

# Recording Sharks and Rays Statistics from Southeast Asia at Species Level

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The Southeast Asian region, which includes Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Thailand, and Viet Nam, is home to a rich diversity of sharks, rays, skates, and chimaeras (Class Chondrichthyes). According to Ahmad and Lim (2012), Ahmad *et al.* (2013) and Ahmad *et al.* (2014), at least 329 species of chondrichthyans are found to inhabit in this region from freshwater to the deep sea. This includes 174 species of sharks from 8 orders (29 families), 148 species of rays from 5 orders (19 families), and 7 species of chimaeras from two families. Ahmad *et al.* (2013) reported that Indonesia recorded the highest diversity of sharks with 114 species and 26 families followed by Philippines (94 species; 26 families), Thailand (64 species; 19 families), Malaysia (63 species; 18 families), Brunei Darussalam (34 species; 13 families); Myanmar (34 species; 10 families), Viet Nam (29 species; 13 families), and Cambodia with 11 species and 6 families. As for batoids (rays and skates), Ahmad *et al.* (2014) reported that Indonesia also recorded the highest number with 106 species and 17 families followed by Malaysia (84 species; 14 families), Philippines (66 species; 18 families), Thailand (71 species; 12 families), Cambodia (55 species; 14 families), Myanmar (44 species; 10 families), Viet Nam (38 species; 12 families), Brunei Darussalam (36 species; 11 families), and Lao PDR with 3 species and one family. Information on chimaeras however is still scanty. Until 2015, only 4 species of *Hydrolagus*, 2 species of *Chimaera* and one species of *Harriotta* have been recognized. Indonesia recorded 4 species of *Chimaerids* while the Philippines recorded 3, and Malaysia and Thailand recorded only one species. With new species continuously being discovered, the number of Chondrichthyan species in this region is expected to increase.

## International Concern on Sharks Conservation and Management

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) promotes the conservation and protection of species of wild animals and plants considered endangered to ensure that their international trade does not threaten the survival of the species in the wild. CITES has been protecting large numbers of species of animals and plants against over-exploitation through international trade by listing these in the CITES Appendices. Once species are listed in Appendix I, II or III of CITES, depending on the level of endangerment, the member countries of CITES are obliged to take the required actions with respect to international trade.

Deterioration of the global environment leads to the listing of a number of species including some fishery resources in the CITES Appendices which had continually increased throughout the past decades.

Being considered as among the endangered species, several species of sharks and rays have been proposed for listing in the CITES Appendices for protection and conservation (SEAFDEC, 2012). CITES has played a pivotal role in the collection of biological data and trade information on sharks. The term “sharks” is taken to include all species of sharks, skates, rays, and chimaeras (Class Chondrichthyes). More specifically, Resolution Conf. 9.17 adopted in November 1994 urged the Parties to submit to the CITES Secretariat available information concerning trade and status of sharks. As a result, the Food and Agriculture Organization of the United Nations (FAO) and other international fisheries management organizations have established several programs to collect biological and trade data on species of sharks. At the 10<sup>th</sup> Conference of the Parties of CITES (CoP10 CITES), focus was given on the need to improve the methods of identifying, recording, and reporting landings of sharks by species. Since then, the importance of compiling statistics on sharks and rays had been addressed by many organizations including SEAFDEC (Chamsai and Siriraksophon, 2011). During the 16<sup>th</sup> Conference of Parties of CITES (CoP16 CITES) in 2013, five species of sharks and all manta rays were listed in Appendix II, namely: oceanic whitetip shark (*Carcharhinus longimanus*); porbeagle shark (*Lamna nasus*); scalloped hammerhead shark (*Sphyrna lewini*); smooth hammerhead shark (*Sphyrna zygaena*); great hammerhead shark (*Sphyrna mokarran*), giant manta (*Manta birostris*), Alfredi manta ray (*Manta alfredi*), and *Manta* sp. These species were added to the list of other sharks and sawfishes that had already been listed in the CITES Appendices over the past decades. The complete list of shark species in the CITES Appendices could be gleaned at: [https://cites.org/eng/prog/shark/other\\_sharks.php](https://cites.org/eng/prog/shark/other_sharks.php).

