is still a need to develop more efforts aimed at learning about and implementing IPOAs, because they have not been broadly disseminated in various countries. Consequently, activities first arise in response to the specific management needs of the fisheries, and in some cases, with the will to comply with IPOA guidelines. As has been mentioned in other issues already discussed, El Salvador has made significant progress compared to the rest of the region, possibly due to various efforts undertaken in the last five to six years to modernize and achieve greater efficiency in fisheries management.

Regarding **marine fisheries under management**, there is no uniform behaviour in the region. Mexico, El Salvador, Costa Rica and Panama manage over 67 percent of their fisheries using instruments such as specific rules or regulations for each fishery or fishing type, management plans, support actions for specific management objectives and traditional or customary rules and regulations established by fisheries organizations. Despite these instruments, less than 33 percent of fisheries subject to management in Mexico and El Salvador have a formal and documented management plan.

Between 33 percent and 67 percent of fisheries are subject to management in Honduras and Nicaragua, and less than 33 percent in Guatemala. In all cases, several of the instruments described above are used, but enactment of specific norms or regulations is common for fisheries at maximum exploitation or that are overexploited. There are also some important fisheries that have not been regulated, such as artisanal fisheries targeting sharks, rays, mussels and clams in Honduras, and artisanal lobster, finfish and recreational fisheries in Nicaragua. Mexico has not regulated coastal and shark fisheries, and Panama has not regulated the grouper and *mahi mahi* fisheries.

Given management needs, there has been an increase in the number of fisheries under management in the last ten years, however, some terms have not been formally defined. Exceptions are Costa Rica where excess fishing (overexploitation) is described as what "occurs when maximum sustainable yield is surpassed" and in El Salvador, where "in accordance with the studies carried out it has been verified that utilization [of over-exploited resources] has surpassed maximum sustainable limits".

MANAGEMENT ACTIVITY IN COMMERCIAL AND INDUSTRIAL MARINE FISHERIES

- In Mexico, the main fisheries (sardine, tuna and shrimp) have been regulated and have had management plans since 1994. All of them have bycatch. Some specific environmental provisions have been established. There has been an increase in

the number of participants in the tuna fishery, while there has been a decrease for those in shrimp and sardine fisheries due to the high level of exploitation of these resources. Of the total fleet, 90 percent targets shrimp, 6 percent tuna and 4 percent sardine, and all vessels must have a licence to operate.

- In Guatemala, the most important fisheries (shrimp, tuna and shark) have management measures. Since 1987 no new licences have been issued for shrimp, but there is open access for artisanal fishers although there are some temporary bans. In 1987, licences were issued to the industrial fleet for finfish and in 1999 for tuna. Bycatch is important in the shrimp and tuna fisheries, a factor considered by the management measures; in addition, there are specific environmental considerations in the three fisheries. The industrial fleet consists of 64 shrimp boats and 4 tuna vessels. In the last ten years the number of participants has increased for shrimp and shark but has not varied for tuna. Given the lack of scientific and technical evidence, the state applies discretionary criteria to protect fisheries resources and to dictate management measures.[3]
- In El Salvador, the most important fisheries (tuna, shrimp and prawn) have implemented management plans between 1999 and 2000 to protect the sustainability of tuna and prevent overexploitation of all shrimp species. Various species are captured in these fisheries and environmental aspects are taken into consideration, the criteria of which are included in state management. In the last ten years there has been an increase in the number of participants in the tuna and king prawns fisheries and a decrease for the other shrimp fisheries. The industrial fleet requires licences to operate and consists of 100 vessels, of which 90 percent targets shrimp, 7 percent prawns and 3 percent tuna.
- Since Honduras has no industrial fisheries in the Pacific (Gulf of Fonseca), it therefore excluded from this analysis.
- In Nicaragua, the main fisheries, finfish and shrimp, lack management plans. For both species there is some bycatch but no management measures apply, except in shrimp where the use of Turtle Excluder Devices (TEDs) is mandatory, fishing by the industrial fleet is prohibited within the first 3 nm, and mesh size of nets is regulated. It is estimated that in the last ten years, the number of participants has increased in these fisheries; the fleet consists of 29 vessels (48 percent target fish and 52 percent target shrimp) and requires licences to operate.
- In Costa Rica, the most representative fisheries (tuna, major pelagic species and shrimp) have had management plans since 1950, 2001 and the late 1960s, respectively. In all cases there are bycatch species for which measures exist, including environmental considerations. For tuna and major pelagics, especially sharks, the number of participants has increased and it has not varied for shrimp. The fleet consists of 684 vessels: 4 percent target tuna, 86 percent, major pelagics and 10 percent, shrimp; all require licences to operate.
- In Panama, the main fisheries (anchoveta and herring; snappers and groupers; shrimp) have had management plans for small pelagics since 1977 and shrimp since 1974. Demersal fish and shrimp fisheries have some by-catch species, but there are no specific management measures for them, except in the case of shrimp where environmental provisions have been established, such as the use of TEDs and protecting recruitment or hatching areas. The number of participants has increased in the fishery for demersal species only, while there is no variation for the other two. The fleet consists of 483 vessels: 7 percent target small pelagics, 49 percent demersal species, and 44 percent shrimp. All require licences to operate.

