

INTRODUCTION OF TRADE RELATED ISSUES ON SHARK FISHERIES

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1. INTRODUCTION

Shark fisheries make up only a small percentage of the species targeted by the world's fisheries. However, over the past two decades, human exploitation of sharks has substantially increased worldwide, as sharks have become a valuable resource. They are of primary importance in some regions of the world, sustaining important fisheries in some countries. Moreover, they have been, and are, a cheap but valuable source of protein for coastal communities dependent on subsistence fisheries. Humans can utilize much of the carcass for food or other uses. Sharks are exploited for their meat, fins, skin, liver, teeth, cartilage and other internal organs.

As a result of over-exploitation, some populations are now believed to be endangered in several areas of the world. Scientific data are scarce, but biologists think that of the 100 exploited species, 20 or so are in most trouble and are considered vulnerable, endangered or critically endangered.

Subsequently, a growing international concern over the possible effects of continued exploitation is emerging with the need for improved control of fishing for shark fisheries. There are signs that governments, too, are beginning to take the problem seriously. CITES resolution on the biological and trade status of sharks (Conf. 9.17) and Decision 10.73 and respective related decisions by COFI XXI, XXII and the Kyoto Conference in 1995 resulted in an FAO work program which led to the adoption of the International Plan of Action (IPOA) for the conservation and Management of Sharks.

This introductory paper compiles pertinent information and issues related to shark fisheries. Likewise, a compilation of country feedbacks on issues related to sharks is presented and analyzed.

2. GENERAL INFORMATION

2.1 Biology and characteristics of sharks

Sharks belong to the *Chondrichthyes* class, together with *rajiformes*, torpedos, sawfish, skates, rays, chimaeras and elephant fish. They are part of a family of fishes known as cartilage fishes. These fish differ from the *Osteichthyes* or bony fish as they possess a cartilaginous skeleton instead of a bony skeleton. The great majority of the commercially important species of chondrichthyans are elasmobranchs, where sharks are included.

Shark populations are extremely heterogeneous and are represented by a great variety of species, roughly 479 species classified into 35 families. They differ markedly in habits and

biology, in particular in growth and reproduction. They are found throughout the world in a wide variety of habitats from the bottom of marine oceans to freshwater rivers, lakes, inshore estuaries and lagoons, from polar waters to warm tropical regions. They live in coastal waters, open sea, at different depths, even as low as 2,000 meters. Only 5% are really oceanic. There are species, such as the megamouth shark (*Megachasma pelagios*), which inhabit the ocean depths; while hammerheads (*Sphyrna spp.*) and sandbar sharks (*Carcharhinus plumbeus*) prefer shallow coastal waters. Sharks vary greatly in size from the colossal whale shark (*Rhincodon typus*), which can exceed 12 meters, to the pygmy sharks (*Euprotomicrus bispinatus*), which are full grown at 25 cm. Most species are highly migratory and travel great distances, such as mako sharks (*Isurus spp.*), blue shark (*Prionace glauca*) and whitetip shark (*Carcharhinus longimanus*), which are pelagic, but other species are localized. There are species with a limited distribution and those which are widespread. There are also wide differences in their social behaviour: some species are solitary, like the thresher sharks (*Alopias spp.*), but they can assemble when attracted by shoals of prey. There are species that tend to segregate geographically on the basis of age and sex, such as sandbar, blue and dogfish (*Squalidae*). They can live as long as 60-70 years like the tope sharks (*Galeorhinus galeus*), or they can have a shorter lifespan like the roughly 20 years of the blue shark. They can take up to 20-25 years to mature like the dusky shark (*Rhizoprionodon taylori*). Not all sharks are totally carnivorous. There are species such as the whale, basking (*Cetorhinus maximus*) and megamouth sharks which eat predominantly plankton. Shark reproductive strategies also vary widely from one species to another. They can be oviparous, viviparous or ovoviviparous as many species lay eggs, others have placentas, and some produce embryos. The gestation time can be long (two years) and the number of offspring can reach 300 (e.g. the whale shark) or be limited to one (e.g. the sandtiger shark (*Carcharias taurus*)).

