

**ELASMOBRANCHS AND THE FAO
AN IGO'S ACTIVITIES IN SUPPORT OF MANAGEMENT
AND CONSERVATION OF SHARKS AND RAYS**

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1. INTRODUCTION

The Fisheries Department of the Food and Agriculture Organization is the lead technical agency for fisheries-related issues for the United Nations system. In this regard the mandate of FAO's Fisheries Department commonly abuts that of the United Nations Environmental Program and that of the International Maritime Organization.

FAO's major fisheries program aims at promoting sustainable development of fisheries and food security. To do this, the Fisheries Department's activities in Fishery Resources, Fishery Policy, Fishery Industries and Fishery Information focus on three medium-term objectives:

- i. Promotion of responsible fisheries sector management with priority on the implementation of the **Code of Conduct for Responsible Fisheries**, particularly with regard to excess fishing capacity and the 'institutional' strengthening of fisheries organizations.
- ii. Promotion of increased contribution of responsible fisheries and aquaculture to world food supplies and food security. The Department focuses on reduction of waste in fisheries (particularly discards) and aquaculture and support is given to aquaculture as well as protection and rehabilitation of the marine environment.
- iii. Global monitoring and strategic analysis of fisheries, with priority given to development of databases and analysis of information and publication of the State of World Fisheries and Aquaculture (SOFIA) and related information basis such as **Fisheries Global Information System (FIGIS)**, **Fisheries Resources Monitoring (FIRMs)** and partnership involvement in web sites such as the **UN Atlas of the Sea**.

Thus, while FAO has a general mandate for marine living resources, elasmobranchs is in fact just one part of that general responsibility.

In 1994, the Ninth Conference of Contracting Parties of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) adopted a Resolution on the Biological and Trade Status of Sharks (Conf. 9.17), requesting inter alia that (a) FAO and other international fisheries management organisations establish programmes to collect and assemble the necessary biological and trade data on shark species; and (b) all nations utilising and trading specimens of species to co-operate with FAO and other international fisheries management organisations.

This request was the precursor to discussions at FAO's Twenty-second Session of its Committee on Fisheries (COFI), which met in Rome in 1997. Many delegations expressed the view that conservation and effective management of shark populations merited further examination. It was suggested that FAO organize, in collaboration with Japan and the United States using extra-budgetary funds, an expert consultation to develop and propose guidelines leading to a plan of action to be submitted to the next Session of COFI. Japan and the United States then undertook the organization of such a meeting in collaboration with FAO. On a parallel track, the Committee also called on regional fishery management bodies and, where appropriate, other competent organizations or arrangements, to explore mechanisms for all aspects of shark conservation and management.

Thus, an International Plan of Action for Conservation and Management of Sharks (IPOA-SHARKS) was developed through the meeting of a *Technical Working Group on the Conservation and Management of Sharks* that was held in Tokyo in April 1998 and a subsequent *Consultation on Management of Fishing Capacity, Shark Fisheries and Incidental Catch of Seabirds in Longline Fisheries* held in Rome in October of the same year. The International Plan of Action for Sharks was adopted by the 23rd session of COFI when it organized in Rome in 1999 with essentially no debate or discussion other than to note that the implementation of the plans of action for Conservation and Management of Sharks should be pursued as high priority.

2. THE INTERNATIONAL PLAN OF ACTION FOR SHARKS

One of the first things to note about the 'IPOA - Sharks' is that it is not only about sharks - or even elasmobranchs, but strictly speaking, about the chondrichthyans¹. And although some argued that there was nothing wrong with using the technically correct term, as is apparent, they did not prevail. The full text for the IPOA is given in Appendix I. A suggestion for the contents of a shark management plan is also given.

There are several important things to note about the IPOA in regards to its effectiveness. First, its implementation is voluntary. Second, from the perspective of those who drafted it, the Plan addresses all fisheries management regimes where elasmobranchs are harvested. Third, the Plan of Action notes that "FAO will as, and to the extent directed by its Conference, and as part of its Regular Programme activities, support States in the implementation of the IPOA-SHARKS, including the preparation of Shark-plans". FAO has noted that it believes that the action on the Plan of Action should be reviewed not less than every four years.