[3] Data extracted from Información sobre la ordenación pesquera de la República de Guatemala. October 2000. Available at http://www.fao.org/fi/fcp/fcp.asp and from the questionnaire for the study, Situación actual y tendencias de la ordenación de la pesca marina en Guatemala, 2003.

TABLE 9
Management instruments applied to fishery resources and industrial fishing areas by country

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

The management instruments applied to one or more of the most representative resources of commercial and industrial fisheries in the region are shown in Table 9.

It can be concluded from this summary that most management instruments applied to industrial fisheries in the region specifically relate to:

- spatial restrictions to protect renewal of fisheries resources;
- temporal restrictions with emphasis on defining fishing seasons;

- gear restrictions to prevent the catch of small individuals, protect resource sustainability, reduce bycatch and improve the profitability of fishing operations;
- restrictions to participation, since all countries issue licences and entry into maximum harvest level and overexploited fisheries is limited;
- restrictions to total allowable catch;
- taxes or royalties collected from the industrial fleet;
- performance standards to reduce bycatch and discards.

MANAGEMENT ACTIVITY IN SMALL-SCALE, ARTISANAL AND SUBSISTENCE FISHERIES

When undertaking a similar analysis for artisanal fisheries in the countries, the management instruments used are as follows:

- In Mexico, the main artisanal fisheries are giant squid, shark and shrimp, with the latter only having had a management plan since 1994 (differentiated temporal closure in lagoons and the high seas and gear restrictions). Shark and shrimp fisheries are multi-species, which influences management measures, although there are no ecosystem provisions. There has been an increase in the number of participants in the last ten years and currently there are over 5 000 boats licensed to operate. Fishers targeting shark and shrimp are more dependent on their catch than those targeting giant squid, which is never their main source of food. Only shrimp has established protected zones or marine reserves due to fisheries management.
- In Guatemala, artisanal fisheries consist of shark, mahi mahi and sardine and there are no no management plans for these species. Shark and sardine fisheries are multi-species which bear no impact on state management and for which there are no ecosystem provisions. The number of participants has increased in the last ten years and although there are no exact figures regarding the number of boats, it is estimated that about 4 900 are operating and do not require licences. In all cases, fisheries are the main source of income for fishers but not their basic source of food.
- In El Salvador, management plans for finfish, shrimp and other coastal crustaceans were implemented between 1999 and 2000 to prevent capture of individuals under a certain minimum size and to allow recovery of the resources. All are multi-species with some environmental provisions, which impact on state management measures. The number of participants has increased in the last ten years and about 5 700 boats are licensed to operate. In all cases, fisheries are the main source of income for fishers, but not their main source of food. Fisheries management is one of the basic objectives for establishing protected areas or marine reserves in artisanal fisheries.
- In Honduras, shrimp, sharks, rays and crabs are the main resources targeted by artisanal fisheries, but no management plans have been developed. These are multi-species fisheries although this has no impact on state actions; therefore, neither are there ecosystem considerations. The number of participants has increased in the last ten years and about 600 boats operate, requiring licences. Fishing is the main source of income and food for artisanal fishers.
- In Nicaragua, finfish, lobster and shrimp fisheries have no management plans. They are multi-species (except lobster), but this has no effect over state actions nor have ecosystem measures been designed. The number of participants has increased in the last ten years but there are no accurate figures on the number of boats operating since no licences are required – they are estimated at about 1 100. Artisanal fisheries are the main source of income but not the main source of food.
- In Costa Rica, artisanal fishers have targeted demersal and pelagic species under management plans since the 1960s. These are multi-species fisheries with ecosystem measures. The number of participants has increased in the last ten years

