



**Report of the First Meeting of the Scientific Working Group on
Neritic Tuna Stock Assessment in the Southeast Asian Waters**

Shah Alam, Selangor, Malaysia

18-20 November 2014

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Southeast Asian Fisheries of Development Center

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Report of the First Meeting of the Scientific Working Group on Neritic Tuna Stock Assessment in the Southeast Asian Waters

18-20 November 2014

Grand BlueWave Hotel, Shah Alam, Selangor, Malaysia

I. Introduction

1. The 1st Meeting of the Scientific Working Group (SWG) on Neritic Tuna Stock Assessment in the Southeast Asian Waters was convened at Grand BlueWave Hotel, Shah Alam, Selangor, Malaysia from 18 to 20 November 2014. The Meeting was attended by the nominated experts/scientists and researchers from seven (7) Member Countries namely: Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand and Viet Nam. Representatives and officers from SEAFDEC/Marine Fishery Resources Development and Management Department (MFRDMD), SEAFDEC/Training Department (TD), SEAFDEC/Secretariat and members of the Regional Fisheries Policy Network (RFPN) for Indonesia, Malaysia and Philippines. The list of participants appears as **Annex 1**.

II. Opening of the Meeting

2. On behalf of the Department of Fisheries Malaysia as host country, the Chief of SEAFDEC/MFRDMD, *Ms. Mahyam Binti Mohd Isa* welcomed the participants to the Meeting and highlighted that the importance of this Meeting as the first gathering for the Scientific Working Group Members, whom had been officially nominated by Member Countries with expected that they could contribute knowledge and ideas in the sustainable management of neritic tuna in Southeast Asian waters. She added that, in the past few years, statistics showed a slightly decline in terms of the production volume of neritic tuna, as well as some mis-identification of the longtail tuna lead main problems in trading internationally. Thus, it is SEAFDEC and ASEAN Member State's role to address these concerns to ensure that neritic tunas are sustainable utilization for food security of the future generations.

3. She recalled that the task of developing a Regional Cooperation focusing on neritic tuna fisheries was given to SEAFDEC during the 45th Meeting of the SEAFDEC Council in April 2013 in the Philippines. In response to such instruction, the Regional Plan of Action or RPOA for sustainable neritic tuna fisheries and management was developed during the Experts Group Meeting in Krabi Province, Thailand that was convened on June 2014. One of the important activities agreed during that Meeting was the establishment of Scientific Working Group on Neritic Tuna Stock Assessment. Her Opening Remarks appears as **Annex 2**.

III. Selection of Chairperson, Background and Arrangements, and Introduction of Scientific Working Group Members

4. The SWG Member for Philippines, *Mr. Noel C. Barut* nominated *Ms. Mahyam Bt. Mohd Isa*, the Chief of SEAFDEC/MFRDMD as the chairperson of the Meeting and the nomination was seconded by *Dr. Htun Thein*, SWG Member for Myanmar. The Meeting continued with the introduction of SWG Members from the Member Countries.

5. *Ms. Hemalatha Raja Sekaran*, RFPN Member for Malaysia presented the background and introduction of the Meeting as appear in the Prospectus (**Annex 3**). Later, she introduced the Agenda of the Meeting which adopted as appear in **Annex 4**.

IV. Introduction of the RPOA-Neritic Tuna and Work Plan for 2014-2015

6. *Dr. Somboon Siriraksophon*, Policy Program Coordinator, SEAFDEC/Secretariat presented the background of the development of RPOA-Neritic Tuna (**Annex 5**) as well as the agreed work plan of 2014-2015 (**Annex 6**). He provided information on previous information on the status of tuna (neritic and oceanic) assessment in the Southeast Asian waters which funded by the Japanese Trust Fund (JTF) focused on four (4) countries like Indonesia, Philippines, Thailand, and Viet Nam from year 2008 to 2012.

7. He added that for this Meeting would focus the neritic tuna where Sweden Government expressed the support on the sustainable utilization of neritic tuna in the region. He recalled the Meeting that during the 45th SEAFDEC Council Meeting in 2012, the issue was presented in order to understand the importance of neritic tuna in the region based on the study on tuna conducted by SEAFDEC, the Council directed SEAFDEC to develop the regional cooperation plan of action for neritic tuna. In response to this issue, SEAFDEC conducted series of meeting for neritic tuna to review the status and trend of neritic tuna in the region and after the meeting in Songkhla started to conceptualized and developed a Regional Plan of Action (RPOA) for neritic tuna. The recent meeting was conducted in Krabi Province in June 2014 where experts from Member Countries were invited and come up with the final draft of the RPOA- Neritic Tuna.

8. In addition, he presented and discussed the prioritized issues where lot of issues to consider at the regional level that need to address and to consider in drafting the RPOA. Regarding this, the RPOA was developed and was able to come up with six (6) important objectives to address the issues and problems facing by the region where he pointed out the establishment of the Scientific Working Group (SWG) for the conservation of neritic tuna in the region are also important.

9. Moreover, he reported the progress of immediate work plan for regional cooperation to promote sustainable utilization of neritic tuna resources in the Southeast Asian waters and reported that one of the activity is the conduct of on-going stakeholder consultation, which the first meeting was conducted in Philippines and was attended by boat owners, fishery university, and the national and local government officers, however, another few more consultations would be considered to be conducted in 2015 in Indonesia, Malaysia and Thailand if time allows.

10. The second and third activity of the work plan was the establishment of SWG, the work plan on the stock assessment, and the plan of actions on human resource development, he insisted to the Meeting to double work on this matter. He then emphasized to the Meeting that the SWG was going to improve the strategic plan and curriculum on data collection system in the region and the strategic plan for awareness building to let the industry understand how important the neritic tuna industry. He also encouraged the Meeting to finalize the Term of Reference (ToR) of the SEAFDEC established Scientific Working Group (SWG) for Neritic Tuna and also the SWG will provide guidelines fort the human resource development program for neritic tuna in the region.

11. And finally, he informed and requested the cooperation of the Meeting that next year will finalize several documents for the important activities for the stock assessment with regards to the different Standard Operating Procedures (SOP) for data collection where SEAFDEC-Sweden will provide financial support to the meetings related to neritic tuna program.

12. After the presentation made by *Dr. Somboon*, the SWG Member for Thailand asked for the clarification on the difference the nature of the ASEAN Tuna Working Group and SEAFDEC RPOA-Neritic tuna activities. In response, it was informed that the ASEAN Tuna Working Group was set-up under the ASEAN framework with the cooperation with economist group focused on trade issue and tried to come-up a thematic area in order to sustain the tuna trade industry while SEAFDEC focus in the technical matters. Both groups made clarified understanding that there was no duplication of functions and purpose, where every meeting in ASEAN was no scientist and fishery experts attending except SEAFDEC. SEAFDEC support the intra-regional trade industry within the ASEAN region and that's where SEAFDEC stands in the ASEAN Tuna Working Group. With regards to RFMO and SEAFDEC, SEAFDEC will not duplicate the work but rather complement and provide solution to the problem especially on incomplete data gathered for any fisheries management.

13. The SWG Member for Philippines added that the ASEAN Tuna Working Group mainly focus on the promotion, marketing and trading of tuna products not on scientific information and the status of tuna fishery. He also added that SEAFDEC could serve science core provider for ASEAN for clear understanding with other ASEAN members, a scientific-based result and advices use as a basis for fishery management to the fishery managers and policy makers to finally make decision.

14. With regard to the six (6) objectives of the RPOA, *Dr. Worawit Wanchana* pointed out that the meeting should prioritized the issues so we can determined what we need to provide precise actions and the established SWG will work on this matter.

15. The SWG Member for Malaysia, commented that some of the objectives of the RPOA need some refinement, to harmonize the work between ASEAN Tuna Working group (ATWG) and SEAFDEC, include the **trust in trade** on “promote sustainable utilization of neritic tuna resources”. He identified and proposed as the main priority of the RPOA is the stock assessment and status of the fishery product.

V. Reviews the Updating Status and Trends of Neritic Tuna Fisheries in the Southeast Asian Region

16. The SWG Member for Cambodia, *Mr. Samreth Sambo*, presented the status of tuna stocks in Cambodia (**Annex 7**). He presented general information on coastal fisheries in Cambodia which covers from the artisanal, middle and large scale fisheries, and showed its annual production which Indian mackerel is the major fish catch and fishing methods used were mostly drift gillnet, fishery management for specific species. According to his presentation, bullet tuna (*Auxis rochei*) and bonito (*Sarda orientalis*) was the only neritic tuna present and caught by the fishermen in waters of Cambodia. The Meeting observed that the status and trend could not be determined at present due to insufficient information on the production trend of neritic tunas where catch and effort data could not be standardized and also recognized the difficulty of data collection for neritic tunas, and then the Meeting suggested considering to improve their capacity in establishing a national status and trend of neritic tunas, to enhance their capability in identifying the species for stock assessment.

17. The SWG Member for Indonesia, *Mr. Thomas Hidayat*, presented the status of neritic tuna stocks in Indonesia (**Annex 8**). He informed that Pemangkat is one of the biggest landing sites of neritic tuna operating in Natuna Sea and South China Sea area, using drift gill net as the main fishing gear catching neritic tuna. In addition, he informed the catch composition is widely dominated by kawakawa (*Euthynnus affinis*), longtail tuna (*Thunnus tonggol*), and Spanish mackerel (*Scomberomorus commersoni*).

18. The SWG Member for Malaysia, *Mr. Samsudin bin Basir* presented the Country Report of Malaysia. He provided the overview of neritic tuna fisheries in Malaysia and described the Exclusive Economic Zone (EEZ) of Malaysia. The Meeting noted that the common neritic tuna species found in Malaysia are *Thunnus tonggol* (longtail tuna), *Euthynnus affinis* (kawakawa) and *Auxis thazard* (frigate tuna). He also provided the data on total annual landing of neritic tunas from 2008 to 2013 and further shared the detailed information on annual landing by species and area, in particular the Straits of Malacca and South China Sea. The Meeting also took note of the monthly landing of longtail tuna, kawakawa and frigate tuna in the West Coast of Peninsular Malaysia. He informed the Meeting that the import and export data available in the national statistics is not recorded by species, and it combines all tuna species and its parts. His presentation appears as **Annex 9**.