Progress with Implementation

When will it be known if the IPOA has been successful, at least in stimulating management action that would not have otherwise occurred? This is proving a difficult question to confidently answer. First, several countries that have formally implemented IPOA-Sharks would, no doubt, have addressed the pressing conservation needs of sharks in their national waters no matter what. Second, my impression is that, in response to the FAO initiative, many countries have declared that an IPOA-sharks will be, or is being, implemented, but

¹ i.e. the cartilaginous fishes.

from the information that FAO receives, it is impossible to determine how much effective action is, or has been, undertaken. In this regard, probably the best measure of national commitment would be an indication of the *extra* means (funds and human resources) that have been committed to shark conservation and their management.

At this point in the implementation of the programme, it is evident that the IPOA has stimulated many countries to address the issue of shark conservation in their waters. Appendix II provides a brief indication of FAO's knowledge of the situation in many member countries.

3. FAO ACTIVITIES ON THE UTILIZATION OF SHARKS²

As a consequence of the need to collect more information on biological and trade data on shark species FAO has produced various technical studies on the utilization of sharks and other cartilaginous fish. The most recent publication by the Fish Utilization and Marketing Service (FIU) updates the FAO/UNCTAD/GATT report "Shark utilization and marketing"³. The new technical report⁴ provides a comprehensive and timely report on trade in shark products and identifies regional and global trends in demand and supply. It consists of a world overview, selected country reports and various Appendixes that have mainly been written by external experts.

Ms. Sei Poh Chen (Malaysia) is the author of Appendix II of the report, which focuses on individual countries, their commercially important shark species and their utilization. In Appendix III Mr. Hooi Kok Kuang (Singapore) analyses non-food uses of sharks as cartilage and liver oil. The studies covered under Appendix IV are country and regional analyses: Mr. Hooi Kok Kuang wrote on Hong Kong, Ms. Sei Poh Chen on Singapore and Malaysia, Mr. R.A.M. Varma (India) on India, INFOYU on China, Mr. Santiago Caro Ros of INFOPESCA on Latin America, Mr. Massimo Spagnolo (Italy) on the Mediterranean and Mr. O. Abobarin, Mr. O.K.L. Drammieh and Mr. M. Njie on Gambia and Ghana.

The Ninth Conference of CITES in 1994 passed a resolution (Conf. 9.17) calling for the establishment of a programme for the monitoring of shark production and trade. And, the ICCAT SCRS Shark Working Group Sub-Committee, at its meeting on by-catch in February 1996, identified as a priority the issue of collection of basic data on shark catch (whether kept or discarded). There is a substantial trade in dried shark fin tissue in many parts of the world and it is currently poorly known if this trade is endangering any species of shark. Accurate information on trade in shark fin is especially problematic in that dried fins in markets cannot easily be identified as to the species from which they came, a problem compounded by the ease with which this product can be transported to other markets. In order to address these issues (and to implement the FAO Code of Conduct, which calls for the conservation of biological diversity and the sustainable use of its component species), the FAO is implementing a project funded by the Government of Japan titled, "Sustainable Contribution of Fisheries to Food Security".

² FAO contact Helga Josupeit

³ R. Kreuzer, R. and R. Ahmed 1978 Shark utilization and marketing. FAO, Rome. 178pp.

⁴ Vannuccini, S. 1999. Shark utilization, marketing and trade. *FAO Fish. Tech. Pap.* No. 389. Rome, FAO. 470p.

4. DNA STUDIES ON SHARK FIN SPECIES IDENTIFICATION⁵

A component of the programme funded by the Government of Japan has been to evaluate the efficacy of molecular techniques to identify shark species using dried fin tissue as means of monitoring this trade. Such the information could provide a means to assess the species composition of shark-fin fisheries and their potential impacts on endangered sharks. Five genetic laboratories from around the world agreed to participate in the study. Each laboratory was provided with known samples of blood, muscle, liver, and dried fin from several individual sharks from several different species and developed molecular techniques to differentiate species. Following the development of laboratory protocols for species identification, each laboratory was sent unknown samples of dried fin tissue for analysis. The cost and technical requirements of the techniques used by the different laboratories were evaluated as to their appropriateness for a global programme on molecular analysis of shark fisheries. The results of this programme are to be documented.

5. CASE STUDIES ON MANAGEMENT OF ELASMOBRANCH FISHERIES⁶

As part of the follow-up activities arising from the COFI interest in elasmobranch conservation, FI undertook the preparation of a number of case studies describing how these fisheries are managed in different management jurisdictions. To facilitate comparability, authors were asked to follow, as much as possible, a similar format in their reports.

