

scientific evidence, the countries in the Southeast Asian region required more time to undertake the necessary measures to react on the proposal for listing such species in the CITES Appendices. The countries are now developing conservation measures and working towards sustainable fishery management of such species considering that their possible listing in the CITES Appendices could directly or indirectly affect the national economies and livelihoods of small-scale fishers in the Southeast Asian region.

The issues on the sustainable fishery management of economically-exploited aquatic species have been discussed at SEAFDEC Meetings for many years. Specifically, while considering the importance of the issue on sharks and the possible listing of shark species in the CITES Appendices, the 43rd Meeting of the SEAFDEC Council in 2011 requested SEAFDEC to support the Member Countries by coming up with scientific information and evidence to support the development of common position of the Member Countries. In this regard, SEAFDEC also recognized that policy recommendations and management plan on the improvement of data collection of commercially-exploited species in the Southeast Asian region would be crucial in order to come up with the required information that would support the assessment of the stocks of such species.

1.3.1 Sharks and Rays

Sharks and rays, (Subclass Elasmobranchii) biodiversity in Malaysia, Indonesia and Thailand is the richest in the Southeast Asian Region, with at least 252 species from 44 families comprising 129 species of sharks under 7 orders and 27 families and 123 species of rays from 6 orders and 17 families. The species inhabit the waters of these three countries from fresh water environment to deep ocean. Indonesia recorded the highest biodiversity of sharks with at least 110 species from 26 families, followed by Thailand with 63 species (20 families) and Malaysia with 62 species

(18 families). As for rays, Indonesia also have the highest number with 104 species from 17 families followed by Malaysia with 79 species (15 families), and Thailand 64 species and 13 families (**Table 51**).

Only a few species of sharks and rays are dominant but the dominant species are vary among the countries with oceanic species are rarely caught, except for Indonesia. In general the most dominant sharks species caught are spot-tail shark, *Carcharhinus sorrah*; silky shark, *Carcharhinus falciformes*; blacktip reef shark, *Carcharhinus melanopterus*; bull shark *Carcharhinus leucas*; milk shark, *Rhizoprionodon acutus*; scalloped hammerhead shark, *Sphyrna lewini*; grey bambooshark, *Chiloscyllium griseum*; and brownbanded bambooshark, *Chiloscyllium punctatum*. As for rays, the most dominant species in general are blue-spotted maskray, *Neotrygon kuhlii*; whitespotted whipray, *Himantura gerrardi*; scaly whipray, *Himantura imbricata*; pale-edged stingray, *Dasyatis zugei*; leopard stingray, *Himantura uarnak*; whitnose whipray, *Himantura uarnacoides*; and dwarf whipray, *Himantura walga*. The fresh water sharks and rays species such as the Borneo river shark, *Glyphis fowlerae*; giant freshwater stingray, *Himantura polylepis*; white-edge freshwater whipray, *Himantura signifer*, Mekong stingray, *Dasyatis laosensis* and roughback whipray, *Himantura kittiponggi* are rarely found and endemic within certain area and are threatened to overfishing. Sawfishes species such as *Pristis microdon*; knifetooth sawfish, *Anoxypristis cuspidata*; green sawfish, *Pristis zijsron* and smalltooth wide sawfish, *Pristis pectinata* are now very rarely seen and listed as endangered species in all countries.

Most ray species especially those are localized within estuarine and coastal waters are no longer appeared due to heavily fishing pressure. Freshwater ray species especially *Himantura polylepis* is now becoming endangered in all countries. Endemic species especially confined in freshwater rivers such as *Himantura signifer*, *Dasyatis*

Table 51. Number of sharks and rays in Malaysia, Indonesia and Thailand compared with that of the world's total number

| Group | Number of Order | Number of Family | Total number of species (Malaysia, Indonesia, Thailand)* | Total number of species (World)** | Percentage compared to number of species in the world |
|--------------|-----------------|------------------|--|-----------------------------------|---|
| Sharks | 7 | 27 | 129 | 479 | 26.9 |
| Rays | 6 | 17 | 123 | 604 | 20.4 |
| Total | 13 | 44 | 252 | 1083 | 23.2 |

Sources:

*SEAFDEC/MFRDMD study

**Compagno (2002); Compagno and Last (2002)

Table 52. Number of species and families of sharks and rays in Malaysia, Indonesia and Thailand

| Country | Sharks | | Rays | | Total (Sharks & Rays) | |
|-----------|--------------|---------------|--------------|---------------|-----------------------|---------------|
| | Total family | Total species | Total family | Total species | Total family | Total species |
| Malaysia | 18 | 62 | 15 | 79 | 33 | 141 |
| Indonesia | 26 | 110 | 17 | 104 | 43 | 214 |
| Thailand | 20 | 63 | 13 | 64 | 33 | 127 |

Sources: Fahmi, 2010; Vidthayanon, 2020; and Yano et.al, 2005

laosensis and *Himantura kittipongi* are also affected by the pressure from fisheries activity and other human-induced sources of habitat degradation.