19. The Meeting also noted that there was misidentification of neritic tuna species, especially between longtail and kawakawa species, and agreed that there is a need for capacity building pertaining to the neritic tuna species identification in order to avoid misreporting.

20. The Meeting noticed that from the presentation, the data on neritic tunas in Malaysia is focused on the West Coast of Peninsular Malaysia (Andaman Sea and Straits of Malacca), and suggested that the data collection should be improved to include the data of East Coast Peninsular Malaysia (South China Sea and Sulu-Sulawesi), in order to obtain the overall status of neritic tuna resources in Malaysia.

21. *Dr. Htun Thein*, the SWG Member for Myanmar explained the status of neritic tuna fisheries in Myanmar. He informed the Meeting that the data on neritic tunas is insufficient, and that the present data available in Myanmar, including data on species identification is not reliable. The Meeting noted that the four (4) common neritic tuna species found in Myeik Archipelago are *Auxis thazard* (frigate tuna), *Auxis rochei* (bullet tuna), *Euthynnus affinis* (kawakawa) and *Scomberomorus commersoni* (Narrow-barred Spanish Mackerel), and the distribution depends on geographical location. According to the fishers, the main gears used to catch neritic tunas are drift gill net and purse seine. However, composition and population of neritic tunas in Myanmar waters is still unknown, as Myanmar does not carry out official data collection for neritic tunas. He added that the establishment of the Scientific Working Group is a good opportunity for Myanmar to initiate the stock assessment study of neritic tuna species in the country.

22. The Meeting learned that Myanmar had formed a Working Group under the BOBLME project to carry out the stock assessment study for Hilsa Shad. Nevertheless, the capacity for data collection and compilation for neritic tuna species is still lacking, and knowing that neritic tuna species identification and data collection method is required to conduct the stock assessment. The country report shows as **Annex 10**.

23. The SWG Member for Philippines, *Mr. Noel C. Barut*, presented the current status of Philippine neritic tuna fishery (**Annex 11**). He provided the Meeting the general information of

national marine fisheries, tuna fishery industry, and its distribution, as well as, providing the seven (7) common tunas (oceanic and neritic) commercially utilized within the coastal and EEZ waters like the big-eye tuna, yellowfin tuna, skipjack, frigate tuna, bullet tuna, kawakawa/eastern little tuna, and longtail tuna.

24. *Mr. Barut* informed the Meeting that the fisheries sector management is mainly based on the three (3) main legal framework, likewise, the different special institutional arrangements for the conservation and management of fishery resources. He also informed that there were ongoing initiatives made by the NFRDI, BFAR and related agencies to collect data like National Stock Assessment Program (NSAP), logsheet system, observer program, VMS, catch certification, and cannery receipts which are properly implemented.

25. He explained that the BFAR and NFRDI were collaborated each other to collect fisheries data mainly for any fisheries management purposes, however, the Bureau of Agricultural Statistics (BAS) agency mandates to collect and compile data for national budget and planning purposes. He added also that there were responsible partners in collecting information's like Philippine Fisheries Development Authority (PFDA) which they provided data and information of unloaded volume of catch, in terms of species, fishing ground, and value in main fishports, while National Statistics Office (NSO) provides official statistics on exports and imports of fishery products.

26. Moreover, he presented the future national fisheries management plans on NPOA-IUUF, FAD management policy, and the strategic action program for the sustainable fisheries management of the Sulu-Celebes (Sulawesi) Sea Large Marine Ecosystem (SCS-LME). He then presented as example as best fisheries management practice in Davao Gulf where the area is known as the spawning ground for oceanic and neritic tuna, and they established a closed season for the conservation of small pelagic species. He provided also the list of existing national fishery laws and regulations related to tuna for ready reference. In addition, he also informed the Meeting the different fishing methods used for catching tuna such as purse seine, ringnet, multiple hook and line, handline with the used of Fish Aggregating Device (FADs) as an accessory for aggregating small pelagic fish, and other gears like gillnet, modified Danish seine, liftnet, trap net, troll line, scoop net, and trammel net.

27. Finally, the national status and trends of neritic tuna was presented from 2005 to 2013 where eastern little tuna and frigate tuna was the top two major tuna production in municipal and commercial fishing industry. He explained also the distribution of eastern little tuna and frigate tuna which commonly found in the Southern part of the Philippines where purse seine and ringnet are the main contributors of voluminous production of tuna. He concluded that national issues and constraints on management of neritic tuna fisheries where the collection of fisheries data is not properly reported as expected by BFAR since the transfer of mandate to Bureau of Agricultural Statistics (BAS).

28. The SWG Member for Thailand, *Ms Praulai Nootmorn*, presented the status of neritic tuna fishery in Thailand (**Annex 12**). She provided general information regarding the national contribution of fish production in the Gulf of Thailand (GoT) and Andaman Sea from 2000 to 2011 and concluded that with the available data and information for neritic tuna is not overfished, according to her. She explained clearly the different sub-division of fishing areas fishing season and the different types of fishing methods used in the utilization of neritic tuna in the Gulf of Thailand and Andaman Sea. She further explained the different types of gears used like Thai purse seine, light luring purse seine, FAD purse seine and Tuna-Purse seine. In

addition, she discussed on the status and production of neritic tuna resources which observed that in the year 2008 there is an abrupt decline of production which trigger on more discussion in the Meeting.

29. Moreover, in terms of imports and export of tuna, she told that despite the production of neritic tuna in the country is minimal still on top exporter of canned tuna because of high numbers of tuna canneries and it needs volume of tuna supply from other countries.

30. However, she provided information on existing national fishery laws related to neritic tuna fishery from the notifications from the Ministry of Agriculture and Cooperative and the fishery laws and regulations enforcement.

31. In addition, she also informed the Meeting that the Department of Fisheries (DoF), Thailand provided information's gathered on the national statistics data that supports the management of tuna fishery, including data for on all types of tuna purse seines.

32. The SWG Member for Viet Nam, *Mr. Nguyen Viet Nghia*, presented the Neritic Tuna Fisheries in Viet Nam. He provided general information regarding Viet Nam marine capture fisheries, area and zoning in Viet Nam waters as well as their management arrangements. The Meeting noted that there are five (5) common neritic tuna species found in Viet Nam waters namely *Auxis rochei* (bullet tuna), *Euthynnus affinis* (eastern little tuna/kawakawa), *Thunnus tonggol* (longtail tuna), *Auxis thazard* (frigate tuna), and *Sarda orientalis* (striped bonito) and the main fishing gear used to catch neritic tunas are purse seine and gill net. Furthermore, he also shared information with the Meeting such as the data on fishing efforts, fishing ground, annual landing, and trend of Catch per Unit Effort (CPUE) for both purse seine and gill net, respectively. Other information on neritic tuna resources and biomass by species, biological data, and import and export data was also presented during the Meeting. In addition, he highlighted the issues and constraints in neritic tuna fisheries as well as provided suggestions on way forward and future works. His presentation appears as **Annex 13**.

33. The Meeting noted that Viet Nam has comprehensive data, especially the data on fishing efforts. On the other hand, the Meeting was clarified that Viet Nam had conducted stock assessment study for three (3) oceanic tuna species and the data are available starting from 2009 until present. In addition, Viet Nam also implements log book system to facilitate the fisheries data collection whereby it is part of the Fisheries regulation in the country.

34. For the Regional neritic tuna trend and status, *Dr. Somboon* presented the overall status of neritic tuna (**Annex 14**) for better understanding on the conservation and management of neritic tuna in the ASEAN waters.

VI. Special Issues on Status and Trends of Longtail Tuna

35. *Dr. Somboon Siriraksophon* delivered a presentation on production trend of longtail tuna (*Thunnus tonggol*) in the Southeast Asian Waters based on the National Statistics from 2004-2010 (**Annex 15**). He expressed appreciation to Malaysia, Indonesia and Philippines for a detailed presentation for the local fishery management. He reiterated that it is very important that SWG should work together on stock assessment in the sub-region Andaman Sea, South China Sea, Gulf of Thailand, and Sulu-Sulawesi Sea area to compile data with other countries.

36. Based on his observation, he explained that the data of status and trends of longtail tuna showed fluctuating of fish production. He added that the present production status of overall neritic tuna in Southeast Asian waters is still good however it is necessary to check the issues and consult the industry especially on cannery and processing plants in Thailand if they can still export and import neritic tuna products.

37. With regards to the issues of exporting tuna canned (longtail tuna) to Sweden and Scandinavian. He requested that it is timely that the SWG to work together for sustainable use of neritic tuna resource in the region.

38. Another concern on the genetic study of eastern little tuna/kawakawa and longtail tuna to determine the origin of stock using the DNA analysis. The Meeting noted that to conduct the genetic study would take time at six (6) months for conducting the sampling at all sites and for the analysis one (1) year. The Philippine representative took note that the genetic study conducted on eastern little tuna/kawakawa in the South China Sea belongs only to one single stock is already published and conducted genetic study also for other species like frigate tuna, round scad and sardinella and they belong to one stock where the samples collected in Malaysia, Indonesia and Philippines. With the different views and experiences shared by the experts on genetic study, Ms. Wahida said that microsatellite DNA it needs to design 7 primers and about 1 year to develop and more expensive while mitochondrial DNA is simple and she recommended using the mitochondrial DNA analysis for the study.

39. The SWG member for Viet Nam raised a suggestion related to stock identification by using the otolith method for stock assessment through measuring the size of the organ at different sizes and shape, and also to identify the age and origin of fish sample. The member for Indonesia shared his experienced on otolith, he mentioned that it takes a long method when they had study on using otolith organ analysis, due to lack of human resource and capacity to do the analysis they must sent the samples to Australia for proper analysis.

VII. Development of the Strategic Work Plan 1: Improving Data Collection, Developing Key Indicators and Stock Assessment

40. *Dr. Somboon* emphasized to the Meeting that there is a need to develop the SOP for data collection and scientific analysis, and the inclusion of the genetic study where MFRDMD will consult the Meeting and elaborate more on this data to be collected.