The objective of the Case Studies was to describe elasmobranch management practices within the context of respective national fisheries administrations. For most case studies, one can simultaneously learn of related national management practices including the management objective setting and subsequent fisheries policy formulation, evaluation and selection processes, how fisheries data and catch statistics systems are run, stock assessment procedures, if any, and the role and manner of enforcement of fisheries regulations in the context of the national fisheries laws. This context setting has been done as it was felt it was essential for understanding the fisheries sectors' circumstances in which the respective management regimes operate. Only in this way would the challenges that exist for elasmobranch management be fully appreciated.

Despite this report's size (920pp) its is not without deficiencies. A particular failure has been the gaps in its geographical balance. This arose for two reasons; first, for many major global areas, there is no management of elasmobranch resources. The reasons are varied. In some cases it is because of national indifference, in others, institutional incapacity, either lack of technical skills, funds for management, or human resources. Second, a common reason, and one which provides the greatest difficulty in surmounting, is that while the need for effective elasmobranch management is well appreciated by many fisheries departments, they are faced with exigencies, if not crises, of greater management priority. Thus, the neglect that management of elasmobranchs suffers, and was the motivation for preparing this report, is often regretted, not least by those responsible for their management.

⁵ FAO contact is Devin Bartley, FIRI <devin.bartley@fao.org>

⁶ Shotton, R. 1999. Case Studies on the Management of Elasmobranch Fisheries. FAO. Tech. Rep. No. 378. 920pp.

Another report result was the documentation of the sad neglect that management of elasmobranchs receives, not only in regions where competition for management resources can be expected to be fierce, but also in many areas where levels of economic prosperity are such that little, or no, valid reasons exist for the neglect of the husbandry of resources which so many states have claimed under the aegis of the Law of the Sea and extension of national jurisdictions. In these regions, the failure to manage what are national patrimonies must be seen more as an issue of national values rather than one of scarcity of resources. Despite the criticism by some of the authors of their national elasmobranch management accounts, many reports show that the challenges in many management regimes have been fully recognized and resolutely tackled. And, the professionalism of some of the management practices documented in this volume is truly impressive.

A theme that dominates all papers is the dissatisfaction with the quality of elasmobranch catch data, both in identifying the species that are caught, and the amount of catch and landings - usually not the same thing because of unreported discards. While in some cases, aggregation of species data is a consequence of lack of suitable species identification keys, more commonly it is the result of lack of motivation to ensure that resources (funds and staff) are available to accurately identify the elasmobranch catch composition, but not always. In several chapters it is noted that national regulations have been changed to ensure that the fins and other body parts remain attached to the carcasses to enable identification of the shark, a task that outside of using DNA techniques becomes almost impossible once the fins are separated from the body. Aggregation of the data for catches of different fish species is a curse not only for shark fisheries but also for the skates and rays where the market provides little price differential between species and thus little motivation for fishermen to separate their catch by species.

The Northeast Atlantic is represented by an omnibus account that, as the authors, Pawson and Vince note, is not matched by the commitment to active management in the area, primarily the remit of the European Union. Two detailed accounts of regional management in the Maritimes of Canada and the Southwest US complement the Northeast Atlantic study. Two studies are available for the western Caribbean; a regional account of the CARICOM area which underlines the difficulty of shared stock management in an area that is only now marshalling the resources needed even for basic domestic management requirements. The second study for this region is from Guatemala.

The management of two skate fisheries in the Atlantic are described, one in the northwest and the other in the southwest, both recently begun. The Newfoundland fishery, prompted by the search for new resources, is prosecuted in the area of one of the oldest and most famous fisheries of the world, that of the cod fisheries, now collapsed. In contrast, industrial fisheries in the Falkland Islands/Malvinas region have been prosecuted for just over two decades. While the Falklands Island fishery is managed from Britain, the administration of both these fisheries is in strong contrast to the situation for skate in the European Union area. The South Atlantic is further represented, in the east by a study from South Africa and in the west by one from Uruguay that focuses on a specific elasmobranch group - *Cazón (Galeorhinus galeus)* - the soupfin shark.

East Africa, the Red Sea and the Persian Gulf, despite their abundance of elasmobranchs, along with West Africa, remain unaddressed by the report. More success has been had slightly to the east where accounts have been obtained from the Seychelles and the Maldives. In the former, the effect of eco-tourism in causing the closure of the shark fishery, at least

officially, is still to be revealed whereas in the Maldives a fascinating account is provided of how the tourism sector has been considered a major factor in formulation of national shark management plans. These two studies are complemented by those from India and Sri Lanka, both important elasmobranch-fishing nations, but with the more conventional goal of feeding national populations.

