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.

In the over all, the national data collection system is constrained by limited number of enumerators especially in remote areas, inadequate understanding on the part of fishers on the importance of collecting fishery data and statistics, and large amount of time and effort needed to compile the necessary fishery statistical data considering the huge number of fishers spread all over the countries (*e.g.* Indonesia has recorded more than 2 million fishers in 2009 with more than 600,000 fishing vessels). The major challenges in tuna data collection are therefore hinged on the number of fishing boats and landing size, and size of the countries' management areas as well as the number of fishers to be managed coupled with inadequate capable personnel in the field (**Box 2**).

In 2010, the tuna catch from the EEZ of the Philippine waters was 574,836 MT, of which commercial tuna fisheries accounted for about 65% while the remaining 35% was contributed by the country's municipal tuna fisheries. The country's commercial tuna fisheries make use of a variety of fishing gears that include purse seine, ring net and hand line while the municipal fisheries employ much larger variety of gears with line gears accounting for about 60% of the municipal catch. The major tuna species caught are the yellowfin tuna, skipjack, eastern little tuna or kawakawa, and frigate tuna (*Auxis thazard*). Earlier, bigeye tuna (<60 cm) which is also caught had been classified as small size yellowfin tuna. In 2005 however, efforts were made to separately classify the catch of bigeye from the yellowfin tuna. As a member of the WCPFC, the Philippines submit tuna catch by species based on data from the country's waters.

In the Southeast Asian region, the production of neritic tuna has gained more economic importance because of the high price of tuna offered by tuna canneries especially in Thailand. The tuna catch of Thailand from the Gulf of Thailand and landed in Thailand comprises three major species of neritic tuna such as frigate, little and long-tail tunas that are mainly caught by tuna purse seine. The catch data also indicates that the most abundant species is long-tail tuna followed by kawakawa.

For the tuna catch from the Andaman Sea landed in Thailand, the main tuna species mainly caught by light luring purse seine are the frigate tuna, kawakawa, bullet, and long-tail tunas, the most abundant of which is bullet tuna followed by frigate and kawakawa. Considering that Thailand is the main supplier of canned tuna in the world market, the demand for tuna by canneries in Thailand has been increasing and could have some impacts on the country's tuna fisheries. It is therefore encouraged that studies on tuna stocks should be urgently conducted to identify the problems, concerns and status of tuna fisheries especially in the case of Thailand.

Box 2. Recommendations from the Special Meeting on Improvement of Tuna Information and Data Collection in Southeast Asia, Songkhla, Thailand, 7-9 September 2011

Aimed at improving the methods of collecting data and information by identifying the gaps in the collection of the data taking into consideration the importance of tuna fisheries in the region especially to the small-scale fishers, the Meeting identified four common issues and concerns in the improvement of collecting tuna data and information:

- inadequate budget and human resources for data collection;
- non-systematic coordination among data collecting/ reporting agencies, private sector and NGOs;
- insufficient efforts on tuna stock assessment in Southeast Asia and database system still scanty; and
- national data collection system needs improvement for the compilation of good quality data (*e.g.* from logbooks, observer program, transshipment reports, tuna cannery records, fishing grounds).

Specially noted on the major gaps and constraints in collecting information on tuna catch data in Southeast Asia were:

- The difficulty of identifying the species of tunas especially in landing sites, considering that most of the catches are small sizes including yellowfin and bigeye tuna. It was therefore recommended that a special training should be conducted on the identification of tuna species especially the juvenile stages of the species, to be able to assess the tuna stocks. As for the appropriate method of stock assessment, it was suggested that existing models that are now being used could be adapted but should take into account the available validated data on total catch, fishing effort, fishing grounds, oceanographic conditions, among others.
- Insufficient number of staff in terms of number and capability for data collection, inadequate financial resources to fund any tuna survey, and the absence of appropriate and cost effective data collection systems.

SEAFDEC was therefore requested to undertake various activities in response to the need of improving the collection of tuna information and data, which include:

- consultation with countries on possible continuation of the development of regional tuna fisheries database;
- improvement of the quality and timeliness of data through capacity building programs, such as data collection onboard tuna fishing vessels (*e.g.* logbooks, observers onboard), from landing sites (catch unloading, species identification), and from cannery (accuracy in species identification);
- conduct of study on reduction of juvenile tuna catch from purse seine, pole and line, FADs, and by-catch in tuna fisheries;
- translation of existing relevant information materials (*e.g.* guidebooks, posters, brochures) issued by countries into English language for dissemination to the other countries in the region; and
- consultation with experts on stock assessment in order to come up with appropriate plan of activity to support the countries in the improvement of their respective information collection systems.

1.3.3 Sea Turtles

Six of seven species of living sea turtles in the world were confirmed to nest or inhabit the Southeast Asian waters. These are the leatherback (*Dermochelys coriacea*), green turtle (*Chelonia mydas*), olive ridley (*Lepidochelys olivacea*), hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*), and the flatback turtle (*Natator*