41. The Meeting decided the important data and information for the data collection, developing indicators and stock assessment needed for this program. In terms of catch data: area, species, gear group, month (season), fishing ground, genetics and gonad. In terms of measurement: length (total length, standard length, body length, fork length and body depth), weight, Truss network (morphometric). This morphometric will measure the length from tip of the mouth to 1st dorsal fin and 2nd dorsal fin of the fish sample.

42. The Meeting identified the study areas were the four (4) sub-regional areas and the countries involved for data collection, catch and effort as such the Andaman Sea, Gulf of Thailand, South China Sea and Sulu Sulawesi Sea. Please see the Table 1 for the specific countries involvement in the sub-regional areas of implementation.

Table 1. Sub-regional areas and countries involve.

Sub-Regional Area	Countries Involve
➤ Andaman Sea	1. Indonesia

	<ol style="list-style-type: none"> 2. Malaysia 3. Myanmar, and 4. Thailand
➤ South China Sea + Gulf of Thailand	<ol style="list-style-type: none"> 1. Brunei Darussalam 2. Cambodia 3. Indonesia 4. Malaysia 5. Philippines 6. Thailand, and 7. Viet Nam,
➤ Sulu Sulawesi Sea	<ol style="list-style-type: none"> 1. Indonesia 2. Malaysia, and 3. Philippines

43. The different sampling location/sites for the stock assessment, GSI and stomach content of every member countries were finally decided by the SWG Members of every country in the South China Sea and Andaman Sea. Please see Table 2 for the sampling sites of every member country.

Table 2. The sampling sites for stock assessment, GSI and stomach content by country

Country	Sampling Site/s
Andaman Sea Sub-Region	
➤ Indonesia	<ol style="list-style-type: none"> 1. Banda Aceh 2. Belawan
➤ Malaysia	3. Kuala Perlis
➤ Myanmar	4. Myeik
➤ Thailand	<ol style="list-style-type: none"> 5. Ranong 6. Phuket
South China Sea and Gulf of Thailand Sub-Region	
➤ Brunei	1. Brunei Darussalam
➤ Cambodia	<ol style="list-style-type: none"> 2. Siano Veil – GN 3. Koh Kung – GN 4. Kampot – GN
➤ Indonesia	5. Pemangkat
➤ Malaysia	<ol style="list-style-type: none"> 6. Tok Bali 7. Kuantan 8. Kota Kinabalu 9. Kuching
➤ Philippines	<ol style="list-style-type: none"> 10. Masinloc (Zambales) – PS 11. Sta. Cruz (Zambales) – PS 12. Puerto Princesa (Palawan) – PS and RN 13. Antique - GN, PS and RN 14. General Santos City – PS and RN
➤ Thailand	<ol style="list-style-type: none"> 15. Trat 16. Songkla 17. Patani
➤ Viet Nam	<ol style="list-style-type: none"> 18. Nghe An – GN and PS 19. Danang – GN and PS

	20. Vung Tau - GN 21. Tien Giang - PS 22. Kien Giang (GoT) – PS
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44. The suggested and agreed data information to be studied and collected for stock assessment will cover the seven (7) species composition of neritic tuna and seerfish caught by all types of fishing gears such as; eastern little tuna/kawakawa (*Euthynnus affinis*), frigate tuna (*Auxis thazard*), longtail tuna (*Thunnus tonggol*), bullet tuna (*Auxis rochei*), bonito (*Sarda orientalis*), Indo-pacific king mackerel and narrow barred Spanish mackerel. However, the Meeting agreed to focus and assess the two (2) neritic tuna species for the Gonado Somatic Index (GSI), stomach content and genetic study which is very prominent to every country was the eastern little tuna/kawakawa and longtail tuna.

45. The activities were finally identified for 2015-2016 and the important data's to be collected in the sampling sites were shown in Table 3.

Table 3. Type of Data to be collected for stock assessment

ACTIVITIES (2015-2016)	STATUS/REMARKS
1. Historical data for 5 to 10 years	- PH, TH, ID MY (available) - CAM, VN, MM (need assistance)
2. Catch and effort data sampling by site and gear for Andaman Sea (6 sites) and SCS (22 sites)	- PH, TH, ID MY (on-going) - CAM, VN, MM (need assistance)
3. Length measurement and weight for all neritic tuna species and mackerel (7 species) ➤ All type of fishing gears ➤ Not less than 100 samples/species/month	- PH, TH, ID (on-going) - CAM, MY, VN, MM (need assistance)
4. Gonad and Stomach content for two species (long tail and kawakawa) ➤ More than 25 cm in length ➤ All type of fishing gears ➤ 100 samples/month/species/all sizes	- All countries need assistance
5. Genetic study (long tail and kawakawa) use dorsal fin ➤ 35 samples per site at the (same period, one time)	- All countries needs assistance except Myanmar where MFRDMD will assist - Standardized the method of sampling - 15 sampling sites for all landing sites

46. For more in-depth understanding, further clarification and information with respect to genetic analysis, the chairperson of the Meeting requested Ms. Wahidah M. A. of MFRDMD to provide the basic information for DNA analysis using the Mitochondrial DNA and Microsatellite DNA. She also informed that several genetic study reports made on *Thunnus tonggol* and *Euthynnus affinis* conducted by different researchers in ASEAN waters where most of the studies conducted for DNA by using Mitochondrial DNA considering that microsatellite DNA is more expensive compared to the latter one. The type of DNA type to be used will be decided when the experts from TH, PH, IN, MY and VN will finally agree and may depend on the cost of expenses may consider.

47. *Ms. Wahida* and the Meeting decided to have fifteen (15) sampling sites for the genetic sampling sites, where four (4) landing sites in Andaman Sea and eleven (11) landing sites South China Sea + Gulf of Thailand. The fifteen (15) sampling sites identified in Andaman Sea and the South China Sea is shown in Table 4.

Table 4. The sampling sites for Genetic study

Country	Sampling Site/s
Andaman Sea:	
➤ Indonesia	1. Belawan
➤ Malaysia	2. Kuala Perlis
➤ Myanmar	3. Myeik
➤ Thailand	4. Ranong
South China Sea:	
➤ Indonesia	5. Pemanagkat
➤ Malaysia	6. Kuantan 7. Sabah
➤ Philippines	8. Tawi-tawi 9. Puerto Princesa 10. San Fernando
➤ Thailand	11. Trat 12. Patani
➤ Viet Nam	13. Nghe An 14. Danang 15. Vung Tao

48. *Dr. Worawit Wanchana*, representative from SEAFDEC/TD, provided information on the Joint Tuna Research in Sulu-Sulawesi Sea (**Annex 16**) such as information and data to be collected (Tuna fishery profile in SSS, Catch and landing, Length frequency, Weight frequency Growth pattern, Gonad, Stomach contents, and Genetics). He additionally discussed the different activities conducted under the project such as Review catch and efforts, Data collection, Tuna stock assessment, Determination of tuna spawning grounds, and Assessment of the use of FADs for tuna fisheries conducted in Indonesia, Malaysia and Philippines different landing sites.

49. *Dr. Somboon* reiterated the importance of SWG for the neritic tuna which is a regional concept and will linked to the national program and framework, as he reiterated the Meeting understand that this is long term program and should work together, understand their roles as SWG members for their country. He also emphasized that everyone should have a sense of ownership to this program where SEAFDEC could only facilitate, provide support and assist to the less capable countries in the collection of important data in order to be able to know stocks trend of neritic tuna in the region and to attain the program goal.

50. The SWG member for Viet Nam brought up an issue with regards to data sharing, which should have a clear procedure to share the data or else it's impossible for them to share the data to the regional stock assessment because of their strict policy regarding this matter and clarify what type of data and its intention especially if the budget used was finance by their Government. *Dr. Somboon* suggested the Meeting to add an item on policy of data sharing on stock assessment in reference to TOR for SWG member and the details expounded at the TOR for capacity building, and to resolved farther that sharing data is available during the study period for neritic tuna regional stock assessment including biological data.

VIII. Development of the Strategic Work Plan 2: Awareness Building and Capacity Building

51. The SWG member for Viet Nam proposed the capacity building in data collection based on catch and effort data, stock assessment, biological data, species identification, data handling/processing and data sharing among other Member countries.

52. The SWG member for Philippines suggested that the data collection based on gear, but depend on the countries whether they need to come up a catch result catch by species and gear.

53. The SWG member for Malaysia proposed the capacity building is more focused on how to improve data collection.

54. The chairperson acknowledged the capacity of the Member Countries for stock assessment except Myanmar, Cambodia and to include Viet Nam requested to assists them in on-the-job training for the two countries identified need improvement on data base collection. Malaysian experts were suggested to provide basic data training in excel format and analyse and process data on pivot table.

55. The SWG member for Philippines raised point of clarification regarding catch and effort data and asking if we have a common methodology or submit the raised collected effort and catch data collected for the month.

56. The SWG member for Indonesia shared his recently attended training on CPUE and suggested that we can have this training for simple method for stock assessment method to determine the status of our neritic tuna while waiting for the genetic study.

57. *Dr. Somboon* concluded in the office and needed to consult this to funding donor (Sweden Project) how important this activity to the region. The activities will be expected to start next year (2015) starting most probably April 2015.

58. The Meeting identified the three (3) main topics to be address for the stock assessment of neritic tuna species in region. The list of strategic work plan in order to improve awareness building and capacity building appears as **Annex 17**.

IX. Term of Reference (TOR) for SWG on Stock Assessment for Long Term Management

59. *Dr. Somboon Siriraksophon* presented the working paper Terms of Reference for the Scientific Working Group (SWG) for Stock Assessment on Neritic Tunas in the Southeast Asian Region, consist of the role of SWG-Neritic Tuna, scope of work, terms of reference (TOR), composition of the SWG, and the nature of SWG activities and financial arrangements. He added the draft TOR will be finalized by during the Meeting and submitted to the SEAFDEC Council for consideration.