due to unemployment in the agriculture and livestock sector. About 2 400 boats are licensed to operate. Fisheries constitute the main source of income but are not a vital food source. Fisheries management has no impact over the establishment of national parks and wildlife refuges, but when the fisheries authority establishes protected areas, fisheries management is the main reason.

- In Panama, artisanal fisheries consist of finfish, crustaceans and coastal mollusks. These are multi-species, impacting on the management and design of ecosystem provisions. The number of participants has increased in the last ten years; it is estimated that about 6 700 boats operate and require licences. As in the other countries, fishing is the main source of income, but not the main source of food. Management is a basic objective for establishing protected areas of marine reserves in artisanal fisheries. The main management instruments used in artisanal fisheries are shown in Table 10.

In sum, the main artisanal fisheries management instruments are: (i) spatial restrictions, with emphasis on the establishment of temporal closures and reserve areas to ensure renewal of the resources; (ii) fishing gear restrictions to regulate the size of individuals captured, which are the most prevalent; (iii) restrictions to participation through licences and in some cases, limited entry into the fisheries; and (iv) regulations for adjusting rights and incentives, basically those relating to group fishing rights, territorial use rights and stock use rights for some resources.

In the countries of the region, artisanal fisheries are the main source of income for fishers. They do not necessarily ensure food security, however, because high commercial value resources are sold and those consumed locally are part of the diet, including some species of finfish and mollusks in combination with agricultural products.

In terms of employment, about 39 000 artisanal fishers operate 20 000 boats in the Central American Pacific. Although this figure may not be significant when compared to other economic sectors, it is representative because fishers are not involved in other economic sectors. This is because they learn their trade from their fathers, and the communities are far from urban centres, resulting in high dependency on fishing.

MANAGEMENT ACTIVITY IN CATCH AND RELEASE RECREATIONAL FISHING, ECOTOURISM AND DIVING

Recreational fisheries minimally participate in regional fisheries and in no case for commercial purposes, which partially explains the lack of records on volume and value of catch. It is only relevant in Costa Rica because of the significant amount of hard currency generated by foreign tourists visiting the country for this reason. The main resources targeted by this fishery are: various species of marlin, sailfish, swordfish, *mahi mahi* and tuna.

Although most countries have not developed management plans or regulations for the activity, there are environmental considerations; it is frequently required for sports fishers to release unharmed or small individuals back to the sea. For this reason Costa Rica, for example, promotes the use of round hooks to reduce mortality. Regarding areas where sports fishing is permitted, some countries have established specific areas: Mexico 0 – 50 nm, Costa Rica 2 – 30 nm and El Salvador 8–60 nm.

This activity has increased in almost all countries in the last ten years, except for Nicaragua, where there are no records, and Honduras, where only a few amateurs operate. Despite this, no country has exact records on the number of participants that require a licence to fish, except for Honduras and Panama.

Since licences have to be issued, non-compliance with fishing regulations results in sanctions and fines. Further, participants are usually consulted in the countries where sport fishing occurs and collaborate in the management effort, striving for the sustainable use of the resources. Conflicts are not frequent, but some may arise with commercial longliners and tuna purse seiners.