In general, the life history of sharks is characterized by slow growth rates, low fecundity potential, relatively late sexual maturation, long life spans and so they are classified by ecologists as strong **K** strategists. **K** strategists refer to a variable normally employed by ecologists in describing life histories of species wherein their population at or near saturation density or carrying capacity can exist indefinitely in a certain environment or habitat. Species intermediate to **K** strategist are not advantageous to have high birth rate and they tend to put a great deal of resource into raising only a few young. Furthermore, they are usually the top predators in their communities and are therefore comparatively sparsely distributed. So, they possess biological peculiarities and an ecological role that indicate that they could be particularly sensitive to an increase in fishing exploitation.

2.2 Utilization and importance of sharks

Though sharks make up only a small percentage of the species targeted by the world's fisheries, they are extremely versatile and humans can use much of the carcass. Fins have become one of the world's most lucrative fisheries' commodities, particularly appreciated in Chinese cuisine. Shark cartilage has been claimed to be beneficial in a great variety of diseases, such as arthritis, psoriasis colitis, acne, enteritis, phlebitis, rheumatism, peptic ulcers, hemorrhoids, herpes simplex, melanoma, recently also AIDS, and above all cancer. Even though its benefits are unproved, a new market for cartilage as an alternative therapy for cancer treatment and prevention has been created. Sharks are also valued for their liver oils, specially the hexaunsaturated isoprenoid alkene squalene. It is estimated that one ton of squalene could require the livers of 2,500 to 3,000 sharks. Nowadays liver oil is mainly used in the textile and tanning industries and in the production of cosmetics, pharmaceutical

products, and lubricants. The skins can be manufactured to produce high-quality leather or used as an abrasive. Discards are also used for the production of fishmeal and fertilizer. In addition, shark teeth and jaws are marketed and sold.

3. MAJOR INTERNATIONAL AND DOMESTIC ISSUES ON SHARK FISHERIES

3.1 Unregulated and unmonitored trade

Sharks are exploited not only for their meat but also for their fins, skin and internal organs. The trade in sharks and shark products is vast and, in some cases, increasing. In many regions, increased trade in shark products especially shark fins has played a significant role in increased shark harvests in recent years. At the same time, majority of shark fisheries and trade remain largely unregulated and unmonitored in spite of international and domestic control measures in place.

3.2 By-catch and utilization of sharks

In addition to being directly targeted in various commercial and recreational fisheries throughout the world, a great number of sharks are taken as by-catch in fisheries targeting other species. The increase in price and demand for fins have also created the problem on the proper and full utilization of sharks. Shark fins are now the world's most expensive fishery products, although the value varies according to color, size, thickness and fin needle content. Oftentimes, only this most valuable part is used and processed while the rest of the animal is thrown back into the water or discarded, and ultimately unrecorded.

3.3 Lack of research and development programs

Few nations have the capability to develop and conduct their research activities on sharks. Often, these nations rely on other sponsors to provide financial assistance to ultimately conduct research activities on their fisheries. This problem is even more compounded by the scarcity of nations to sponsor such undertaking. Subsequently, limited knowledge of shark biology, of the size and status of their stocks, of the real volume of their captures and their population dynamics presents serious difficulties for fishery management. With this handicap, shark fisheries data and statistics are rather limited and questionable.

3.4 Absence of national management measures and plans

The absence of conservation and management measures in the national level is even a major cause for concern. Without such measure or program in place, the fishing pressure and the continued disregard of over-exploitation of shark fisheries will always pose a threat and endanger the population of sharks.

4. INTERNATIONAL INSTRUMENT FOR THE CONSERVATION AND MANAGEMENT OF SHARKS

The International Plan of Action for Conservation and Management of Sharks (IPOA-Sharks) has been developed to ensure the conservation and management of sharks and their long-term sustainable use. The instrument has been elaborated within the framework of the Code of Conduct for Responsible Fisheries. Though voluntary in nature, it

encourages all concerned States and fishing entities, members and non-members of FAO, to adopt a national plan of action for the conservation and management of shark stocks.