60. The meeting was clarified that the recommendations made by the SWG will be tabled at the higher level meeting for considerations. It was agreed that the scope of SWG's work shall cover the five (5) neritic tuna species and two (2) seerfish species that was identified under Agenda 6.

61. The Meeting was clarified that review and assessment of the status of neritic tuna industry and fisheries management measures is not part of the SWG's work as it requires the trade information, and therefore agreed to remove from the scope of work.

62. Philippines SWG member explained that the Ad-hoc Technical Working Group is not needed under the SWG, because the SWG itself is a working group. Therefore, the Meeting agreed to remove the provision on the Ad-hoc Technical Working Group.

63. After in-depth discussion, the Meeting decided that the SWG shall be chaired by the Chief of MFRDMD and co-chaired by a representative of the member country on an annual basis, following the alphabetical order. In principle, the SWG Meeting shall be convened at least once a year, however more than one (1) meeting could take place, depending on its necessity.

64. The Meeting also agreed that a stock assessment expert from MFRDMD shall be appointed as the interim Chief Scientist under the SWG. The work period of the Chief Scientist depends upon the tenure of the study period as decided by the SWG. In this connection, the Meeting recommended that a stock assessment expert should be recruited under SEAFDEC to assist the undertaking of the stock assessment project.

65. The Meeting noted that the SWG-neritic tuna was formed not only for the particular stock assessment project but to ensure sustainable utilization of neritic tuna resources within the region. In this regard, there is no specific tenure for the SWG.

66. The SWG member for Malaysia, *Mr. Mohd Noor bin Nordin* suggested that the SWG members shall convey the outcome of the Meeting to their higher management in order to obtain commitment and support from their respective department and avoid communication breakdown.

67. The Meeting took note of the importance of reporting mechanism for conveying the recommendations made by the SWG to the higher level committees. In this regard, the Meeting agreed that a systematic flowchart describing the reporting mechanism of the SWG shall be developed and annexed to the TOR.

68. After thorough discussion, some modifications were made to the draft TOR. The revised TOR is shown as **Annex 18**.

X. Immediate Action Plans and Way Forwards

69. The Meeting discussed the way forward and listed important actions including timelines and responsibilities that need to be accomplished to ensure smooth implementation of the project. The Timetable of activities for SWG appears as **Annex 19**.

70. In order to plan the budget for overall project, the Member Countries shall provide information on the budget requirement to carry out the data collection activities at their designated stations. In this regard, the Meeting agreed that the Secretariat of the SWG would prepare a template for budget requirements and co-finance, and that the template will be distributed to the Member Countries for feedback. The Member Countries shall submit the budget requirements, including the cost of hiring enumerators for the data collection to the Secretariat of the SWG by mid of January 2015. The proposal for obtaining fund for the

project will be prepared by the Secretariat of the SWG, according to the results based approach as required by the donor (Sweden Government).

71. In addition, it was also agreed during the Meeting that the Member Countries shall provide the list of all tuna landing sites, including the landing sites identified for the project, in order to analyse the cost incurred for the routine data collection activities, which would assist in the budget estimation and co-financing arrangements for the neritic tuna stock assessment.

72. The Meeting was advised to assign provincial staff for the data collection activity instead of assigning staff from the Head Office, as to reduce the travelling cost and ensure effective utilization of the budget.

73. The Meeting decided that the data collection activity for the neritic tuna stock assessment will begin in June 2015 until end of May 2017, considering the monsoon and spawning season patterns.

74. The Meeting was suggested the Letter of Agreement (LOA) between SEAFDEC and collaborating agency e.g. Department of Fisheries of each Member Country of concern would be a kind of mean to facilitate the financial arrangements for the project.

75. All necessary documents will be finalized and submitted to all Member Countries of concern. The SWG members were advised to convey the outcome of the Meeting to the top management of their respective countries to obtain cooperation and commitments for the success of the project.

XI. Closing of the Meeting

76. *Ms. Mahyam Binti Mohd Isa*, Chief, MFRDMD thanked everyone for giving valuable insights and their active participation and cooperation for the successful deliberation that contributed to the success, especially in attaining the objectives of the Meeting. Finally, she wishes every participant a safe journey to their respective home countries, and declared the Scientific Working Group Meeting close.

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LIST OF PARTICIPANTS

Cambodia

Samreth Sambo
Deputy Director

Marine Fisheries Research and Development
Institute
Fisheries Administration
186 Norodom Blvd, Sangkat Tonle Basac Khan
Chamcar Mon, Phnom Penh
Tel. (855-12) 714 239
Fax: (855-23) 219 256
E-mail: SamrethSambo@yahoo.com

Kao Monirith
Deputy Director

Marine Fisheries Administration Inspectorate
Fisheries Administration
186 Norodom Blvd, Sangkat Tonle Basac Khan
Chamcar Mon, Phnom Penh
Tel. (855-12) 714 239
Fax: (855-23) 219 256
E-mail: kaomonirith@yahoo.com

Indonesia

Thomas Hidayat
Researcher/Scientist

Research Marine Institute of Marine Fisheries,
Balai Penelitian Perikanan Laut Komp Pelabuhan
Nizam Zachman, Jl.Muara Baru Ujung Komplek
Pelabuhan Perikanan Nizam Zachman,
Jakarta
Tel: +62-081806043030; +62-216602044
Fax: +62-21-665912
E-mail: thomas.hidayat@yahoo.com

Tegoeh Noegroho
Researcher/Scientist

Research Marine Institute of Marine Fisheries,
Balai Penelitian Perikanan Laut Komp Pelabuhan
Nizam Zachman, Jl.Muara Baru Ujung Komplek
Pelabuhan Perikanan Nizam Zachman,
Jakarta
Tel: +62-081280141056; +62-21-6602044
Fax: +62-21-6605912
E-mail: tegoeh_brtehnik@yahoo.com

Malaysia

Hj Samsudin bin Basir
Head of Resource Section

Fisheries Research Institute,
Kampung Acheh, Kompleks Perikanan,
Kg. Acheh, Jabatan Perikanan
32000 Sitiawan Perak, Malaysia
Tel: +6056914752; +60194572978
Fax: +6056914742
E-mail: s_basir@yahoo.com

Mohd Noor bin Nordin

Department of Fisheries Malaysia

Head of Marine Aquaculture Section

Level 1, Tower Block 4G2, Wisma Tani
No. 30, Persiaran Perdana, Precinct 4
62628 Putrajaya, Malaysia
Tel: +60388704618; +60126784028
Fax: +60388891749
E-mail: normnee@yahoo.com

Myanmar

Htun Thein (Dr.)
Assistant Director

Department of Fisheries,
Marine Fisheries Research and Survey Unit,
Building No. 36, Nay Pyi Taw
Tel: +9595027889
E-mail: htunthein.akyab@gmail.com

Nay Myo Aye
Assistant Fisheries Officer

Regional Fishery Officer, Department of Fisheries
Ye Township, Mon State
Tel.: +959425355353
E-mail: irnp.dof@gmail.com
nyonyo.ye@gmail.com

Philippines

Noel C. Barut
National Coordinator National Stock Assessment
Program/Chief Aquaculturist

National Fisheries Research and Development
Institute (NFRDI)
Interim Deputy Executive Director,
Corporate 101 Bldg, 101 Mother Ignacia Avenue
Quezon City, Metro Manila
Tel./Fax: +63 2-3725063
E-mail: necbarut@gmail.com

Grace V. Lopez (Ms.)
Aquaculturist II,
OIC Vertebrate Section, NFRDI

National Fisheries Research and Development
Institute (NFRDI)
Marine Fisheries Research Division
Vertebrate Section,
Corporate 101 Bldg, 101 Mother Ignacia Avenue
Quezon City, Metro Manila
Tel.: +63 2-765133; +63 2-3765133 (LOC. 607)
Fax: + 63 2-725063
E-mail: gmvlopez@yahoo.com

Thailand

Praulai Nootmorn (Ms.)
Director

Marine Fisheries Research and Technological
Development Institute
Kaset-Klang, BangKhen, Bangkok 10900
E-mail: nootmorn@yahoo.com

Pakjuta Khemakorn (Ms.)
Fishery Biologist, Professional Level

Southern Marine Fisheries Research and
Development Center,
79/1 Wichianchom Rd., Bo-Yang,
Muang, Songkhla 90000
Marine Fisheries Research and Development
Bureau, Department of Fisheries
Fax: +667 4312495

E-mail: pakjuta@gmail.com

Viet Nam

Pham Hung
Officer

Department of Capture Fisheries and Resources
Protection, Directorate of Fisheries
10 Nguyen Cong Hoon, BaDinh, Hanoi
Tel.: +84-983-804-039
E-mail: hungfam83@gmail.com
nvnghia@rimf.org.vn

Nguyen Viet Nghia
Deputy Director, Expert

Research Institute for Marine Fisheries
224 Le Lai, Hai Phong city
Tel.: +84-982-728-365
Fax: +84-313-836-812
E-mail: nvnghia@rimf.org.vn

SEAFDEC

SEAFDEC Training Department

Worawit Wanchana (Dr.)
Head of Capture Fishery Technology Division

SEAFDEC Training Department
P.O. Box 97 Phrasamutchedi
Samut Prakan 10290, Thailand
E-mail: worawit@seafdec.org

Namfon Imsamrarn (Ms.)
Information Technology Officer

E-mail: namfon@seafdec.org

SEAFDEC

Marine Fisheries Resource Development and Management Department (MFRDMD)

Mahyam binti Mohd Isa (Ms.)
Chief of MFRDMD

Fisheries Garden Chendering
21080 Kuala Terengganu, Malaysia
Phone: +609 6175940
Fax: +609 6175136
E-mail: mahyam@seafdec.org.my

Abdul Razak bin Latun
Head of Fishery Oceanography and Resources
Enhancement Section