There are three excellent reports on national shark fishery management from Australia and the study from New Zealand provides an interesting complement. Readers interested in shared-stock management should be interested (and depressed) by the considerable evidence for the movement of sharks between these two countries despite their separation - at a minimum 1200 miles! And, readers will get some idea of how New Zealand's Quota Management System is being applied to such an interesting group taken primarily as a by-catch fishery. The north Pacific is represented by Japan and Fiji offers a Pacific comparison to the small-island-state fisheries in the Indian Ocean. Again, shark fins and by-catches from foreign fishing ventures that target tuna figure prominently but with management complicated by traditional indigenous rights and management practices and eco-tourism concerns.

Three accounts are given for the west coast of the Americas; that for British Columbia echoes the accounts of many of the others in emphasizing the role that shark livers, or more accurately, their vitamin A content, have played in development of these fisheries, in addition to the importance of shark liver oil for its role as an illuminant, lubricant and oil base for paints. Following the US account, a further contribution (in Spanish) describes the fishery in Ecuador. The chapter from Ecuador contains an extensive photographic record of small-scale shark fisheries handling practices that should interest those whose association with this group of fishes and related fishing practices gets no closer than the printed page. There are in addition regional accounts - for soupfin shark (*Galeorhinus galeus*) in a global context and of the ways a regional tuna commission handles elasmobranchs. An account of the roles of NGOs that are involved in this issue is included and finally an account is given of the deplorable state of global catch statistics relating to the chondrichthyans.

6. FIRM/SIDP ELASMOBRANCHES SPECIES IDENTIFICATION PUBLICATIONS⁷

6.1 FAO Species Catalogue for Fisheries Purposes

6.1.1 *Sharks of the world*

A revision of "Sharks of the World" is under preparation, the new catalogue describes about 480 species, in contrast to the 1984 catalogue which described about 350 species - a 37% increase. Due to problems encountered in resolving taxonomic issues, distribution started in 2001 with Volume II dealing with Bullhead, Mackerel and Carpet sharks. The manuscript of volume I should be ready at the end of 2002 for a publication in 2003 and volume III is expected for a release in 2003-2004. This substantially differs from the original plan for reasons mentioned above.

6.1.2 *Batoids of the World*

The new Catalogue of Batoids of the World was launched at a meeting that was organised by FAO and hosted at the Museum d'Histoire Naturelle in Paris in March 2002, with the

⁷ <michel.lamboeuf@fao.org>

editors: Dr. L.V.J Compagno, Shark Research Centre, South African Museum, (South Africa); Dr. Peter R. Last, CSIRO Marine Research, Hobart (Australia); Dr. John D. McEachran, Department of Wildlife and Fisheries Sciences, Texas A&M University College Station, (USA); and Dr. Bernard Seret, Museum National d'Histoire Naturelle, Paris, (France). The purpose of the meeting was to discuss the content, format and organisation of the volumes, review the list of species, standardise the collection of information on Batoids characteristics and allocate coordinators and authors to the various volumes. Batoids comprise approximately 630 species of electric rays, sawfishes, guitarfishes, skates, and rays. They represent about 60% of the cartilaginous fishes but are less known than sharks, as the group lacks the public notoriety of sharks.

Anthropogenetic activities have placed many species at risk, as they compete for inshore coastal habitats with humans and other taxa and are vulnerable to new fishery technologies. It is critical to further improve our knowledge of the taxonomy and systematics of Batoids before they suffer further decline and to insure their future survival.

The catalogue will have 5 volumes and will include 626 species, of which 84 are new and yet undescribed. Cybium has accepted to dedicate a special issue to the description of all new species of Batoids. A tentative timetable was put forward for the production of the various volumes.

Volumes	Species groups	Volume coordinator
I (2004)	Pristoids through to Zanobatoid,	L.V.J. Compagno
II (2005)	Torpenoids,	L.V.J. Compagno
III (2007)	Rays,	J. E. McEachran
IV (2009)	Stingrays	B. Seret
V (2009)	River Stingrays through to Mantas	P. Last

The Catalogue of Batoids of the World is a major undertaking to both consolidate and reinterpret available knowledge, and to conduct original research to further resolve taxonomic issues and systematic relationships within the group. This involves extensive travel of the volumes editors to study specimen in the various museums during the first two years. FAO is committed to coordinate the project using its own resources, mainly personnel and limited funds, but it cannot cover all budget needs and is seeking external funding in the range of \$500,000 to bring about the project during the entire period.