5. PRELIMINARY INFORMATION AND ASSESSMENT OF SHARK FISHERIES IN THE ASEAN AND SEAFDEC MEMBER COUNTRIES

To initially obtain general information on the shark fisheries of the ASEAN and SEAFDEC member countries, the SEAFDEC Secretariat has devised a simple questionnaire highlighting on six particular issues related to sharks, to wit:

1. *Does your country fully develop collaborative mechanism with industries (large-scale) in order to collect required data and information?*
2. *Does your country have shark fisheries (as target species)?*
 - 2.1 *If yes, what kind of fishing gears is used to catch sharks and how?*
 - 2.2 *If yes, where are their locations?*
 - 2.3 *If not, how (fishing gears) they catch sharks as part of by-catch?*
3. *What are the main shark species caught by local fishers?*
4. *What are the general usages of sharks?*
5. *What is your shark classification on shark in your national statistics?*
6. *Are there any research activities on conservation and management of shark?*

Of the ten SEAFDEC Member Countries, eight countries have responded and complied with the Secretariat request. Their responses were summarized accordingly:

5.1 Brunei Darussalam

Brunei has so far not developed any collaborative mechanism with large-scale or commercial industries to collect data and information on sharks. Sharks are taken as by-catch by the following fishing gears – bottom set long line, demersal trawl, hand line and trammel. The main shark species caught are *Carcharirus sp.*, *Sphyrna lewini*, *Rhinobatus thouini* and *Mustelis sp.* Generally, the shark's meat is eaten fresh. Subsequently, sharks are classified as *Sharks* under classification of Grade IV. Brunei has collaborated with SEAFDEC to conduct its research activities on the conservation and management of sharks. The initial stage of the research activity covered the taxonomy and the biology of sharks and rays. The activity is being or was implemented under the Regional Project: The Study, Conservation and Management of Sharks in Southeast Asia.

5.2 Cambodia

The development of collaborative mechanism with commercial or large-scale industries to collect sharks data and information has never happened. Likewise, shark fisheries do not exist and fishermen are not inclined of going into shark fishing. Accidentally (or incidentally), sharks are caught by trawl net, scomberomous gill net, floating gill net, purse seine net and other surrounding nets. *Cephaloscylium fasciatum*, *Galeocerdo cuvier*, *Scoliodon walbeehmi*, *Sphyrna zygaena* and *Stegostoma varium* are the main shark species

being caught. Generally, shark products as fin, meat and liver are used for food. In its national statistics, sharks are not classified. Similarly, there is no specific national research activity or program on sharks but rather on fisheries in general.

5.3 Indonesia

Previously, no mechanism has been developed to collaborate with commercial or large-scale industries in the collection of data and information on sharks. Until recently, enumerators were assigned on board fishing vessels following the recommendation made from the collaborative research between Australia and Indonesia. By and large, shark fisheries are target species of bottom long lines and gill nets commonly caught in Pelabuhan Ratu (West Java), Cilacap (Central Java) and Tanjung Luar, Lombok, Nusa Tenggara Barat (Sunda Lesser). Majority of large sharks come from single boat that stayed out at sea for up to a month, taking nearly a week just to reach the fishing grounds (northwards in Java Sea). The main shark species caught by the local fishers are: *Chiloscyllium punctatum*, *Carcharhinus falciformis*, *Carcharhinus limbatus*, *Galeocerdo cuvier*, *Prionace glauca*, *Carcharhinus longimanus*. In terms of its utilization, various parts of shark are used for food, leather and as an ingredient in medicines. Based on the Indonesia statistical report, sharks are classified under sharks together with rays. International Research reports that there are about 128 species of sharks. At present, research programs are underway to conserve sharks. Research activities are being implemented collaboratively between CSIRO Marine Research of Murdoch University, an Australian organization, and the Research Institute for Marine Fisheries (RIMF) of the Indonesian Institute of Science, Center for Agricultural and Socio-economic Research. The research project was the result of an initiative developed by the DGCF proposing a collaborative research on shark in 2001 with the aim to (1) evaluate the socio-economic status of the artisanal fishery and to describe the main biological, catch, and gear characteristics of the fishery; (2) develop a preliminary assessment of the status of the stocks and the extent to which they may be shared with Australia; and (3) provide training and advice to Indonesian scientists with respect to issues that may be important with regard to possible alternative management option for the fishery.