TABLE 10
Management instruments applied to fishery resources and artisanal or small-scale fishing areas in artisanal fisheries

Instrument	Mexico	Guatemala	El Salvador	Honduras	Nicaragua	Costa Rica	Panama
Spatial restrictions (areas and closures)							
Protected marine areas	X	X	X			X	X
Nursery area closures	X		X		X	X	X
No-take zones							
Marine reserves where fishing is sometimes allowed						X	X
Other temporary area closures for specific purposes			X			X	X
Temporal restrictions							
Defined fishing season(s)	X	X	X		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	X		X	
Engine size	X						
Gear size	X		X	X	X	X	X
Gear type	X	X	X	X	X	X	X
Size restrictions (min., max.)	X	X			X		
Participatory restrictions							
Licences	X		X	X		X	X
Limited entry	X					X	X
Catch restrictions							
Total allowable catch (TAC)							
Vessel catch limits							
Individual vessel quotas							
Rights- / incentive-adjusting regulations							
Individual effort quotas							
Individual fishing quotas							
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							
Performance standards							

Given the low contribution of sports fishing to sectoral growth and considering that the countries have other priorities for their fisheries, the budgets allocated are often earmarked for monitoring, surveillance and daily management, and to a lesser extent, research and development, except in cases where resources are studied to evaluate their potential or to manage commercial fisheries.

COSTS AND FUNDING OF FISHERIES MANAGEMENT

Due to its nature, the management operations require state funding; however, the budgets allocated are partial and insufficient and have been traditionally reduced despite the fact that management needs additional support.

Management needs have grown in recent years for the following reasons: increased monitoring, control and surveillance responsibilities; conflict resolution (usually between industrial and artisanal fishers competing for access to the same resources) and the need to modify, change or amend fisheries management regulations. In the particular case of Mexico, costs have also increased due to more frequent occurrence of illegal actions and changes to the fisheries institution. On the other hand, Panama has now assigned the responsibility for flagging vessels to the fisheries institution.

With respect to research and development, other government institutions participate (for example in Panama and Mexico), including research centres, some international cooperation agencies or projects, and universities with academic programmes directly or indirectly related to fisheries, such as Biology, Limnology, Natural Sciences and Ocean Sciences.

As in the case of monitoring, control and surveillance functions, the need to fund research is growing, as investigation constitutes the scientific base necessary to recommend and formulate management measures. In addition, these activities require a multidisciplinary approach (biological-fisheries and socio-economic), which is generally a long and costly process, that includes, *inter alia*, research cruises in specialised vessels, analysing samples and results, editing and publishing reports.

Government funding for management is part of the general national budgets and comes from fisheries and aquaculture activities, but the proceeds are rarely totally reinvested in the sector. The legislation differs in each country as well their possibilities of recovering management costs from the fisheries sector (see Table 11 for a synthesis).

It can be inferred from the Table 11 that the state receives income for allowing harvesting of fisheries resources and from infractions against fisheries legislation. This income becomes part of the national income and at the beginning of each fiscal period, are transferred to the institutions responsible for management and sectoral research to comply with their investment programmes. The level of reinvestment is not equal to the amount of income received, however, since the state also allocates part of these funds to other sectors.

To this effect, Mexico and Honduras are the exception, because they do not collect income for authorizing fisheries activities. This implies that they basically depend on national income coming from sectors other than fisheries, which may partially explain the insufficiency of available resources.

TABLE 11
Ways of financing management projects and fisheries research by governments in each country

Country	Right to license for participants in the fishery	Right to license for participants in other fisheries	Lease of fisheries resources	Other funding sources
Mexico	No	No	No	No
Guatemala	Yes	Yes	No	No
El Salvador	Yes	Yes	No	No
Honduras	No	No	No	No
Nicaragua	Yes	Yes	No	Fines
Costa Rica	Yes	Yes	Yes	No
Panama	Yes	Yes	Yes	Sanctions and licences for international and tuna fisheries in jurisdictional waters

IMPLEMENTATION OF GLOBAL MANDATES AND INITIATIVES

All countries in the region have implemented one or more global mandates, agreements and conventions aimed at ensuring sustainable exploitation of fisheries resources. In addition, they belong to regional organizations responsible for the technical or political activities to support the development and implementation of management measures. In some cases, agreements have been signed among several neighbouring countries to foster joint fishing area and/or resource management measures.