Meanwhile, FAO promoted the International Plan of Action for Conservation and Management of Sharks (IPOA-Sharks) which was adopted during the Meeting of FAO Committee on Fisheries (COFI) in 1999, to provide support for the implementation of the Code of Conduct for Responsible Fisheries, especially on the conservation and management of sharks and their long-term sustainable use. The IPOA-Sharks covers all sharks and other chondrichthyan fisheries, both target and non-target fisheries, whether they be industrial,

artisanal or traditional fisheries. Class Chondrichthyes includes the cartilaginous fish species that are jawed vertebrates with paired fins, paired nares, scales, a heart with its chambers in series, and skeletons made of cartilage rather than bone (<https://en.wikipedia.org/wiki/Chondrichthyes>). The IPOA-Sharks also intends to provide a framework for the development of national, sub-regional, and regional plans as well as assessments of sharks in member countries' respective waters and also for trans-boundary species of sharks.

## SEAFDEC Initiatives to Improve Compilation of Sharks and Rays Statistics

In the Southeast Asian scenario, the pressure to list several commercially captured shark and ray species in the CITES Appendices has recently been rising and SEAFDEC was asked by its Member Countries to address such concern. Through a series of consultations and meetings, the SEAFDEC Member Countries agreed to collect data on various species of sharks and rays, and develop their respective management plans as necessary. Specifically, the assistance of SEAFDEC was sought by its Member Countries for the identification

**Box 1. Initiatives of SEAFDEC to improve sharks conservation and management in the Southeast Asian region**

- Providing a platform at regional level to:
  - Update and share progress of work on development/ implementation of IPOA and NPOA-Sharks among ASEAN Member States (AMSs), *continuing*
  - Develop common understanding of the AMSs on the issues related to CITES listing of sharks and rays, *continuing*
- Providing regional technical assistance for AMSs to come up with stock assessment of sharks and rays in their respective countries, including:
  - Dissemination of the publication on Field Guide Book for Sharks and Rays Species Identification, *completed*
  - Development of Standard Operating Procedures (SOPs) for sharks/rays data collection for the Southeast Asian region, including analysis and reporting systems, *completed*
  - Regional analysis of sharks and rays data collected at selected landing sites in seven (7) countries, *ongoing*
- Providing assistance in terms of capacity building programs on elasmobranch taxonomy, at regional and national levels, through:
  - Regional Training of Trainers on Elasmobranch Taxonomy, *continuing*
  - National Workshops on Sharks and Rays Data Collection, *first sessions completed; subsequent sessions planned*
  - On-site Training on Elasmobranch Taxonomy and Biology in selected member countries, *ongoing*



National workshop conducted by SEAFDEC in Indonesia in 2015 to identify sharks and rays species



of elasmobranchs species which is a fundamental step in data collection and law enforcement, especially in terms of conservation and protection of the economically-important species of sharks and rays. Thus, attempts had been made by SEAFDEC to assist the ASEAN Member States (AMSs) in improving their system of compiling the statistics of sharks and rays (Chamsai *et al.*, 2013). Nonetheless, there is still a need to strengthen the expertise of the AMSs in identification and compilation of biological data on sharks and rays. In addition, information on utilization of by-catch sharks and rays should also be collected and compiled to enhance the understanding of stakeholders in the AMSs on the importance of sharks and rays, and on the need to establish fisheries management measures for such economically-important species.

In Southeast Asia, sharks and other elasmobranchs are utilized as non-target catch by hook-and-line, long-line, gillnet, trawl net, purse seine net, and other fishing gears. Even though the Southeast Asian waters have one of the richest elasmobranch diversity in the world, the status of these resources and their utilization are still largely undetermined due to insufficient data on catch, landings at species level, and trade as well as limited information on the biological parameters of many sharks species due to limited capacity in collecting fishery data in most countries in the region. This leads to difficulties in assessing the status of sharks stocks and in planning and implementing management measures for sharks. Therefore, SEAFDEC has initiated some regional actions to improve sharks conservation/management in Southeast Asia as shown in **Box 1**.

## Pilot Study on Recording of Sharks and Rays Fisheries in Southeast Asia

SEAFDEC carried out its first regional studies on recording of sharks and rays landings at species level in Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, and Viet Nam during 2003-2004. Studies on local use, marketing and international trade were also carried out in Malaysia, Singapore, and Thailand with technical and financial support from SEAFDEC. Results of these one-year studies included: quantity of sharks catch and its proportion to total fish catch; total weight composition of fishing gear catching sharks; catch composition and biology of dominant species captured; other biological aspects; and shark utilization and marketing. Nevertheless, in the process of carrying out such studies, the countries encountered various constraints, as shown in **Box 2**.