Even though the number of sharks and rays species recorded in Malaysia, Indonesia and Thailand is more than 250 species, the status of its biomass is still unknown (Ahmad and A.P.K.Lim, 2011). With new species continuously discovered, the number could increase in the future.

Specifically, deep water species are mostly unknown due to limited research activity, while fishers from Indonesia reported to have caught deep water sharks using long line. The total number of sharks and rays in these countries is about 23% of total number recorded in the world which is now more than 1080 species of which sharks account for about 27 % and rays about 20% (Table 52).

The abundance of Chondrichthys fauna in the Southeast Asian Region and its adjacent area is due to the region's geographical location covering many seas such as South China Sea, Gulf of Thailand, Sulu Sea, Philippine Sea, Celebes Sea, Flores Sea, Makassar Strait, Karimata Strait, Java Sea, Malacca Strait, Andaman Sea, Indian Ocean and western part of Pacific Ocean. Moreover, the coastal waters of many countries in the region also comprise a rich ecosystem characterized by the existence of areas with extensive coral reefs and seasonal up-welling, as well as nutrient from land that are suitable for breeding, spawning, nursing and growing of wide diversity of fish species including sharks and rays.

Diverse sharks and rays faunas occupy a variety of habitats from freshwater river to oceanic realms beyond the continental shelves. According to Compagno (2002) and Last and Compagno (2002), the habitats occupied by sharks and rays could be categorized into: marine continental and insular shelves (from freshwater lakes and rivers to 200 m depth, the continental and insular slopes below 200 m and extending to 2000 m depth, and oceanic realm beyond the continental shelves and above the slopes and ocean floor. Many species overlap two or more of these categories of habitats which could be classified as shelf to slope (SHS), slope to oceanic (SOC), shelf to oceanic (SHO), shelf to semi-oceanic (SSO) and wide range of habitats (WRH). Others habitats are euryhaline freshwater/shelves (SHF) confined in oceanic (OCE), continental/insular shelves (SHL) and continental/insular slopes (SLO). Compagno and Cook (1995) placed freshwater elasmobranch for those species confined in freshwater as obligate freshwater (FWO).

The habitats preferred by species of sharks and rays species in Malaysia, Indonesia and Thailand (Compagno, 2002; Last and Compagno, 2002) indicated that rays are

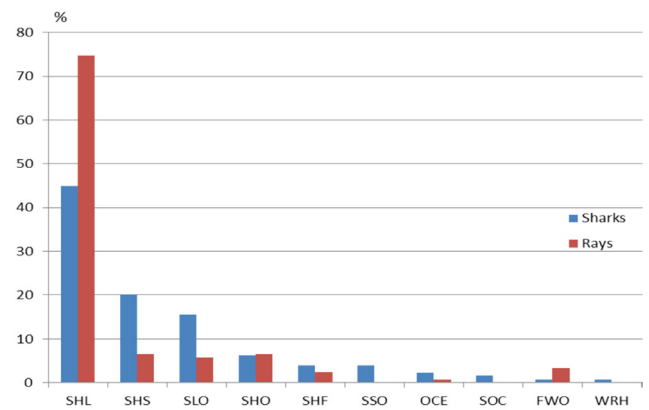


Fig 33: Overall habitat preferred (in percent) by species of sharks and rays in Malaysia, Indonesia and Thailand

mostly adapted to a benthic life style and dominant in continental/insular shelves (SHL). Only some species are pelagic compared to sharks which are dominant in more categories especially within continental/insular shelves (SHL), shelf to slope (SHS) and continental/insular slopes (SLO). In general a total of 58 species of sharks (45%) and 92 species of rays (75%) inhabit the continental/insular shelves (SHL): 26 species of sharks (20%) and 8 species of rays (7%) in shelf to slope (SHS); and 20 species of sharks (16%) and 7 species of rays (6%) in continental/insular slopes (SLO). The other categories such as freshwater (FWO), wide range (WRH), slope to oceanic (SOC), shelf to semi-oceanic (SSO) and oceanic (OCE) are inhabited by only 1-5 species except for shelf to oceanic (SHO) with 8 species of sharks and rays respectively (Figure 33).

Various issues on sharks had been raised by the ASEAN and SEAFDEC during the 13th Meeting of the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership in 2010, where SEAFDEC was asked to support the Member Countries in coming up with information/scientific evidence to support the development of regional common position to address the global issues on sharks. Specifically, the Meeting identified the priority areas that should be undertaken by SEAFDEC, which included the improvement of data collection on sharks at the national level and the implementation of human resource development activities on species identification of major shark species in the region. Such issues and challenges in conserving and managing shark and ray resources were followed-up recently at the Special Meeting on Sharks Information Collection in Southeast Asia organized by SEAFDEC in September 2011 in Thailand (Box 1).