E-mail: abdulrazaklatun@seafdec.org.my

Wahidah binti Mohd Arshaad (Ms.)
Head of Biology and Genetic Unit

E-mail: wahidah@seafdec.org.my

Mohammad Faisal bin Md.Saleh
Head of Resources Assessment Unit

E-mail: mohd_faisal@seafdec.org.my

Nadzri bin Seman
Assistant Research Officer

E-mail: nadzri@seafdec.org.my

SEAFDEC Secretariat

Somboon Siriraksophon (Dr.)
Policy and Program Coordinator

SEAFDEC Secretariat
P.O. Box 1046, Kasetsart Post Office

Bangkok 10903, Thailand
Tel.: +66 2 940 6333; 0819003361
Fax: +66 2 940 6336
E-mail: somboon@seafdec.org

Pattaratjit Kaewnuratchadasorn (Ms.)
Program Manager

E-mail: pattaratjit@seafdec.org

Suwanee Sayan (Ms.)
Policy and Program Officer

E-mail: suwanee@seafdec.org

Julasak Markawat
General Service Officer

E-mail: julasak@seafdec.org

SEAFDEC Regional Fisheries Policy Network (RFPN) Members

Indri Yani Zaini (Ms.)
RFPN Member for Indonesia

SEAFDEC Secretariat
P.O. Box 1046, Kasetsart Post Office
Bangkok 10903, Thailand
Phone: +66 2 940 6326
Fax: +66 2 940 6336
E-mail: indry@seafdec.org

Hemalatha Raja Sekaran (Ms.)
RFPN Member for Malaysia

E-mail: hemalatha@seafdec.org

Efren V. Hilario
RFPN Member for the Philippines

E-mail: efren@seafdec.org

OPENING REMARKS

By Ms. Mahyam Binti Mohd Isa, Chief of SEAFDEC/MFRDMD

Distinguished Scientific Working Group Members from SEAFDEC Member countries; SEAFDEC officials; Ladies and Gentlemen; A very good morning!

First of all, on behalf of the Department of Fisheries Malaysia, co-organizer of this Meeting, please allow me to welcome all of you to this 1st Meeting of the Scientific Working Group on Neritic Tuna Stock Assessment in the Southeast Asian Waters, co-organized by SEAFDEC Secretariat in collaboration with MFRDMD through funding support from the Government of Sweden through the SEAFDEC-Sweden Project. I also would like to express my gratitude for giving me the chance to give the Opening Remarks of this Meeting. It is a great honour for me to have the opportunity to speak here today.

Ladies and gentlemen,

You must be already aware that the sources of neritic tuna production of Southeast Asian region are mainly from Indonesia, the Philippines, Viet Nam, Malaysia, and Thailand. A total production of neritic tuna in Southeast Asian waters was estimated at about 857,440 metric ton in 2010. However, in the past few years, our statistics showed a slightly decline in terms of the production volume of neritic tuna, as well as some miss-reporting of the tonggol tuna lead main problems in trading internationally. Thus, it is SEAFDEC and ASEAN Member State's role to address these concerns to ensure that neritic tuna are sustainable utilization for food security of the future generations.

Ladies and Gentlemen, the task of developing a Regional Cooperation focusing on neritic tuna fisheries was given to SEAFDEC during the 45th Meeting of the SEAFDEC Council in April 2013 in the Philippines. In response to such instruction, the Regional Plan of Action or RPOA for sustainable neritic tuna fisheries and management was developed during the Experts Group Meeting in Krabi province, Thailand that was convened in June 2014. One of the important activities agreed during that Meeting was the establishment of Scientific Working Group on Neritic Tuna Stock Assessment.

Today is the first gathering for the Scientific Working Group Members, whom had been officially nominated by your good countries to contribute knowledge and ideas in the sustainable management of neritic tuna in Southeast Asian waters. The response of the Member Countries with positive indications through your representations at this Meeting is a good sign that we can continue the work since started in 2013. I would therefore encourage everyone to actively participate during the discussions, and openly share your knowledge and experience to achieve the expected outputs and the goal of this Meeting to ensure the sustainability of neritic tuna resources in our region.

As a host country of SEAFDEC/MFRDMD, I would also like to ensure you all that MFRDMD would play an important role on this task which is aligned with MFRDMD mandate. I therefore fully support MFRDMD to lead this task work in near future (from 2015) in collaboration with all Member Countries and with SEAFDEC Secretariat.

Ladies and Gentlemen,

Lastly, on behalf of the co-organizer, I would wish to thank you once again for coming to this Meeting. As I wish all of us the best in this undertaking, I also look forward to a very fruitful and successful Meeting. Without further ado, I now declare this 1st Meeting of the Scientific Working Group on Neritic Tuna Stock Assessment in the Southeast Asian Waters, open.

Thank you and good day!

PROSPECTUS

I. Introduction:

In the Southeast Asian region, neritic tunas are caught commercially using three main fishing gears, namely: purse seines, ring nets (mainly in the Philippines), and drift gillnets. Three types of purse seine operations are adopted in many Southeast Asian countries such as purse seines with searching methods, those associated with fish aggregating devices (FADs), and with luring light methods. In Thailand as well as in other countries, such as Cambodia, Malaysia, Myanmar, Brunei Darussalam, and Indonesia, the purse seine used must have evolved from the Chinese purse seine which became widely used after 1957. This purse seine has been developed with a unique style of seining appropriate to conditions in the waters of Thailand, although such gear was initially intended to catch small pelagic fishes other than tunas. Targeting the small tunas using the Thai purse seine fishery started in 1982 with the expansion of the country's tuna canning industry. The Thai purse seine fishery is labor-intensive requiring 30-40 crew members to work on vessels with sizes that range from 25 to 30 m. The length of the nets range from 800 to 1250 m while the nets' depths range from 70 to 120 m and mesh sizes from 2.5 to 9.7 cm. Recently, modern purse seiners are equipped with radar, depth sounder, sonar transceiver, and satellite navigational instruments. Compared with purse seine operations nowadays, drift gillnets have also played an important role in neritic tuna fisheries, especially in the early period of development of small pelagic fisheries in many Southeast Asian countries. Specifically, drift gillnets are important for some countries such as in Viet Nam where 37% of its total neritic tuna catch of 72,650 mt is reported in 2013 using drift gillnets.

Taking into accounts the countries' statistical records, the main sources of neritic tuna production of Southeast Asia are from Indonesia, Philippines, Viet Nam, Malaysia, and Thailand. However, it should be noted that neritic tuna production of Viet Nam has not been properly recorded in its national statistics, although the Research Institute of Marine Fisheries (RIMF) of Viet Nam estimated the country's neritic tuna production in 2012 to be 72,650 mt. As well as the tuna production of Brunei Darussalam of less than 100 mt per year comprises mostly the eastern little tuna and skipjack tuna due to few purse seiners are operating in the country. In conclusion, a total production of neritic tuna in Southeast Asian waters in 2010 could therefore be estimated at about 857,440 mt (including the estimated volume of Viet Nam as of 2012 and production from Brunei Darussalam).

Recognizing the importance of neritic tuna fisheries in the Southeast Asian waters, the regional or sub-regional cooperation to promote the sustainable utilization of neritic tuna is therefore needed. In this connection, the 45th Meeting of the SEAFDEC Council endorsed the proposal of SEAFDEC Secretariat to conduct regular stakeholders' consultations for the development of the Regional Plan of Action for Sustainable Neritic Tuna Fisheries (RPOA-Neritic Tuna). Thus, SEAFDEC with funding support from the SEAFDEC-Sweden Project together with ASEAN-SEAFDEC Member Countries organized the "Consultative Meeting on Regional Cooperation on Sustainable Neritic Tuna Fisheries in Southeast Asian Waters" in October 2013 in Songkhla Province, Thailand. The Meeting had provided the platform to initiate and coordinate a process of promoting dialogue and cooperation on "regional" (neritic) tuna resources, while information on the status of neritic tuna in the region and sub-regions were revealed and shared as well as experiences of SEAFDEC and partner organizations at regional and sub-regional level. Issues related to neritic tuna fisheries and trade were also discussed taking into account the current problems/challenges in different sub-regional areas/fishing grounds, i.e. South China Sea, Gulf of Thailand and Andaman Sea, and Sulu-Sulawesi Seas. One of the outputs from the meeting is the list of prioritized issues for national and regional levels to be used for consideration when drafting the RPOA-Neritic Tuna.

Based on the above inputs, SEAFDEC come-up with the zero draft of the Regional Plan of Action for discussion and harmonization among AMS at the Expert Group Meeting held on 18-20 June 2014 in Krabi province, Thailand. The result from this meeting is the finalized Regional Plan of Action on Sustainable Utilization of Neritic Tunas in the Southeast Asia waters (RPOA-Neritic Tuna) agreed by

all AMS that attended the meeting such as Cambodia, Indonesia, Malaysia, Myanmar, the Philippines, Thailand and Viet Nam. The agreed RPOA-Neritic Tuna is developed – taking into account the identified issues/problems facing at national, regional and international concerns – including six objectives as follows:

1. **Determining available data and information, improving data collection and developing key indicators:** two main action plans included in these objectives are improve data collection –analysis for neritic tuna and Assess neritic tuna stocks and develop resource key indicators.
2. **Improving sustainable fisheries management:** several key action plans under this objective are to solves problems on open access, inadequate management of neritic tuna resources in some areas, and Negative impacts of climate change to changes of neritic tuna stocks.
3. **Improving sustainable interaction between fisheries and marine ecosystem:** This objective aims to reduce negative impacts of neritic tuna fisheries to marine ecosystem.
4. **Improving compliance to rules and regulations and access to markets:** the objective is linked to the combating IUU fishing that occurring in the region, improve infrastructure in fishing port, improve post-harvest techniques, product quality, and enhance intra-regional and international trade.
5. **Social Issues:** in accordance with Inadequate benefits for people involved in neritic tuna fisheries and industries and issues on working condition and labor issues. The objective therefore aims to improve the Benefits for People Involved in Neritic Tuna Fisheries and Industries as well as improving working conditions of labor.
6. **Regional Cooperation:** This objective aims to enhance/develop Sub-regional Action Plans for Neritic Tuna Fisheries, support the assessment of the status and trends of Neritic Tuna at Sub-Regional Level and enhancing intra-regional and international trade.