6.2 Field Guides

Two Guides of Elasmobranches are in preparation, they mainly aim at providing a quick identification guide in B5 format to persons involved in fisheries work. They include a species identification key, species drawings with a brief descriptions including two or three species per page. The printing of **Elasmobranches of the Red Sea** is financed by Japan. The preparation and printing of **Elasmobranches of the Mediterranean** is financed by the COPEMED project.

7. FROM STRATEGY TO ACTION - SOME THINGS THAT OUGHT TO BE DONE

7.1 Some Institutional Observations

Several people have noted that when there is a problem at the national level with articulation and implementation of a national plan for the management of elasmobranchs, there is often a similar management problem with other sectors, e.g. if the collection of catch and effort for shark fisheries is weak, then often this is the same for pelagic or crustacean fisheries. Likewise, if no regular stock assessment is undertaken of elasmobranch resources, then this too may be the case for other much more valuable and important fisheries. A valid organizational question is, if management is weak for other more important sectors, why should priority be given to sharks.

Such a perspective is difficult to rebut, and although I agree with many aspects of this argument, there are some points worth noting.

- i. Shark populations are under threat especially many of the smaller and often poorly known stocks that are taken as by-catch. Vulnerable stocks may disappear, harvested to commercial or biological extinction, completely unbeknown to management authorities.
- ii. How elasmobranch statistics are handled may be a good indicator as to how the statistics for other fishery sectors are being handled - that is a warning sign that a department does not know what is happening with its fishery resources.
- iii. Environmental NGOs and CITIES are not going to go away! ENGOs who have detected the crises that exists for many shark resources, or at least the lack of information on the status of these stocks and their fisheries, are well funded, highly motivated and characterized by considerable staying power. No minister should ignore their ability to take conservation issues across commercial sectors. If one's department has not been conscience in preventing the extirpation of an elasmobranch resource, such organizations may well take their publicity campaigns to, e.g. the tourist sector.

7.2 Some Institutional Considerations

Several of my colleagues have questioned the logic of national fisheries administrations implementing an IPOA-sharks, arguing that usually, if there is a problem with the management sharks usually there are management deficiencies with other sectors that invariably are much more important, e.g. shrimp. For example, if the elasmobranchs data are bad, then so probably are the data for other stock units.

There is a compelling logic to such assertions. But there are several counter arguments that should not be neglected. First, many shark stocks are vulnerable to extreme reduction in stock size because of the characteristics of their population biology - i.e. their longevity, vulnerability to capture, low fecundity and late maturity. Further, many species are taken as by-catch and little has been recorded about their capture, much less documentation of CPUE trends and other indicators of their abundance. These species may disappear without notice. This is not the case for species such as shrimp.

Second, even if there is little domestic pressure to manage fisheries to maintain or improve marine bio-diversity, there are international pressures. Environmental NGOs (ENGOS) are acutely aware of the vulnerable status of many elasmobranch resources. These ENGOS are well funded, persistent and capable of switching where they apply pressure from one commercial sector (e.g. fisheries) to another, e.g. the tourism sector. Which is the most important sector in SEAFDEC countries?

