PRESENT STATUS OF SHARK FISHERIES IN INDONESIA[1)]

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INTRODUCTION

In relation to the Ecologically Related Species (ERS) of Southern Blue-fin Tuna (SBT), as generally known, there is no SBT-Fisheries in Indonesia. The SBT is considered as "by-catch" of tuna fisheries not the main target. Most Indonesian tuna long-liners operate in the Indian Ocean (where the SBT usually caught) catch the Yellow-Fin and Big-Eye Tunas as the main targets.

Since the year of 2002 Ministry of Marine Affairs and Fisheries of Indonesia has got assistance from IOTC-OFCF and ACIAR/CSIRO for monitoring of tuna caught by Indonesia tuna long liners operate in the Indian Ocean. It is expected that from this kind of monitoring system-in the next coming years- ERS oftuna fisheries, could be recorded (at least for the large scale of fishing vessels).

In addition to the tuna species and billfishes, tuna long-liners also catch some other species such as sharks, rays and other fishes. So far no recorded data on turtles and sea birds incidentally caught by tuna long-liners. In Indonesia, sharks not only caught by tuna long-liners but also by gill-nets, bottom long line for demersal fin-fish and seines for pelagics.

COLLECTION OF DATA AND INFORMATION

A preliminary research on biology and fisheries of sharks was conducted by Research Institute for Marine Fisheries in Jakarta in the Indian Ocean waters south of Indonesia between 2000 to 2001. A number of 61 spesies were identified (Tabel 1) and a poster of more than 30 species of sharks was published by Central Research for Capture Fisheries in 2002. Additionally, a draft of species identification is undertaken and will be

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published in the near future. So far, a number of scientific papers were published in the fisheries national journal (Widodo *et al*. 2002; Widodo *et al*. 2002; Pralampita *et al*. 2003).

NATIONAL PLAN OF ACTION IN SHARK FISHERIES

The only shark-fishery found in Indonesia is only in Tanjung Luar of West Nusatenggara Province. There are about 30 "shark long line" vessels of 12 – 20 GT size used by the fishermen operated in the Indian Ocean. In general, landings of shark are as by catch of those of several artisanal fisheries, namely tuna longline and gillnet, fishnets, bottom longline for demersal finfish, and seines for pelagics.

Within the last decade the annual landings of shark were slightly increased, namely from 45 000 t in 1991 to 70 000 t in 2000 (Figure 1). There are three major landing sites of sharks, first along the south coast of Java, Bali, and Nusa Tenggara as bycatch of tuna fisheries in the Indian Ocean; second, around the Arafura Sea as bycatch of long line for demersal fisheries as well as tuna fisheries; and third, around South China Sea as bycatch of demersal and small pelagics fisheries in the area. Almost all of the shark landings are consumed locally except for the fins that so far have been exported. Accordingly, from nutritional and socio-economic point of view shark fisheries have a strategic role in Indonesia both as source of food as well as as source of employment and income for traditional and small-scale fishers and their families.

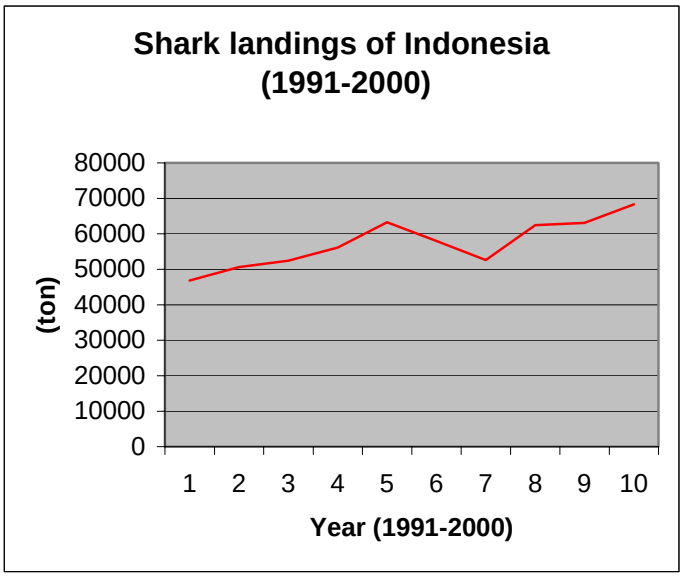

Figure 1. Annual landings of sharks (t) in Indonesia from 1991 to 2000. An increasing tendency of the landings was occurred from 45 000 t in 1991 to 70 000 t in 2000 (analysed from Indonesian Fisheries Statistics (1991-2000).