The other outputs from the meeting are the establishment of the Scientific Working Group (SWG) on stock assessment and the list of prioritized capacity building to support AMS in implementing the RPOA-Neritic Tuna. In order to follow-up and support implementation of the RPOA-Neritic Tuna by AMS, provision the platform for SWG members to meet and discuss is needed, in this connection the relevant AMS nominated their scientist and senior expert on as members of the SWG in September 2014. With support from the SEAFDEC-Sweden project, SEAFDEC Secretariat in collaboration with MFRDMD and TD proposes the 1st Meeting of the SWG on Stock Assessment to be organized in the Shah Alam, Selangor, Malaysia.

II. Objectives of the Meeting:

- 1) To introduce the RPOA-Neritic Tuna and its Work Plan on Stock Assessment
- 2) To develop the Strategic Plan for Stock Assessment, Improvement of data collection and awareness building to support the implementation of the RPOA-Neritic Tuna
- 3) To formulate the Term of Reference (TOR) for SWG on Stock Assessment for management of neritic tuna in long term

III. Expected outputs/ outcomes:

Expected Outputs

- A Strategic Plan for stock assessment, improvement of data collection and awareness building program
- TOR for establishment of the SWG on Stock Assessment for scientific-based management of neritic tuna in long term

Expected Outcomes

- Increased commitment to collaboration and cooperation among Southeast Asian countries, regional and sub-regional organizations and initiatives in management of neritic tuna fisheries at national, sub-regional and regional levels.

IV. Date and venue:

The Meeting of the SWG on Stock Assessment will be held at BlueWave Hotel, Shah Alam, Selangor, Malaysia from 18-20 November 2014.

V. Participants:

- SWG Members from Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, the Philippines, Thailand and Viet Nam,
- One or Two experts/resource persons from the Region on Stock Assessment,
- Senior Officers and Working staffs from SEAFDEC Secretariat, Training Department and MFRDMD,
- Representatives from Regional/international organizations responsible for tuna fisheries management, and
- Observers from NGOs and other stakeholders

Annex 4

AGENDA

- Agenda 1 Opening Remarks by Host Country (DOF/Malaysia)
- Agenda 2 Selection of Chairman, and co-chair
 - 2.1 Background, arrangements of the meeting
 - 2.2 Introduction of the SWG members
- Agenda 3 Introduction of the RPOA-Neritic Tuna and Work Plan for 2014-2015
- Agenda 4 Reviews the Updating Status and Trends of Neritic Tuna Fisheries in the Southeast Asian region
- Agenda 5 Special Issues on Status and Trends of Tonggol tuna
- Agenda 6 Development of the Strategic Work Plan 1: Improving Data Collection, developing key indicators and Stock Assessment
- Agenda 7 Development of the Strategic Work Plan 2: Awareness building and capacity building
- Agenda 8 TOR for SWG on Stock Assessment for long term management
- Agenda 9 Conclusion and Recommendations:
 - Strategic Work Plan 1: Improving Data Collection, developing key indicators and Stock Assessment
 - Strategic Work Plan 2: Awareness building and capacity building
 - TOR for SWG on Stock Assessment
- Agenda 10 Immediate Action Plans and Way Forwards
- Agenda 11 Closing of the Meeting

Regional Plan of Action on Sustainable Utilization of Neritic Tuna in the ASEAN Region¹

Objectives I: Determining available data and information, improving data collection and developing key indicators:

No.	<i>Issues/Action Plans</i>
1.	<i>Insufficient data/information</i>
	Improve Data Collection and Analysis for Neritic Tuna
	<ul style="list-style-type: none"> • Compilation and review of existing data and information on neritic tunas from all related national agencies to understand the status, trend and biological parameters • Review and strengthening of data collection systems on neritic tuna • Review of policies, rules and regulations with regards to information collection and sharing • Implementation of collection system on catch data of neritic tunas based on the Regional Framework for Fishery Statistics of Southeast Asia • Regular updating of data based on independent fisheries surveys conducted by research institutions • Introduction of the use of logbook and observer/trainer onboard program, if not already in place • Capacity building for data enumerators, observers, port inspectors, scientists, or other key data informants on species identification and biological information <ul style="list-style-type: none"> ○ Provision of reference materials to data collectors, e.g. colored pictures of fish, fish identification handbooks, mobile applications • Improvement of data/information for a common pool of tuna database
2.	<i>Undetermined neritic tuna stocks status</i>
	Assess Neritic Tuna Stocks and Develop Resource Key Indicators
	<ul style="list-style-type: none"> • Determination of the type of data required for stock assessment or key indicator analysis • Utilization of the existing SOPs for data collection to determine fisheries key indicators on status and trend of neritic tuna • Encouraging the conduct of research on neritic tuna at national level (e.g. stock assessment, biological, genetics, tagging program etc.) • Integration of independent fisheries data with routine data from statistics to improve the analysis of neritic tuna stock assessment at national level • Strengthening capacity building on stock assessment • Conduct and regular updating of national stock assessment of neritic tuna • Seeking technical cooperation with NGOs, RFMOs, relevant research institutions for the conduct of research on neritic tuna

Objectives II: Improving sustainable fisheries management

No.	<i>Issues and Action Plans</i>
1.	<i>Open access</i>
	Promote Management of Fishing Capacity
	<ul style="list-style-type: none"> • Control of fishing effort and capacity at national level <ul style="list-style-type: none"> ○ Determination of Total Allowable Catch (TAC) ○ Estimation of the economic valuations and/or biological success of TAC ○ Issuance of numbers of fishing licenses at optimal level ○ Development of operation strategy considering economic valuation

¹ This is the 4th draft based on the results from Consultative Meeting on Regional Cooperation on Sustainable Neritic Tuna Fisheries in Southeast Asian Waters” in October 2013 in Songkhla Province, Thailand and the Expert Group Meeting on Regional Plan of Action on Sustainable Utilization of Neritic Tuna Resources in the Southeast Asia Waters held on 18-20 June 2014 in Krabi province, Thailand.

	<ul style="list-style-type: none"> • Registration and licensing system of fishing vessels <ul style="list-style-type: none"> ○ Mandatory registration of fishing vessels and licensing to operate based on national policies ○ Provision of authorized foreign fishing vessels conducting fishing operations in national waters of concerned countries based on bilateral agreement • Regulation on fishing gears <ul style="list-style-type: none"> ○ Registration of fishing gear licenses or fishing permits based on national policies ○ Prohibition of active fishing gears (<i>e.g.</i> purse seine, ring net, Danish seine, trawls, etc.) within fishing zones for small-scale fisheries based on national policies ○ Regulation on mesh size of nets, where applicable depending on the type of gears and purposes of fishing • Application of selective fishing gears and/or practices
2.	<i>Inadequate management of neritic tuna resources in some areas</i>
	Promote Sustainable Utilization of Neritic Tuna Resources
	<ul style="list-style-type: none"> • FADs management plan/scheme <ul style="list-style-type: none"> ○ Regulation on the use of FADs (<i>i.e.</i> recording the types/numbers, mapping, and use of environment-friendly materials) ○ Development of FADs management plan at national level • Regulation on fishing areas and/or fishing seasons <ul style="list-style-type: none"> ○ Implementation of closed season for neritic tunas, <i>i.e.</i> during spawning season and nursery grounds based on best available scientific information and recommendations ○ Establishment of fisheries management zoning areas ○ Provision of alternative livelihoods to small-scale fishers (during closed season, if relevant) • Protection of critical habitats and enhancement of fisheries resources <ul style="list-style-type: none"> ○ Deployment of fish enhancing devices, artificial reefs or fish apartments relevant to neritic tuna ○ Establishment of fisheries <i>refugia</i> and/or fish sanctuaries
3.	<i>Inadequate understanding of management and conservation measures</i>
	Enhance Understanding of Management and Conservation Measures of Neritic Tuna
	<ul style="list-style-type: none"> • Enhancement of awareness of stakeholders on the importance of conservation and management measures • Conduct of comparative study of good practices learnt from other countries, RFMOs and international organizations • Arrangement of regular stakeholders' (including scientists, managers, policy makers, and fishers) consultations/meetings on management and conservation measures • Creation of platforms/fora to facilitate cooperation among scientists and managers • Development of information, education and communication (IEC) programs on sustainable use of resources
4.	<i>Negative impacts of climate change to changes of neritic tuna stocks</i>
	Mitigate the Impacts of Climate Change on Neritic Tuna Stocks
	<ul style="list-style-type: none"> • Encouraging the involvement of ASEAN Member States in regional/sub-regional research/study on the impact, adaptation, and mitigation measures of climate change on fisheries particularly on neritic tunas

Objectives III: Improving sustainable interaction between fisheries and marine ecosystem

No.	Issues/ Action Plans
1.	<i>Negative impacts of fisheries to marine ecosystem</i>
	Reduce Negative Impacts of Neritic Tuna Fisheries to Marine Ecosystem

	<ul style="list-style-type: none"> • Implementation of ecosystem approach to fisheries management (EAFM) • Encouraging the conduct of risk assessment on the impacts of neritic tuna fisheries to marine ecosystem • Conduct of R&D on suitable fishing methods and practices for sustainable utilization of neritic tuna resources and promote to ASEAN Member States • Promotion of the use of responsible fishing technology and practices • Development and adaptation of effective management and conservation measures to minimize the catching of small neritic tuna by purse seine/ring nets • Establishment of fisheries <i>refugia</i> system to protect the juvenile and larval stages
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Objectives IV: Improving compliance to rules and regulations and access to markets