International Plan of Action for Conservation and Management of Sharks

Introduction

1. For centuries artisanal fishermen have conducted fishing for sharks sustainably in coastal waters, and some still do. However, during recent decades modern technology in combination with access to distant markets have an increase in effort and yield of shark catches, as well as an expansion of the areas fished.
2. There is concern over the increase of shark catches and the consequences this has for the populations of some shark species in several areas of the world's oceans. This is because sharks often have a close stock-recruitment relationship, long recovery times in response to over-fishing (low biological productivity because of late sexual maturity; few offspring, albeit with low natural mortality) and complex spatial structures (size/sex segregation and seasonal migration).
3. The current state of knowledge of sharks and the practices employed in shark fisheries cause problems in the conservation and management of sharks due to lack of available catch, effort, landings and trade data, as well as limited information on the biological parameters of many species and their identification. In order to improve knowledge on the state of shark stocks and facilitate the collection of the necessary information, adequate funds are required for research and management.
4. The prevailing view is that it is necessary to better manage directed shark catches and certain multi-species fisheries in which sharks constitute a significant by-catch. In some cases the need for management may be urgent.
5. A few countries have specific management plans for their shark catches and their plans include control of access, technical measures including strategies for reduction of shark by-catches and support for full use of sharks. However, given the wide-ranging distribution of sharks, including on the high seas, and the long migration of many species, it is increasingly important to have international cooperation and coordination of shark management plans. At the present time there are few international management mechanisms effectively addressing the capture of sharks.
6. The Inter-American Tropical Tuna Commission, the International Council for the Exploration of the Sea, the International Commission for the Conservation of Atlantic Tunas, the Northwest Atlantic Fisheries Organization, the Sub-regional Fisheries Commission of West African States, the Latin American Organization for Fishery Development, the Indian Ocean Tuna Commission, the Commission for the Conservation of Southern Bluefin Tuna and the Oceanic Fisheries Programme of the Pacific Community have initiated efforts encouraging member countries to collect information about sharks, and in some cases developed regional databases for the purpose of stock assessment.
7. Noting the increased concern about the expanding catches of sharks and their potential negative impacts on shark populations, a proposal was made at the Twenty-second Session of the FAO Committee on Fisheries (COFI) in March 1997 that FAO organize an

expert consultation, using extra-budgetary funds, to develop Guidelines leading to a Plan of Action to be submitted at the next Session of the Committee aimed at improved conservation and management of sharks.

8. This International Plan of Action for Conservation and Management of Sharks (IPOA-SHARKS) has been developed through the meeting of the Technical Working Group on the Conservation and Management of Sharks in Tokyo from 23 to 27 April 1998 and the Consultation on Management of Fishing Capacity, Shark Fisheries and Incidental Catch of Seabirds in Longline Fisheries held in Rome from 26 to 30 October 1998 and its preparatory meeting held in Rome from 22 to 24 July 1998.

9. The IPOA-SHARKS consists of the nature and scope, principles, objective and procedures for implementation (including attachments) specified in this document.

Nature and Scope

10. The IPOA-SHARKS is voluntary. It has been elaborated within the framework of the Code of Conduct for Responsible Fisheries as envisaged by Article 2 (d). The provisions of Article 3 of the Code of Conduct apply to the interpretation and application of this document and its relationship with other international instruments. All concerned States are encouraged to implement it.

11. For the purposes of this document, the term "shark" is taken to include all species of sharks, skates, rays and chimaeras (Class Chondrichthyes), and the term "shark catch" is taken to include directed, by-catch, commercial, recreational and other forms of taking sharks.

12. The IPOA-SHARKS encompasses both target and non-target catches.

Guiding Principles

13. States that contribute to fishing mortality on a species or stock should participate in its management.

14. Sustaining stocks. Management and conservation strategies should aim to keep total fishing mortality for each stock within sustainable levels by applying the precautionary approach.

15. Nutritional and socio-economic considerations. Management and conservation objectives and strategies should recognize that in some low-income food-deficit regions and/or countries, shark catches are a traditional and important source of food, employment and/or income. Such catches should be managed on a sustainable basis to provide a continued source of food, employment and income to local communities.

Objective

16. The objective of the IPOA-SHARKS is to ensure the conservation and management of sharks and their long-term sustainable use.

Implementation

17. The IPOA-SHARKS applies to States in the waters of which sharks are caught by their own or foreign vessels and to States the vessels of which catch sharks on the high seas.
18. States should adopt a national plan of action for conservation and management of shark stocks (Shark-plan) if their vessels conduct directed fisheries for sharks or if their vessels regularly catch sharks in non-directed fisheries. Suggested contents of the Shark-plan are found in Appendix A. When developing a Shark-plan, experience of sub-regional and regional fisheries management organizations should be taken into account, as appropriate.
19. Each State is responsible for developing, implementing and monitoring its Shark-plan.
20. States should strive to have a Shark-plan by the COFI Session in 2001.
21. States should carry out a regular assessment of the status of shark stocks subject to fishing so as to determine if there is a need for development of a shark plan. This assessment should be guided by article 6.13 of the Code of Conduct for Responsible Fisheries. The assessment should be reported as a part of each relevant State's Shark-plan. Suggested contents of a shark assessment report are found in Appendix B. The assessment would necessitate consistent collection of data, including *inter alia* commercial data and data leading to improved species identification and, ultimately, the establishment of abundance indices. Data collected by States should, where appropriate, be made available to, and discussed within the framework of, relevant sub-regional and regional fisheries organizations and FAO. International collaboration on data collection and data sharing systems for stock assessments is particularly important in relation to transboundary, straddling, highly migratory and high seas shark stocks.
22. The Shark-plan should aim to:
 - i. Ensure that shark catches from directed and non-directed fisheries are sustainable;
 - ii. Assess threats to shark populations, determine and protect critical habitats and implement harvesting strategies consistent with the principles of biological sustainability and rational long-term economic use;
 - iii. Identify and provide special attention, in particular to vulnerable or threatened shark stocks;
 - iv. Improve and develop frameworks for establishing and co-ordinating effective consultation involving all stakeholders in research, management and educational initiatives within and between States;
 - v. Minimize unutilized incidental catches of sharks;
 - vi. Contribute to the protection of bio-diversity and ecosystem structure and function;
 - vii. Minimize waste and discards from shark catches in accordance with article 7.2.2.(g) of the Code of Conduct for Responsible Fisheries (for example, requiring the retention of sharks from which fins are removed);
 - viii. Encourage full use of dead sharks;
 - ix. Facilitate improved species-specific catch and landings data and monitoring of shark catches; and