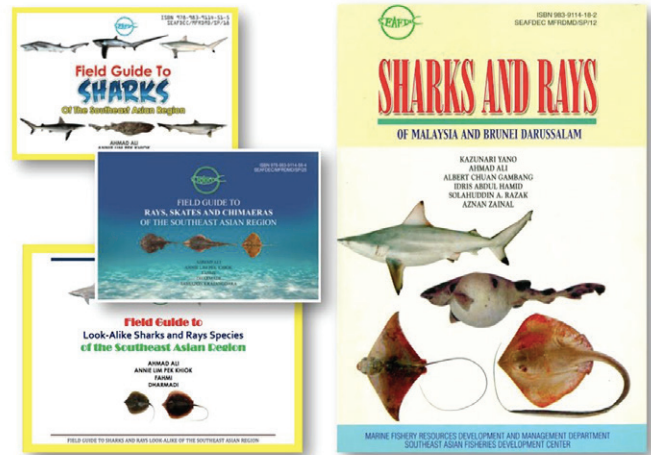
Sites surveyed by SEAFDEC during the one year study on sharks and rays landings in 2003-2004

### Box 2. Constraints encountered by participating AMSs during survey on local use and marketing of sharks and rays

- Insufficient knowledge and experience in data collection, particularly in conducting biological research including taxonomy and in determining the maturity of sharks
- Limited financial support hindering optimal data collection
- Inadequate cooperation of boat owners, fishers and landing site owners during data collection and biodiversity study
- Access to samples of large-size sharks almost nil as these are already cut into smaller parts due to limited fish hold capacity of fishing vessels, or landing headless, or already gutted or dried

## Publication of Book and Field Guides to Identify Sharks and Rays up to Species Level

In order to address the needs of the AMSs in improving their national statistics in recording landings of sharks and rays up to species level, the SEAFDEC Marine Fishery Resources Development and Management Department (SEAFDEC/MFRDMD) published a series of books on elasmobranch taxonomy since 2006. To date, four (4) publications have



already been produced, disseminated and used as regional references for sharks and rays species identification.

## Technical Assistance to AMSs on Sharks Conservation and Management

During the various regional fora organized by SEAFDEC to discuss the status of sharks and rays in the Southeast Asian region, SEAFDEC encouraged all AMSs to develop their respective National Plans of Action on Sharks (NPOA-Sharks) to be able to develop management measures for sharks and rays. At the outset, during the first SEAFDEC regional technical meeting on sharks which was held back-to-back in 2003 with the meeting of the ASEAN Sectoral Working Group on Fisheries, policy support was obtained for the promotion of regional initiatives on sharks. In 2008, SEAFDEC in collaboration with the AMSs started the compilation of fisheries statistics based on the adopted Regional Framework for Fisheries Statistics in Southeast Asia (SEAFDEC, 2008) that encourages recording of data on sharks and rays to species level. However, most of AMSs still could not report their catch landings of sharks and rays by species due to limited capacity on taxonomy of elasmobranch and inadequate experience for carrying out surveys on data collection of sharks and rays landings.

Thus, with financial support from the Government of Japan under the Fisheries Consultative Group Mechanism of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP), SEAFDEC organized a series of technical meetings since 2011 for the AMSs to update on their progress of implementing the

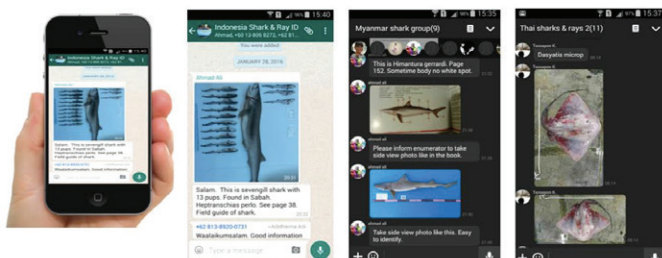
IPOA-Sharks and developing their respective NPOA-Sharks. During such technical meetings, clarifications on the technical assistance required by the AMSs in improving data collection of sharks and rays at landing sites had been highlighted.