No.	<i>Issues/ Action Plans</i>
1.	<i>IUU fishing</i>
	Combat IUU Fishing Occurring in Southeast Asian Region
	<ul style="list-style-type: none"> • Development of respective National Plans of Action to Prevent, Deter and Eliminate IUU Fishing (NPOA-IUU Fishing) • Strengthen the implementation of NPOA-IUU Fishing (for countries with NPOA-IUU Fishing in place) • Promotion of cooperation among ASEAN Member States and with other RPOA-IUU participating countries in combating IUU fishing under the RPOA-IUU Framework • Strengthening coordination with the local governments, private sector and other agencies concerned to improve compliance on rules and regulations • Regulations on transshipment <ul style="list-style-type: none"> ○ Establishment of procedures on transshipment of catch • Establishment of national fisheries observer scheme for neritic tuna • Vessel Monitoring System (VMS) <ul style="list-style-type: none"> ○ Implementation and/or strengthening of VMS program based on national policies • Double flagging <ul style="list-style-type: none"> ○ Exchange of vessel information (upon request) among concerned ASEAN Member States • Poaching <ul style="list-style-type: none"> ○ Establishment of bilateral and multilateral networking to prevent poaching activities ○ Development of measures to regulate and deny access to landing of poached fish based on national legal framework • Strengthening of surveillance activities and enforcement • Prohibition of importation, landing or transshipment at port of neritic tuna from vessels presumed to have carried out IUU fishing activities in the ASEAN region without prior clarification from vessel owners or concerned flag states • Development of measures to refrain the conduct of business transaction with owners and vessels presumed to have carried out IUU fishing activities
2.	<i>Inadequate infrastructures in fishing ports/landing sites</i>
	Improve Infrastructures in Fishing Ports/Landing Sites
	<ul style="list-style-type: none"> • Promotion of the development of infrastructures such as auction facilities, jetties, water supply systems, ice processing plants to be completely available in fishing ports and landing sites • Development of the ASEAN standard (minimum requirements) for the management of fishing ports and landing sites (including safety, hygiene and sanitation standards)

3.	<i>Post-harvest losses/product quality deterioration</i>
	Improve Post-harvest Techniques and Product Quality
	<ul style="list-style-type: none"> • Provision of technical support to promote proper handling and preservation of neritic tuna onboard and at ports • Conduct of assessment of post-harvest losses of neritic tunas and describing the various ways of reducing post-harvest losses • Exchange of fishing and post-harvest technology or preservation techniques onboard as well as design/materials of fishing boats to reduce post-harvest losses
4.	<i>Intra-regional and international trade</i>
	Enhance Intra-regional and International Trade
	<ul style="list-style-type: none"> • Catch documentation and traceability system/scheme <ul style="list-style-type: none"> ○ Development and implementation of traceability system to monitor movement of neritic tuna fish/products in the supply chain for export (<i>i.e.</i> origin of catch, transport, processing, storage and distribution) ○ Implementation of ASEAN Catch Documentation System/Scheme* by ASEAN Member States for neritic tuna fish and fishery products at national level ○ Encouraging the implementation of the Fisheries Improvement Project Protocol (FIPP), where applicable and application of eco-labeling scheme • Facilitation and strengthening of intra-regional and international trade at national level • Development of Harmonized System (HS) Code especially for neritic tuna (regional issue)

Objectives V: Social Issues

No.	Issues/Action plans
1.	<i>Inadequate benefits for people involved in neritic tuna fisheries and industries</i>
	Improve the Benefits for People Involved in Neritic Tuna Fisheries and Industries
	<ul style="list-style-type: none"> • Implementation of socio-economic surveys (<i>i.e.</i> working condition of fishers, their income and the living standard) in local communities, large scale fisheries and ancillary industries to gather baseline information • Development of arrangements and partnership between fisheries authorities or related agencies and fisheries industries regarding implementation of labor standards in fisheries in accordance with national laws, the International Labor Organization (ILO) Work in Fishing Convention of 2007 (C188/Work in Fishing Convention, 2007) No. 188 and other related ILO Conventions • Reinforcement of rights, privileges and responsibilities of fish workers and others involved in fishing industry in accordance with national labor laws and regulations with the purpose of improving the welfare of people engaged in fisheries • Facilitating the cooperation between neighboring countries taking into account the importance of migrant labors
2.	<i>Working conditions and labor issues</i>
	Improve Working Conditions of Labor
	<ul style="list-style-type: none"> • Prevention of child labor under the age of 15 years (or less than 18 years) working in fisheries sectors in accordance with ILO Conventions • Recognizing security and safety issues for all types of fishing activities by implementing skills training program • Promotion of safety requirements at sea with capacity building and training for people engaged in fisheries and related activities

Objectives VI: Regional Cooperation

No.	<i>Issues/ Action Plans</i>
1.	<i>Lack of Sub-regional action plans for neritic tuna fisheries</i>
	Enhance/Develop Sub-regional Action Plans for Neritic Tuna Fisheries
	<ul style="list-style-type: none"> • Reviewing the existing action plans in sub-regions such as Sulu-Sulawesi, Gulf of Thailand, South China Sea, and Andaman Sea • Establishment of cooperation on R&D to support sub-regional management of neritic tuna fisheries • Exchanging of information among ASEAN Member States on legal framework, policies & management, trade rules & regulations at sub-regional and regional levels on neritic tuna fisheries • Encouraging the participation of ASEAN Member States in sub-regional fora and consultations organized by regional fishery management organizations such as IOTC, if applicable and other regional fora
2.	<i>Insufficient information on status and trends of neritic tuna at sub-regional level</i>
	Assessment of the Status and Trends of Neritic Tuna at Sub-Regional Level
	<ul style="list-style-type: none"> • Establishment of the SEAFDEC scientific working group on neritic tuna for regional stock assessment and providing scientific advice for policy considerations on neritic tuna management • Conduct of regular meetings of SEAFDEC scientific working group at a sub-regional and regional levels • Conduct of regional tagging program on neritic tuna
3.	<i>Limited support to intra-regional and international trade</i>
	Enhancing Intra-regional and International Trade
	<ul style="list-style-type: none"> • Development of joint trade promotions within and outside the region through the ASEAN Tuna Working Group • Promotion of bilateral/multilateral cooperation on trade of neritic tuna among ASEAN Member States • Promotion of the development of ASEAN Catch Documentation Systems/Schemes • Enhancement of the promotion of neritic tuna fish and fishery products from small-scale operators • Enforcement of compliance by private sectors on trade regulations

Annex 6

Agreed Immediate Work Plan for Regional Cooperation to Promote Sustainable Utilization of Neritic Tuna Resources in the Southeast Asia Waters²

SEAFDEC Secretariat

Activity 1) Development of the RPOA-Neritic Tunas

SUB-ACTIVITIES	Time Line	Responsible agencies	Status (by July 14)
1) Advice from the Council on the needs to develop the RPOA-neritic tuna	April, 2013	SEAFDEC	In progress
2) Technical Expert Consultation Identify the key issues for drafting	Oct, 2013	All AMS and SEAFDEC	completed
3) Expert Meeting on Drafting the RPOA Neritic tuna	June, 2014	All AMS, SEAFDEC & Stakeholders	completed
4) Stakeholder consultations (Tuna congress, Scientific conference/PH, US-AID-MARKET, others)	Oct.-14	SEAFDEC	In progress
5) Submission to SEAFDEC Council for comments and endorsement	Sept, 2014	SEAFDEC	In progress
6) Address at the 17 th FCG/ASSP for endorsement	Dec. 2014	SEAFDEC and Lead AMS	On going
7) Report the progress to 46 th CM	April 2015	SEAFDEC	On going
8) Endorsement by the 23 rd ASWGF	June, 2015	SEAFDEC and Lead AMS	On going

Activity 2) Establishment of Working Group and Work Plan on Stock Assessment

SUB-ACTIVITIES	Time Line	Responsible agencies	Status (by July 14)
1) Establishing Scientific Working Group (SWG) on Stock Assessment: Andaman Sea, SCS+GOT, Sulu-Sulawesi Seas	Within Aug.-Sept. 2014	SEAFDEC in cooperation with AMS	In progress

² The Expert Group Meeting on Regional Plan of Action on Sustainable Utilization of Neritic Tuna Resources in the Southeast Asia Waters, 18-20 June 2014, Krabi province, Thailand

2) Scientific WG Meeting(s)	Nov. 2014 Feb. June. Aug. 2015	SEAFDEC and SWG	In progress
➤ Develop the Strategic Plan and TOR of the SWG and endorsement by AMS	By Feb. 2015	SWG and SEAFDEC,	On going
➤ Identify the issues on stock assessment at national and regional level	By May 2015	SWG, SEAFDEC & RFMOs, etc	On going
➤ Standardize data collection and models, develop the SOP, tools, etc	By Jul. 2015	SWG, SEAFDEC	On going
3) Scientific WG on Stock Assessment under the TOR	Nov. 2015	SWG, SEAFDEC	On going

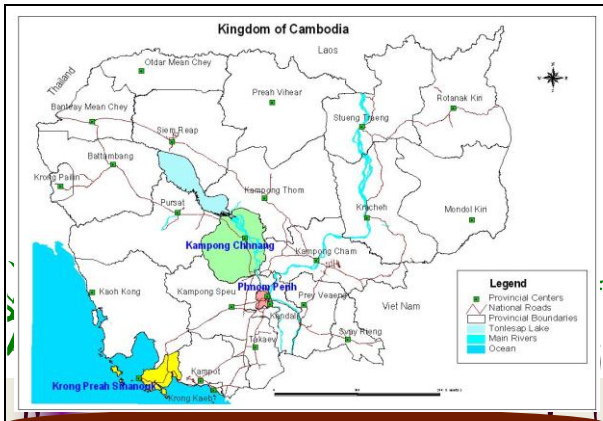
Activity 3) Human Resources Development and Its Activities

SUB-ACTIVITIES	Time Line	Responsible agencies	Status (by July 14)
1) Compilation of the required HRD program from AMS	20 June 14	SEAFDEC	completed
2) Prioritized the HRD Program based on Country Inputs in line with SEAFDEC plan	June- July 2014	SEAFDEC and All AMS	completed
3) Conduct the HRD program(s) based on the prioritized setup and outputs from SWG	July-Oct. 2015	SEAFDEC, some AMS:	On going
4) Improve on Data collection in some AMS based on outputs from SWG	May- Dec 2015	SCS and GOT targeting Tonggol tuna	On going

Country Review on the Status of Tuna Stocks in Cambodia

Samreth Sambo

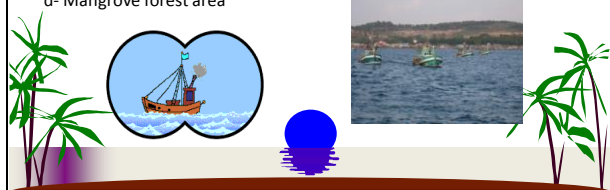
Deputy Director, Marine Fisheries Research and Development Institute, Fisheries Administration
 186 Norodom Blvd, Sangkat Tonle Basac Khan Chamcar Mon, Phnom Penh, E-mail:
 SamrethSambo@yahoo.com



1- Introduction of Neritic Tuna Fisheries

Prior to the introduction of the major gear exploiting the fishery resources in Cambodia.