As a state that produces a lot number of shark landings, Indonesia should adopt a national plan of action for conservation and management of shark stocks. As far as two or more states exploit transboundary shark stocks, it is possible to set up joint Shark Plan, for example among the countries bordering to the South China Sea, the Arafura Sea, and Sulawesi Sea. There are a number of options to regulate shark fishing, namely: (i) control on catch and fishing effort, (ii) control of fishing gear, (iii) bycatch reduction, (iv) to minimize waste of sharks, (v) species conservation. Indonesia is in her attempt to set up a national plan of action in the near future. An extension of the collaboration between Indonesia and Australia in 2004 to 2005 has its emphasis, *inter alia*, to set plan of action on shark fisheries management, particularly those stocks that might have been shared by Indonesia and Australia.

SHARK FISHERY PROGRAM AND REQUIRED RESEARCH

In order to know the present status and future trends of the shark fishery it is necessary to have a number of biological as well as stock indicators. Such indicators can be collected from fishery-dependent activities as well as from fishery-independent ones.

The collection of fishery-dependent data can be conducted by employing a number of landing sites enumerators as well as onboard observers. In collecting fishery-dependent data, it is necessary to set up collaboration with the fishers, processors, traders, etc. by using logbook systems and other means of mutual interest.

On the other hand, fishery-independent data may be obtained by employing research vessel or chartered commercial vessel designed for sampling purposes. The data obtained from the research activities are not only expensive but also in a limited number. Cost efficiency should be considered as a major factor in governing the research. Joint research among a number of bordering countries exploiting the same stocks will be very helpful in increasing cost efficiency as well as data and information obtained.

A rapid appraisal technique to evaluate the sustainability status of fisheries have been applied in the study of sharks fisheries in the south coast of Java, Bali and Nusa Tenggara as well as in the north coast of the Jawa Sea (Pido et al. 1997; Pitcher & Preikshot 2001).

The shark fisheries of Indonesia not concentrated only in the Indian Ocean of Indonesia and in the Java Sea but also in the South China Sea, Arafura Sea, Sulawesi Sea and the Pacific Ocean. In these waters, Indonesia concerns with transboundary, straddling, highly migratory and high seas stocks of sharks. Consequently, collaboration among countries bordering to the South China Sea, Arafura Sea, Sulawesi Sea and the Pacific Ocean will be very helpful in increasing efficiency and effectiveness in shark data collection. Sampling schedule should be set up in accordance with the monsoons that significantly influence the environmental conditions and fisheries of the South East Asia waters.

CONCLUDING REMARKS

In order to know the present status and future trends of the shark fishery it is necessary to have a number of biological as well as stock indicators. Such indicators have been collected from fishery-dependent activities as well as from fishery-independent ones. The collection of fishery-dependent data has been conducted by employing a

number of landing site enumerators as well as onboard observers. In collecting fishery-dependent data, it will be necessary to set up collaboration with the fishers, processors, traders, etc. by using logbook systems and other means of mutual interest.

Collaboration among countries bordering to the South China Sea, Arafura Sea, Sulawesi Sea and the Pacific Ocean will be very helpful in increasing efficiency and effectiveness in shark data collection

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Tabel 1. Identified shark species landed from Indian Ocean west of Sumatra and south of Java, Bali, and Nusa Tenggara (2000 – 2001)