- x. Facilitate the identification and reporting of species-specific biological and trade data.
23. States which implement the Shark-plan should regularly, at least every four years, assess its implementation for the purpose of identifying cost-effective strategies for increasing its effectiveness.
24. States which determine that a Shark-plan is not necessary should review that decision on a regular basis taking into account changes in their fisheries, but as a minimum, data on catches, landings and trade should be collected.
25. States, within the framework of their respective competencies and consistent with international law, should strive to cooperate through regional and sub-regional fisheries organizations or arrangements, and other forms of cooperation, with a view to ensuring the sustainability of shark stocks, including, where appropriate, the development of sub-regional or regional shark plans.
26. Where transboundary, straddling, highly migratory and high seas stocks of sharks are exploited by two or more States, the States concerned should strive to ensure effective conservation and management of the stocks.
27. States should strive to collaborate through FAO and through international arrangements in research, training and the production of information and educational material.
28. States should report on the progress of the assessment, development and implementation of their Shark-plans as part of their biennial reporting to FAO on the Code of Conduct for Responsible Fisheries.

Role of FAO

29. FAO will as, *and to the extent directed by its Conference*⁸, and as part of its Regular Programme activities, support States in the implementation of the IPOA-SHARKS, including the preparation of Shark-plans.
30. FAO will, as and to the extent directed by its Conference, support development and implementation of Shark-plans through specific, in-country technical assistance projects with Regular Programme funds and by use of extra-budgetary funds made available to the Organization for this purpose. FAO will provide a list of experts and a mechanism of technical assistance to countries in connection with development of Shark-plans.
31. FAO will, through COFI, report biennially on the state of progress in the implementation of the IPOA-SHARKS.

⁸ My italics.

SUGGESTED CONTENTS OF A SHARK-PLAN

1. BACKGROUND

When managing fisheries for sharks, it is important to consider that the state of knowledge of sharks and the practices employed in shark catches may cause problems in the conservation and management of sharks, in particular:

- i. Taxonomic problems
- ii. Inadequate available data on catches, effort and landings for sharks
- iii. Difficulties in identifying species after landing
- iv. Insufficient biological and environmental data
- v. Lack of funds for research and management of sharks
- vi. Lack of coordination on the collection of information on transboundary, straddling, highly migratory and high seas stocks of sharks
- vii. Difficulty in achieving shark management goals in multi-species fisheries catching sharks.

2. CONTENT OF A "SHARK-PLAN"

The Technical Guidelines on the Conservation and Management of Sharks, under development by FAO, provide technical guidance, both on the development and the implementation of the Shark-plan. Guidance will be provided on:

- Monitoring
- Data collection and analysis
- Research
- Building of human capacity
- Implementation of management measures

The Shark-plan should contain:

- i. *Description of the prevailing state of:*
 - Shark stocks, populations
 - Associated fisheries and,
 - Management framework and its enforcement
- ii. *The objective of the Shark-plan:*
- iii. *Strategies for achieving objectives*

The following are illustrative examples of what could be included:

 - a. Ascertain control over access of fishing vessels to shark stocks
 - b. Decrease fishing effort in any shark where catch is unsustainable
 - c. Improve the utilization of sharks caught
 - d. Improve data collection and monitoring of shark fisheries
 - e. Train all concerned in identification of shark species
 - f. Facilitate and encourage research on little known shark species
 - g. Obtain utilization and trade data on shark species