During the Meeting, it was recognized that most of the countries in this region have developed their respective national management plans for sharks (NPOA-Sharks) and are in the process of implementing such plans. The major types of management measures related to sharks and rays conservation include: establishment of shark/ray no-take zones in national Marine Parks or marine protected

Box 1. Recommendations from the Special Meeting on Sharks Information Collection in Southeast Asia, Bangkok, Thailand, 15-17 September 2011

Issues, problems and concerns relevant to sharks collection and utilization in the Southeast Asian region were identified, including the inadequacies in stock assessment of sharks and rays as well as insufficiencies in terms of knowledge and skills in species identification especially for the look-alike species of sharks and rays.

For effective management of sharks and rays in the Southeast Asian region, the Meeting recommended that:

- appropriate methodologies should be developed including the conduct of genetic studies for species identification of dominant species based on dried fins and landed fins;
- R&D aimed at identifying and/or developing appropriate models/methodologies for stock assessment of selected dominant species of sharks and rays should be undertaken;
- effective management tools and fishing techniques should be identified that could lead to the reduction of by-catch from fisheries including endangered species of sharks and rays; and
- collaboration among the SEAFDEC Member Countries for the improvement of data collection and stock assessment especially at sub-regional or regional level should be strengthened.

Specifically, the key issues and constraints on the conservation of sharks and rays confronting the region included:

- Most sharks and rays on the continental shelf are incidentally caught by bottom trawl fisheries, although small numbers of small-scale fisheries also operate bottom long line targeting stingrays. Moreover, most sharks and rays in offshore/oceanic areas are also caught as by-catch using pelagic long line and drift gillnet.
- Insufficient information on stock structure, abundance, life history and reproductive rate of dominant/important commercial species of sharks and rays both for marine and freshwater areas.
- Current national statistical data collection does not record landing of sharks and rays by species, while catches from outside the territory (EEZs) are also merged into the national data.
- Inadequate efforts on the assessment of the status of the habitats of sharks and rays.
- Insufficient knowledge on species identification (limitations in the identification of shark/ray species from the color of fresh and preserved specimens), especially the look-alike species of sharks and rays.
- Inadequate national policy, program and related activity to support effective management of sharks and rays.
- Limited public awareness on sharing of data/information among fishers, local communities, and other key stakeholders to support of the fishery management including management of sharks and rays.
- Inadequate understanding on fishing gears and their practices, especially for the improvement of management measures for sustainable utilization of sharks and rays.
- Limited investments and/or collaboration in research and management of sharks and rays.

areas/periods; and prohibition of the use of specific gears in specific management areas. Moreover, it was also recommended that information collection on sharks and rays in the region should be improved and training on shark species identification should be conducted, while the need to set up routine or long-term information collection on selected sharks and rays species which are commonly found in the region was also raised.

Even though the Southeast Asian region has rich shark and ray resources compared with the other parts of the world, information on population status of sharks and rays and their fisheries is still insufficient. The limited information on catch, landings and trade as well as on the biology of sharks and rays species in Southeast Asia requires that information collection should be improved through appropriate national and regional programs.

1.3.2 Tunas

The major tuna species caught and landed in the Southeast Asia through long line, purse seine, pole and line, hand line, and other gears such as troll line and drift gill net, are the yellowfin tuna, bigeye tuna, skipjack tuna and albacore (SEAFDEC/TD, 2002; SEAFDEC/TD, 2004). Hand line is the most common fishing gear used specifically by small-scale fishers using fishing vessels under 5 GT. Skipjack comprises most of the tuna catch and its potential is estimated to be still moderate which means that the stocks could be exploited (See also details on Tuna Species in 3.1 (Part I) and 1.1.1 (Part II)).

An increasing production trend of tunas including neritic and oceanic tunas since 1997 was observed in the Western Central Pacific Ocean (WCPO) sub-area, while production is likely stable in the South China Sea (SCS) and Indian Ocean (IO) sub-areas. Tuna catch landing in the three sub-areas by major tuna species was approximately 550,000 MT/year, where the highest quantity landed was represented by skipjack followed by bigeye and yellowfin tunas. Among the four major tuna species caught in Southeast Asia, skipjack tuna are caught mainly in the WCPO sub-area. However, landing of skipjack tuna of the region has decreased by approximately 150,000 MT from 1997 to 2007. In the IO sub-area, data on skipjack landing shows likely stable level at approximately 50,000 MT/year. Moreover, landing of yellowfin tuna seems likely stable in SCS and IO sub-areas at the level of about 20,000 MT/year, and an increase from 50,000 to 125,000 MT during 1997 to 2007 in the WCPO sub-area. For bigeye tuna, landing data shows similar trend with that of yellowfin tuna in the three sub-areas.

Based on statistics data for Southeast Asia in 2009 (with data provided by Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, and Thailand), the total tuna production of Southeast Asia in quantity was approximately 1,640,000 MT. Indonesia as the leading tuna producer provided 925,660 MT or 56% of the region's total tuna production, followed by the Philippines with 612,008 MT contributing 37%, Malaysia with 56,432 MT accounting for about 3.5%, and Thailand with 47,490 MT providing about 3% of the total production. The total production volume of tuna species contributed 12% to the total marine fishery production of the Southeast Asian region.