Ordo, Family	No	Species	English Name
Ordo **CARCHARHINIFORMES**			
Fam. **TR1AKIDAE**			Houndsharks
	1	*Mustelus manazo*	Starspotted smooth-hound
	2	*Hemitriakis abdita*	-
Fam. **CARCHARHINIDAE**			Requiem sharks
	3	*Carcharhinus albimarginatus*	Silvertip shark
	4	*Carcharinus altimus*	Bignose shark
	5	*Carcharinus amblyrhynchoides*	Graceful shark
	6	*Carcharinus amblyrhynchos*	Grey reef shark
	7	*Carcharinus amboinensis*	Pigeye shark
	8	*Carcharinus brachyurus*	*Copper shark*
	9	*Carcharinus brevipinna*	Spinner shark
	10	*Carcharinus dussumieri*	Whitecheeck shark
	11	*Carcharinus falciformis*	Silky shark
	12	*Carcharhinus fitzroyensis*	Creek whaler
	13	*Carcharinus hemiodon*	Pondicherry shark
	14	*Carcharinus leucas*	Bull shark
	15	*Carcharinus limbatus*	Blacktip shark
	16	*Carcharinus longimanus*	Oceanic whitetip shark
	17	*Carcharinus macloti*	Hardnose shark
	18	*Carcharinus melanopterus*	Blacktip reef shark
	19	*Carcharinus obscurus*	Dusky shark
	20	*Carcharinus plumbeus*	Sandbar shark
	21	*Carcharinus sealei*	Blackspotshark
	22	*Carcharinus sorrah*	Spottail shark
	23	*Galeocerdo cuvieri*	Tiger shark
	24	*Glyphis gangeticus*	
	25	*Lamiopsis temmincki*	Broadfin shark
	26	*Loxodon macrorhinus*	Sliteye shark
	27	*Prionacea glauca*	Blue shark
	28	*Rhizoprionodon acutus*	Milk shark
	29	*Rhizoprionodon oligolinx*	Grey sharpnose shark
	30	*Scoliodon laticaudatus*	Spadenose shark
	31	*Triaenodon obesus*	Whitetip shark
Fam. **SPHYRNIDAE**			Hammerhead sharks
	32	*Eusphyra blochii*	Winghead shark
	33	*Sphyrna lewini*	Scalloped hammerhead
	34	*Sphyrna mokarran*	Great hammerhead
	35	*Sphyrna zygaena*	Smooth hammerhead

Fam. **HEMIGALIDAE**			Weasel sharks
	36	*Chaenogaleus macrostoma*	Hooktooth shark
	37	*Hemigaleus microstoma*	Sicklefin weasel
ORDO ORECTOLOBIFORMES			
Fam. **HEMISCYLLIIDAE**			Longtail carpetsharks
	38	*Chiloscyllium punctatum*	Brownbanded bambooshark
	39	*Hemiscyllium strahani*	Hooded carpetshark
Fam. **STEGOSTOMATIDAE**			Zebra sharks
	40	*Stegostoma fasciatum*	Zebra shark
Fam. **GINGLYMOSTOMATIDAE**			Nurse sharks
	41	*Nebrius ferrugineus*	Tawny nurse shark
Fam. **RHINCODONTIDAE**			Whale sharks
	42	*Rhincodon typus*	Whale shark
ORDO SQUALIFORMES			
Fam. **SQUALIDAE**			Dogfish sharks
	43	*Centrocymnus crepidater*	-
	44	*Centrophorus moluccensis*	Smallfin gulper shark
	45	*Daenia quadrispinosa*	Longsnout dogfish
	46	*Squalus blainvilei*	-
	47	*Squalus megalops*	Shortnose spurdog
	48	*Etmopterus lucifer*	Blackbelly lanternshark
Ordo **SQUATINIFORMES**			
Fam. **SQUATINIDAE**			Angelsharks, sand devil
	49	*Squatina* sp. [Last & Stevens 1994]	Eastern angelshark
Ordo **HEXANCHIFORMES**			
Fam **HEXANCHIDAE**			Cow sharks
	50	*Hexanchus griseus*	Bluntnose sixgill sharks
	51	*Hexanchus nakamurai*	Bigeye sixgill shark
	52	*Hexanchus perlo*	Sharpnose sevengill sharks
Fam **SCYLIORHINIDAE**			Catsharks
	53	*Ateleomycterus marmoratus*	Coral catshark
Ordo LAMNIFORMES			
Fam. **ODONTASPIDIDAE**			Sandtiger sharks
	54	*Carcharias taurus*	Sandtiger shark
	55	*Odontaspis ferox*	Smalltooth sand tiger
Fam. **PSEUDOCARCHARIDAE**			Crocodile sharks
	56	*Pseudocarcharias kamoharai*	Crocodile shark

Fam. **ALOPIIDAE**			Thresher sharks
	57	*Alopias pelagicus*	Pelagic thresher
	58	*Alopias superciliosus*	Bigeye thresher
	59	*Alopias vulpinus*	Thresher shark
Fam. **LAMNIDAE**			Mackerel sharks
	60	*Isurus oxyrinchus*	Shortfin mako
	61	*Isurus paucus*	Longfin mako