- The following is a summary of the acronyms and common names used to refer to the agreements: AIDCP – Agreement for the International Dolphin Conservation Programme.
- APEC – Asia Pacific Economic Cooperation – Fisheries and Marine Resources Working Groups.
- CITES – Convention for International Trade in Endangered Species of Fauna and Flora.
- CPPS – Permanent Commission of the South Pacific (Member Countries are Colombia, Ecuador, Peru and Chile).
- FAO Code of Conduct – FAO Code of Conduct for Responsible Fisheries (1995).
- FAO Compliance Agreement – Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (1993).
- IATTC – Inter-American Tropical Tuna Commission.
- IWC – International Whaling Commission.
- OLDEPESCA – Latin American Organization for Fisheries Development.
- OSPESCA – The Central American Organization of the Fisheries and Aquaculture Sector. This organization is part of the Central American Integration System.
- Sea Turtle Convention – Inter-American Convention for the Protection and Conservation of Sea Turtles.
- UN Fish Stocks Agreement - Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982

TABLE 12
Participation in international organizations and agreements by Eastern Central Pacific countries

	Mexico	Guatemala	El Salvador	Honduras	Nicaragua	Costa Rica	Panama
Participation in international agreements							
UNCLOS	Signed in 1982	Signed		Accepted	Signed	Signed	Signed
UN Fish Stocks Agreement	Signed in 2003	Signed		Accepted		Signed	Signed
FAO Compliance Agreement	Signed in 1999			Accepted	Accepted		Signed
FAO Code of Conduct	Signed in 1995					Already binding	
IADCP	Signed		Signed			Signed	Signed
APEC	Participates						
Sea Turtle Convention						Signed	
Other Fisheries Bilateral Agreements	The United States and Guatemala	Mexico					
Participation in regional fisheries organizations							
IATTC	Member	Member	Member		Member	Member	Member
OSPESCA		Member	Member	Member	Member	Member	Member
OLDEPESCA	Member	Member	Member	Member	Member	Member	Member
CITES	Participates			Participates			
IWC	Participates						
CPPS							Cooperates

relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (1995).
- UNCLOS – United Nations Convention on the Law of the Sea (1982).

It can be concluded from the Table 12 that the countries with the highest participation and commitment in the international fisheries arena are Mexico, Costa Rica, Panama and El Salvador. In particular, the Code of Conduct for Responsible Fisheries is one of the bases for fisheries legislation and management in several countries of the region. However, only Costa Rica has elevated it to the legislative level, and Mexico, being one of its promoters, applies it widely, turning it into a mandatory compliance instrument.

Further, all countries provide information on fishing activities to regional and international organizations. In some cases, schedules are strictly followed; however, countries such as Guatemala, Honduras and Nicaragua often have problems due mainly to lack of an information base, budget and staff.

Finally, it should be noted that in order to comply with norms similar to those contained in the International Plans of Action (IPOAs) referred to in the section on Management Activity in this review, during the 2003 Session of the FAO Committee on Fisheries (COFI), the Central American countries presented a cooperation project request to modernize the management scheme in the region.

CONCLUSIONS AND RECOMMENDATIONS

Since the main marine resources of commercial interest have achieved high levels of exploitation and some are even overexploited, the Central American countries have modified the orientation of their policies from promoting to managing the activities, striving for sustainable harvesting. This has resulted in revising policies, sectoral plans and legislation, and restructuring fisheries institutions. The countries making the greatest progress to this effect are El Salvador, Costa Rica, Mexico and Guatemala.

All countries in the region have some degree of knowledge on international instruments such as UNCLOS, the Code of Conduct for Responsible Fisheries, the UN Fish Stocks Agreement, the FAO Compliance Agreement and the International Plans of Action, which they have tried to implement in their management schemes. Nevertheless, there have been some difficulties in their dissemination and fisheries authorities and participants have had problems understanding them.

The countries in the region with the highest marine fisheries production are Mexico, Panama, Costa Rica and Guatemala. From another perspective, 89 percent of production comes from industrial fisheries and 11 percent is contributed by artisanal fishers. In this regard, artisanal fisheries are more prevalent in El Salvador, Honduras and Nicaragua. Further, the Eastern Central Pacific contributes 2 percent of global marine fisheries, and both Mexico and Panama are among the 55 most important fishing nations in the world.