### Regional Activities to Record Sharks and Rays Landings, Utilization, Marketing and Trade

With financial support from the Government of Japan (through the SEAFDEC Secretariat and MFRDMD) and the European Union (EU) through the CITES Secretariat, SEAFDEC has carried out since 2015 a one-year regional project on sharks and rays data collection in seven (7) countries of the ASEAN, namely: Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, and Viet Nam (**Table 1**). The project is aimed at compiling information for the preparation of Standard Operating Procedures (SOPs-Sharks) on data collection, and undertaking activities that include national workshops and training sessions on sharks and rays identification for enumerators, recording of landing data at species level, and validation of data; mid-term evaluation

Table 1. Selected pilot landing sites by sub-regional waters

Country	No. of survey sites	Selected pilot landing sites
Cambodia	1	Preah Sihanouk
Indonesia	2	Aceh, Cilacap
Malaysia	6	Perak, Sarawak, Sabah
Myanmar	2	Mawlamyine, Yangon
Philippines	2	Palawan, Luzon
Thailand	2	Songkhla, Ranong
Viet Nam	2	Vung Tau, Binh Thuan



meeting; and final meeting to review the national and regional reports. Data collection at selected landing sites which started in July 2015 would be completed during the third quarter of 2016. All information are collected based on the SOPs-Sharks to ensure that recording and analysis are standardized at the regional level.

Through this SEAFDEC/EU-CITES Sharks Project, the major outputs could include the following:

- Translated two (2) field guides on sharks and rays species identification in Viet Nameese and Cambodian languages for dissemination to respective countries
- Compiled and published results from one-year data collection in project’s participating countries (total catch and landing of sharks/rays at selected landing sites; new record of sharks/rays species in the participating countries, etc.) for dissemination to the Southeast Asian region
- Information on weight of sharks/rays by species landed in selected landing sites
- Taxonomic information of sharks and rays caught in the Southeast Asian region
- Trained enumerators making correct and valid identification of species at landing sites during data collection activities
- Compiled information and utilization of sharks and rays in the AMSs

Moreover, the Regional Network on Sharks was established through a collaborative arrangement between SEAFDEC and the National Technical Coordinators (NTCs) designated by the participating countries for the SEAFDEC/EU-CITES Sharks Project. The NTCs play a very important role in implementing the one-year data collection activities in collaboration with their respective local enumerators for collecting the necessary data at selected landing sites.

National workshops were then organized from July to September 2015 at selected landing sites proposed by respective participating countries. Participated by the NTCs of respective countries, local enumerators, and observers, the workshops considered the proposed activities and work plan presented by the SEAFDEC Project Team as well as the SOPs-Sharks and steps for the data key-in. Photograph-taking techniques for scientific data collection were also practiced. All national workshops were followed by visits to designated pilot landing sites to test the various applications and techniques in data collection.

Furthermore, the National Sharks Group (NSG) established in each participating country had been encouraged to use smart mobile telephone application such as Whatsapp and LINE. Members of the NSG include regional shark experts and resource persons from SEAFDEC, NTCs of respective countries, and local enumerators. The use of Whatsapp and LINE applications is considered useful for data validation and confirmation of unidentified species. After the workshops, compilation of data collected at selected landing sites has

been pursued. As agreed during such workshops, all data collected must be submitted to the regional experts through the NTCs of respective countries within two (2) weeks of the following month.

## Way Forward

In order to enhance the understanding of stakeholders on the importance of sharks and rays in the Southeast Asian region and the need to establish fisheries management measures, information on utilization of by-catch sharks and rays would also be compiled. MFRDMD has already started to collect socio-economic information on by-catch sharks and rays in the participating countries by taking advantage of the opportunities during the abovementioned national training activities conducted on-site. During this one-year project implementation, the capacity of AMSs to report their national statistics for sharks and rays up to species level could be enhanced. As a result, national activities in recording sharks and rays landing by local enumerators could be expanded to cover the whole countries participating in the project. Finally, data from AMSs on sharks and rays landing up to species level could be included in the compilation of data for the Fishery Statistical Bulletin of Southeast Asia (SEAFDEC, 2015) which is being produced by SEAFDEC annually.

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