5.4 Malaysia

Like the two previous countries, Malaysia has not collaborated with commercial and large-scale industries in the collection of its sharks data and information. Collection of data on sharks is, however, conducted from fish landing places. Further, shark fisheries are not directly targeted but are rather taken as by-catch mainly by trawl net, drift gill net and hook and line. The commonly caught shark species are *Carcharhinus sorrah*, *Carcharhinus sealei*, *Carcharhinus dussumieri*, *Laxodon macrorhinus* and *Chiloscyllium indicum*. Sharks are mainly used for food especially products such as fin, meat and liver. Sharks are eaten wholly and there is no discards. The meat is sold fresh or dried. The jaws are sold as rare souvenir items. Cartilage and some other discarded parts of the fish are used as bait for fish and crab trap. Small sharks, as well as those that are non-edible or unsuitable for bait are sold to fishmeal factories for fertilizers. Together with rays, sharks are classified under *Elasmobranch* and together they are classified under ISSCAAP Group No. 37. So far there is no research activity being conducted for purposes of conservation and management of sharks. But previously, between 1996-1997, the Darwin Elasmobranch Biodiversity Conservation and Management Project has been implemented in Sabah, particularly in the Island of Borneo. The project was undertaken collaboratively among several institutions – the Department of Fisheries Sabah, the IUCN Species Survival Commission's Shark

Specialist Group, WWF Malaysia and the University Malaysia Sabah. The project was funded under the auspices of the UK government's Darwin Initiative for the Survival of Species.

5.5 Myanmar

There is no collaborative mechanism developed with the large-scale or commercial industries on the collection of sharks data and information. Geographically, sharks inhabit in the coastal areas of Myanmar where they are incidentally caught by long line and drift gill net as by-catch. Shark species mainly caught are *Atelomyxerus marmoratus* (Marble catfish), *Carcharhinus palasorrah* (Blue shark), *Carcharhinus ablimarginatus* (Silver tip shark), *Sphyrna blochii* (Hammerhead shark), *Sphyrna lewini* (Scallop hammerhead shark), *Sphyrna zygaena* (Round headed shark), *Rhincodon typus* (Whale shark), *Pristis suspidatus* (Pointed saw fish), *Pristis microdon* (Small tooth saw fish), and *Pristis ziisron* (Green saw fish). Generally, shark products like fin, meat and liver are used for food. Information on the classification of sharks and research activities are not available.

5.6 Philippines

To some extent, collaborative mechanism with commercial or large-scale industries to collect data and information on sharks is undertaken. The mechanism exists in areas where enumerators are assigned to collect catch and effort data. Sharks are directly targeted or landed as by-catch. Commercial fishing gears like trawl, hook and line, and long line are commonly employed to catch sharks. Municipal or small-scale gill net, hook and line, long line, spear, fish corral and baby trawl are also used for catching the target fisheries. In addition to being targeted in commercial or small-scale fisheries, sharks are also taken as by-catch with fishing gears like purse seine, filter net and beach seine. Sharks are located all over the country but the main species caught are dogfish, requiem, hammerhead and thresher sharks. Generally, sharks are exploited for its fins only while its meat is also utilized for food and leather. Basically, the national statistics classify shark fisheries as shark only. Currently, research activities are being undertaken to collect catch and effort data for stock assessment and shark species identification purposes.