3. SUGGESTED CONTENTS OF A SHARK ASSESSMENT REPORT

A shark assessment report should *inter alia* contain the following information:

- i. Past and present trends for (a) Fishing: directed and non-directed fisheries; all types of fisheries;
- ii. Yield: physical and economic;
- iii. Status of stocks;
- iv. Existing management measures;
- v. Control of access to fishing grounds;
- vi. Technical measures (including by-catch reduction measures, the existence of sanctuaries and closed);
- vii. Monitoring, control and surveillance;
- viii. Effectiveness of management measures;
- ix. Possible modifications of management measures.

Status of Implementation of Shark IPOAs - As Indicated to FAO
February 2002

Current *FAO* Knowledge of Status of Implementation of IPOA-Sharks

As SEAFDEC and ASEAN members will see, this table demonstrates how difficult it is for FAO to monitor what is happening. This information was prepared by FIPL - the Institutional Service of the Fisheries Department.

<i>Country</i>	<i>Shark Plan</i>	<i>Country</i>	<i>Shark Plan</i>
Albania	<i>Expected</i>	Kenya	No Shark plan in place
Argentina	Plan expected	Korea	No Shark Plan in place
Bahamas	Not harvested commercially (?)	Madagascar	<i>Expected</i>
Bangladesh	No shark plan in place and no large scale fisheries target sharks	Malaysia	No specific fisheries targeting sharks
Barbados	No shark plan in place	Marshall Islands	Hopefully soon. Still in development stage
Bhutan	Landlocked	Mauritius	Catch negligible and lack of expertise in the domain
Brunei Darussalam		Mexico	There is a plan in place
Brazil	<i>There is already a shark plan in place</i>	Morocco	No plan is intended
Burkina Faso	Landlocked	Mozambique	No plan is intended
Cambodia	<i>Expected</i>	Myanmar	?
Cameroon	No shark plan in place	Namibia	<i>A Shark plan has been implemented</i>
Canada	Assessment conducted for one stock of sharks	New Zealand	No answer
Cap Verde	<i>Expected</i>	Nicaragua	No plan in place
Chad	Landlocked	Norway	Preparation of plan depends on the availability of funding
Chile	<i>Expected</i>	Oman	
Colombia	<i>Expected</i>	Panama	<i>Expected</i>
Comores	Not expected yet.	Papua New Guinea	<i>Expected</i>
Cook islands	No shark plan in place	Peru	Intended to develop a plan within the work on institutional framework
Cote d'Ivoire	<i>Expected</i>	Philippines	A national workshop will be held in September to formulate such a plan
Cyprus	<i>Expected</i>	Poland	
Denmark	E.U.(see answers of the European Union)*	République démocratique du Congo	<i>Expected after evaluation</i>
Dominican Rep	No plan in place	République du Congo	None in place
Dominica	No targeted shark fishery and no plan in place	Samoa	No sharp plan in place
Egypt		Senegal	A plan is underway

El Salvador	Currently working on a plan formulated specifically for Sharks	Seychelles	<i>Expected</i>
Eritrea	No specific date given for the completion of such a plan	Singapore	?
Germany	E.U.*	South Africa	It is intended to develop such a plan.
Ghana	Unknown when plan will be completed	St Lucia	No assessment yet conducted
Greece	No Shark plan in place	Sudan	
Guatemala	?	Syrian Arab Rep	<i>Intended in near future</i>
Guinea	<i>Expected</i>	Tanzania	No assessment yet conducted yet
Guinea-Bissau	<i>Expected</i>	Thailand	<i>Expected</i>
Guyana	Assistance is needed to develop such a plan	Togo	Might complete such a plan in the future
Haiti	No assessment has been conducted yet	Tonga	No shark plan. The issue has not been discussed yet.
Honduras	No plan in place	Trinidad and Tobago	<i>Expected</i>
India	Need for a shark plan not yet felt	Tunisia	<i>Expected</i>
Indonesia	<i>Expected</i>	Turkey	Has not determined yet whether to develop such a plan
Iran	Started applying closing seasons; no shark plan in place.	Uruguay	No plan in place but the evaluation has been conducted
Japan	?	USA	<i>A plan has been implemented</i>
Jordan		Vietnam	?

*The E.U. has not sent back his questionnaire