In general, management measures have been designed as a result of the need to protect fishing resources, eliminate or reduce conflicts among various stakeholder groups, and to comply with binding international provisions and other specific considerations. In addition, the countries often formulate the objectives of their management plans more as governmental than state policies, which constitutes a limitation to formulating medium- and long-term fisheries policies.

The development and enforcement of management measures are not the exclusive responsibility of the fisheries authorities, but are supported by other organizations such as the naval forces (Navy and Coast Guard), and in the case of reserves and protected areas, environmental authorities. In addition, customs administrations are also involved when dealing with fisheries products for export, landing and trans-shipment by foreign fleets. However, this collaboration, often ill-affected by low budgets, needs to be improved.

There are artisanal and industrial fisheries in the Eastern Central Pacific Ocean, except for Honduras, where industrial activities only occur in the Atlantic. The most commercially important resources are tuna (yellowfin, skipjack, bigeye and bonito), shrimp (genus *Litopenaeus, Trachipenaeus* and *Xiphopenaeus*), demersal and pelagic fish (snappers, groupers, sharks, *mahi mahi* and jack mackerel) and small pelagics (sardine, herring and anchoveta). Countries have enacted most management measures for these resources.

Since the 1980s the Pacific tuna fishery, being one of the most important for the region, has been the one successful fishery in undertaking joint research and management activities. An exception is Honduras, which is not involved in this fishery and is not an IATTC member.

Finfish (mainly snappers and groupers) have a high development potential for industrial as well as artisanal fisheries, and already some vessel owners and fishers in Panama, Costa Rica, Nicaragua and Guatemala have reconverted part of their shrimp fleet to target these resources.

Recreational fisheries are not significant in Central America and most countries do not have detailed records. Marine sports fishing has become important in Costa Rica in the last five years because international events are held there to promote tourism and generate hard currency. The main target species of this fishery are marlin (black, blue and striped), swordfish, sailfish and *mahi mahi.*

Marine fisheries generate income, employment and development for the areas and for participants in each country. Their impact is not significant in macroeconomic indicators, however, representing on average 0.8 percent of the GDP and 6 percent of the agriculture and livestock sector production. It should be noted that in most countries this indicator consolidates fisheries and aquaculture production, which means that the net contribution of marine fisheries is even less, despite the fact that its products have a much higher value than others in the agriculture and livestock sector.

Although it is clear in all countries that fisheries activities generate income, development, employment and food security, management objectives are not usually formulated to this aim, except in Costa Rica, where the legislation explicitly includes these objectives.

When management processes are transparent, stakeholders show greater involvement in the discussion of proposals and commitment in enforcing management measures, although their opinions are not always included in decision-making. Countries such as El Salvador and Nicaragua have demonstrated that this strategy is effective and therefore facilitates the work of the state.

The region does not behave homogeneously in managing its fisheries: Mexico, El Salvador, Costa Rica and Panama manage over 67 percent of their fisheries, while Honduras and Nicaragua manage between 33 percent and 67 percent, and Guatemala less than 33 percent. In general, the most significant fisheries (usually with highest production and value) are under one or more management measures; however, some artisanal fisheries have not been regulated in Honduras, Nicaragua, Mexico and Panama.

The most frequently used management instruments for industrial and artisanal fisheries are the following:

- spatial restrictions, with emphasis on temporal closures to protect resource renewal and on the declaration of reserve zones;
- fishing gear restrictions to regulate the size of individuals captured, reduce bycatch and improve fishing profitability;
- restrictions to participation through licences and limiting entry into maximum harvesting level or overexploited fisheries.

Funding for fisheries management is partial because budgets are insufficient and have been traditionally reduced despite ever-growing needs to support monitoring and

enforcement, daily management, conflict resolution and the need to modify fisheries legislation.

Regarding research and development, budgets and specialized personnel are decreasing due to institutional restructuring, which reduces the possibility of obtaining better scientific and technical evidence to recommend and formulate management measures.

The countries with the most participation and commitment to international agreements and regional fisheries organizations are: Mexico, Costa Rica, Panama and El Salvador. In particular, the Code of Conduct for Responsible Fisheries and UNCLOS have been reflected in the new fisheries legislations enacted after 2001 in El Salvador, Mexico and Guatemala. Further, in Costa Rica, the Code of Conduct for Responsible Fisheries was elevated to the level of Executive Decree, and in Mexico, it is applied as an instrument of mandatory compliance.