5.7 Thailand

At present there exist no collaborative mechanism between the Department of Fisheries (DOF) and the commercial or large scale fishery industries in Thailand. Mechanisms for collaboration do exist however between and among DOF, the Ministerial Notification of the Ministry of Finance, and the Ministry of Commerce, where DOF collect some data and information from the two latter ministries. Further, sharks comprise not the target fisheries but only make up a small portion of by-catch caught by various types of fishing gears such as trawls, purse seine nets, gill nets, bottom long lines, and bamboo stake traps. Large trawlers contribute much to the shark by-catch in Thailand. The main shark species caught by Thai fishermen are *Carcharhinus spp.*, *Chiloscyllium spp.*, *Sphyrna spp.*, *Stegostoma spp.*, and *Scoliodon spp.* The dominant species of sharks in the catch is *Carcharhinus dussumieri* (Whitecheek shark), *Sphyrna lewini* (Scalloped hammerhead shark), and *Stegostoma fasciatum* (Zebra shark). Sharks have been consumed in fresh, smoked, dried (both salted and sweetened) and shark fin soup. In addition, the liver is used to produce fish liver oil while the skin is used for leather goods making. Thailand's fishery statistics classify

sharks into mixed species groups of sharks and rays. However, information related to research activities for the conservation and management of sharks is not available.

5.8 Vietnam

To some extent, mechanism for collaboration with commercial or large-scale industries to collect data and information on sharks is developed. Currently, the collection of fisheries statistics is being undertaken by two agencies. Firstly, it is collected by the Ministry of Fisheries through its Provincial Fisheries Departments collecting mainly fisheries data. Likewise, enumerators are sent to the provinces to collect specialized data such as shrimp, some species of fish like tuna. Secondly, it is also collected by the General Statistics Department, through its provincial and city branches, which gather all kinds of data, including fisheries data. Subsequently, the data are always reflected in general terms such as fish, shrimp, mollusk indexed by province. Nevertheless, shark fisheries are not target species but are incidental catches of long line, gill net and trawl net. Sharks inhabit all over the country but the main species that are caught are *Sphyrna lewini* (Hammerhead shark), *Carcharhinus dussumieri* (White shark), *Chiloscyllium grimseum* (Grey shark), *Sphymidae spp.* and *Orectolobidae*. Sharks meat are rarely consumed but other products as sharks fin are used especially for fin soup while sharks liver are used for oil pill. Vietnam's national statistics classify sharks and rays under family and species. Interestingly, studies have been conducted on the taxonomy and distribution of sharks' species but conservation and management of sharks receive little regard due the resource low economic value.

6. CONCLUSION

Drawing upon the information presented in the previous discussion, the conservation and management of shark fisheries within the national territorial waters of the ASEAN-SEAFDEC country-respondents is boldly wanting. Mechanisms and other effective strategies to obtain relevant data and information on sharks are likewise inadequate and deficient. Furthermore, sharks are valued according to country preferences. While shark fisheries may be directly targeted in certain countries, generally, sharks are landed from multi-species fisheries or taken as by-catch in fisheries targeting other species. Dogfish, requiem, hammerhead, thresher, whitetip, silky, blacktip, and blue sharks mainly compose the catch for target shark fisheries. Commonly employed fishing gears and methods of catching ranges from the most sophisticated to the least conventional ones such as trawl, long line, hook and line, gill net, fish corral and spear. Incidental and by-catch of sharks are taken mostly by long line, drift gill net, trawl, hook and line, trammel net, hand line, beach seine, filter net, purse seine and other surrounding nets. The main composition for shark by-catch includes whitecheek shark, grey bamboo shark, scalloped hammerhead shark, zebra shark, blue shark, smooth hammerhead shark, silver tip shark, sawfishes, etc. Interestingly, sharks are obviously appreciated for its extreme versatility particularly for its fins, meat, liver, skin and cartilage. However, sharks will continue to become more vulnerable to over-fishing if national management plans are not put in place to ensure sustainable use of sharks.

REFERENCES

Internet sources from WWF and IUCN.

Reply-Questionnaires from Brunei, Cambodia, Indonesia, Japan, Malaysia, Myanmar, Philippines, Thailand and Vietnam.

Vanuccinni, S., "Shark utilization, marketing and trade", FAO Fisheries Technical Paper Number 389.