RECOMMENDATIONS

All of the countries in the region have expressed an interest in updating their fisheries policy, and their legal and institutional frameworks. Although Honduras is making progress in this regard, it is necessary to support this country as well as Nicaragua in the implementation of modern fisheries management systems.

Given the growing importance of international agreements and conventions on fisheries management in the last ten years, dissemination programmes aimed at fisheries authorities and participants should be designed and executed to motivate compliance and generate awareness on the need for responsible fisheries according to long-term management programmes.

The main factor that determines the importance of a fishery is the commercial value of its resources, as has traditionally been the case with shrimp and tuna in the Pacific Ocean. To this effect, it is recommended that commercial studies of pelagic and demersal species continue in order to promote the reconversion of a portion of the Central American fleet, to diversify industrial fisheries and to search for other profitable alternatives for investors in the sector.

Since recreational fisheries are not important in the region, it is suggested that potential areas be identified to promote the organization of national and international competitions, as in the case of Costa Rica, a country that has demonstrated that responsible execution of this activity results in significant income for the country with no negative effects on fish stocks.

It would be beneficial for the national fisheries authorities to learn the methodology to calculate GDP, and to collaborate with statistics and macro-economic authorities in valuating the contribution of each subsector (marine fisheries, inland fisheries and aquaculture), both to the national economy and to the agricultural and livestock sector.

Since there is such a great need for cooperation in management, it is recommended that the countries be supported in areas such as formulating fisheries management objectives; achieving greater participation and commitment from stakeholders interested in responsible fisheries; collecting adequate income for authorizing the harvest of fishing resources in order to finance the needs of the sector; and implementing effective ways to ensure compliance with the legislation to reduce infractions.

Since most countries do not have severe or costly sanctions, and monitoring and surveillance activities have not been effective, it has not been possible to deter violations to fisheries regulations, which hampers the implementation of management measures. It is recommended that national fisheries authorities be asked to evaluate better surveillance systems in coordination with the naval, environmental and customs authorities, according to the specific requirements.

Fisheries management is a costly process requiring budgets for monitoring and enforcement, daily management and research tasks to support management measures.

It is suggested that countries be supported in the search for new funding sources to cover these needs, including an assessment of higher income from authorizing fishing activities in order to reduce dependency on governmental budgets.

Given that the Code of Conduct for Responsible Fisheries provides sufficient criteria for fisheries management and development systems, it is recommended to further monitor its application and to support the countries in its dissemination. To this end, progress made by Mexico and Costa Rica in the area should be reviewed.

REFERENCES

Editorial El Tiempo. 1993. Atlas universal mundo de hoy. Bogotá, Colombia.

Inter-American Tropical Tuna Commission (CIAT). 1949. Convention between the United States of America and the Republic of Costa Rica for the Establishment of an Inter-American Tropical Tuna Commission. La Jolla, CA, USA. Available at www.iattc.org.

Inter-American Tropical Tuna Commission (CIAT). 1991. The fishery for tuna and bullfishes in the Eastern Pacific Ocean in 1991. La Jolla, CA, USA. Available at: www.iattc.org.

Inter-American Tropical Tuna Commission (CIAT). 2000. Agreement for the International Dolphin Conservation Program (AIDCP). La Jolla, CA, USA. Available at www.iattc.org.

FAO. 2000. *Information on fisheries management in the Republic of Guatemala*. October 2000. Rome. Available at http://www.fao.org/fi/fcp/fcp.asp

FAO. 2002. *Information on fisheries management in the Republic of Nicaragua*. October 2002. Rome. Available at http://www.fao.org/fi/fcp/fcp.asp

Norwegian Agency for Development Cooperation (NORAD)/ Latin American Organization for Fisheries Development (OLDEPESCA). 1993. *Proyecto regional de ordenación y planificación pesquera. Actualización y análisis del diagnóstico pesquero de Honduras*. Tegucigalpa, Honduras. September 1993.