- a- Inshore fishing area
- b- Offshore
- c- Fishery conservation area
- d- Mangrove forest area

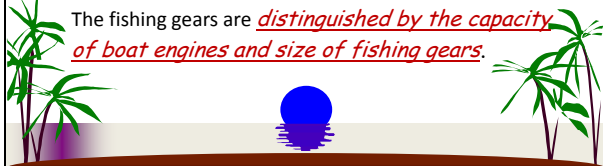


2- Traditional Fishing in Cambodia

The marine capture fisheries in Cambodia are divided into 3 categories:

- ▣ Small-scale or artisanal fisheries
- ▣ middle-scale
- ▣ large-scale fisheries

The fishing gears are *distinguished by the capacity of boat engines and size of fishing gears.*



3-The coastal exploitation in Cambodia

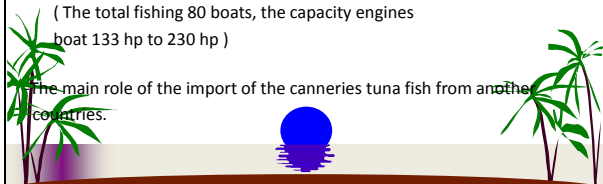
-The total catch of the Indian Mackerel fish 3514 t per year (The total fishing Boat 249 boats, the capacity engine boat 133 hp) closing season from 31 January to 31 March.



Cont

- The skipjack tuna fish 2394 t. per year:
- The Scomberomorus Commerson 1462t per year (Narrowbarred, Max 65 cm)
- The Auxis thazard 932t per year(Bullet tuna, Max 20.5 cm)
- The Sarda Orientalis 620 t per year(Striped bonito,Max 31.6 cm)
- (The total fishing 80 boats, the capacity engines boat 133 hp to 230 hp)

The main role of the import of the canneries tuna fish from another countries.



NERITIC TUNA FISHERIES IN THE SOUTH CHINA SEA

Thomas Hidayat* and Tegoeh Noegroho*

* Research Institute for Marine Fisheries, Jakarta

ABSTRACT

Neritic tuna in the South China Sea, Natuna Sea and adjacent water were caught by drift gill net, purse seine and troll line. Drift gill net is the main fishing gear for catch neritic tuna in Pemangkat west Kalimantan, with boat size ranged from 16-47 GT. The catch composition dominated by kawakawa (*Euthynnus affinis*), longtail tuna (*Thunnus tonggol*), and Spanish mackerel (*Scomberomorus commerson*). The average catch rate of drift gill net is 4086 kg/trip with average 10 days each trip, landing statistical data in last 2 years indicated that most of the catch consisted of kawakawa and longtail tuna. The peak season occurred from August and September. Using Surplus Production Model the neritic tuna in IFMA 711 the MSY is 17.486 ton/year. The utilization of neritic tuna 0.66 (moderate). The status of neritic tuna resources in this area still “healthy”.

INTRODUCTION

Indonesian water divided into 11 Indonesian Fisheries Management Area (IFMA) (Ministerial Regulation No. 01/MEN/2009). Neritic tuna fisheries in Indonesia already exist since early 1960's and being recorded in national level since 1974 after having support from FAO. National Statistic marine capture Fisheries of Indonesia shows the catch of neritic tuna and sheefish reach 588,000 in 2012. The export is 19,130 ton in 2012 and the import reach 209 ton.

There are 6 species of neritic tuna and sheefish in Indonesia waters. The six species are kawakawa (*Euthynnus affinis*), longtail tuna (*Thunnus tonggol*), frigate tuna (*Auxis thazard*), bullet tuna (*Auxis rochei*), narrow-barred Spanish mackerel (*Scomberomorus commerson*) and Indo-Pacific king mackerel (*Scomberomorus guttatus*). Neritic tuna caught by catch by drift gill net, purse seine, troll line, pole and line and pelagic danish seine.

In the South China Sea, Natuna Sea and adjacent water (IFMA711) neritic tuna caught by gill net, purse seine and troll line. In this area, there are several landing site i.e Pemangkat, Bangka Belitung, Batam and Natuna. Pemangkat Fishing Port in west Kalimantan is one of the biggest landing sites for fishing vessel operated in IFMA 711. This paper presents drift gill net fisheries and status of neritic tuna fisheries in IFMA 711.

RESULT AND DISCUSSION

Annual Catches of Neritic tuna

Annual catch of neritic tuna in Indonesia generally shows an increasing trend starting from 2002 with only 378,944 ton to reach 588,060 ton in 2012. Before 2004 neritic tuna recorded only kawakawa, but after that statistical getting better and record all neritic tuna species (Figure 1).

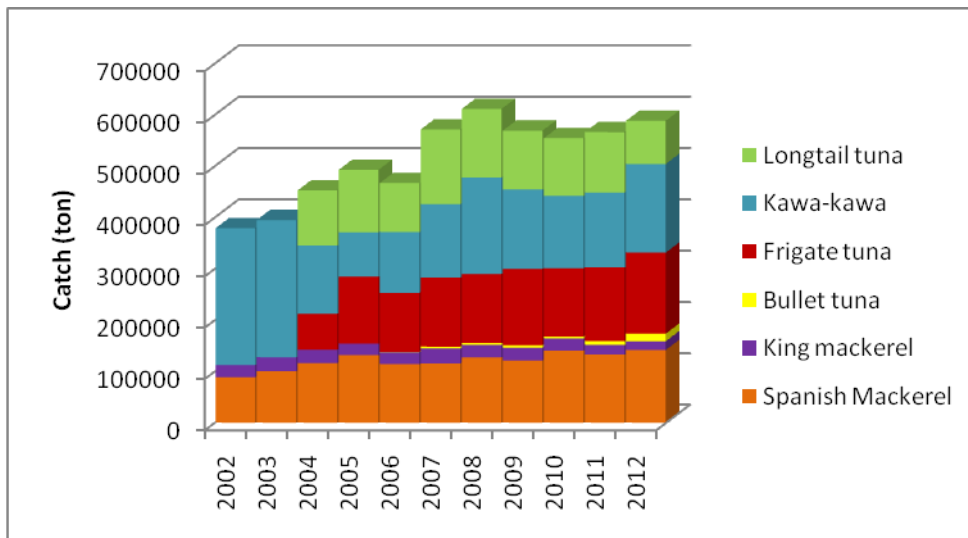


Figure 1. Annual catches of neritic tuna in the Indonesian waters (Source: Marine Capture Fisheries Statistics of Indonesia 2013).

Annual Catches of Neritic tuna in Pemangkat

Prior to 2011, statistics have not recorded all neritic tuna this as recording officers in the field have not been able to distinguish various species. in 2009 there were only kawakawa catch, in statistics, whereas in 2010 the catch of longtail tuna high this case there may be mis-identification, started out in 2011 started good statistical records, in 2011 the catch of very high mackerel this needs further investigation. Trend of catch both kawakawa and longtail tuna from 2011 to 2013 is almost shows the same trend, decreased in 2012 but increased in 2013. In 2012 the catch reach 3500 ton and increase until 3760 ton in 2013 (Figure 2).

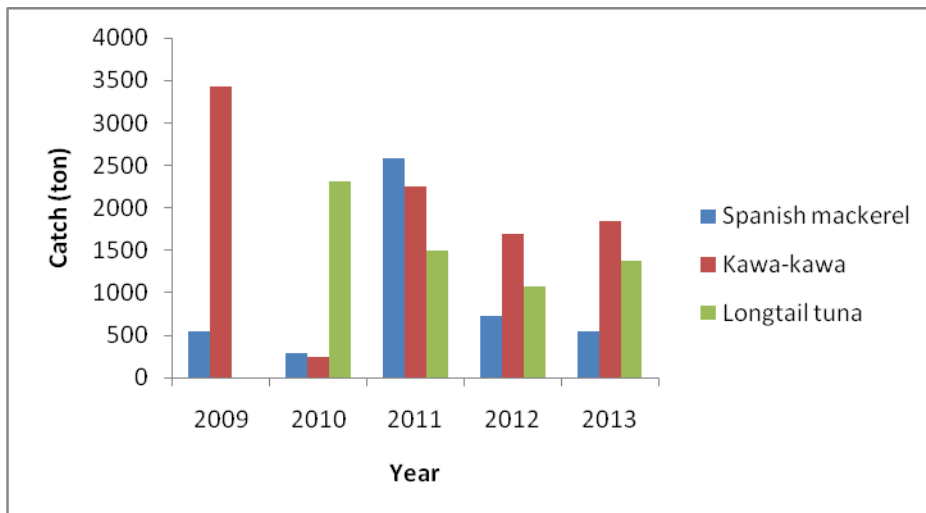


Figure 2. Annual catches of three neritic tuna species landed at Pemangkat Fishing Port

Neritic tuna fisheries in Pemangkat

In the Pemangkat Fishing Port neritic tuna with fishing ground in South China Sea and adjacent water caught by purse seine with luring light and drift gill net. The Catch of three main species of kawakawa, longtail tuna and spanish mackerel, produced 84% by drift gill net vessels; the remaining

26% was contributed by purse seine vessels. Drift gill net is the main fishing gear in the area with boat size ranged from 16-47 GT, and has 9-10 crews, with average 10 days a trip.



Figure 3. Profile of gill netter in Pemangkat

Fishing ground

On January the fishing ground of gill netter in 1° - 2.5° N, in February until April shifting to the south to 0.5° N- 1.5° N, and in the May spread goes until 0° - 2.5° N (Figure4)

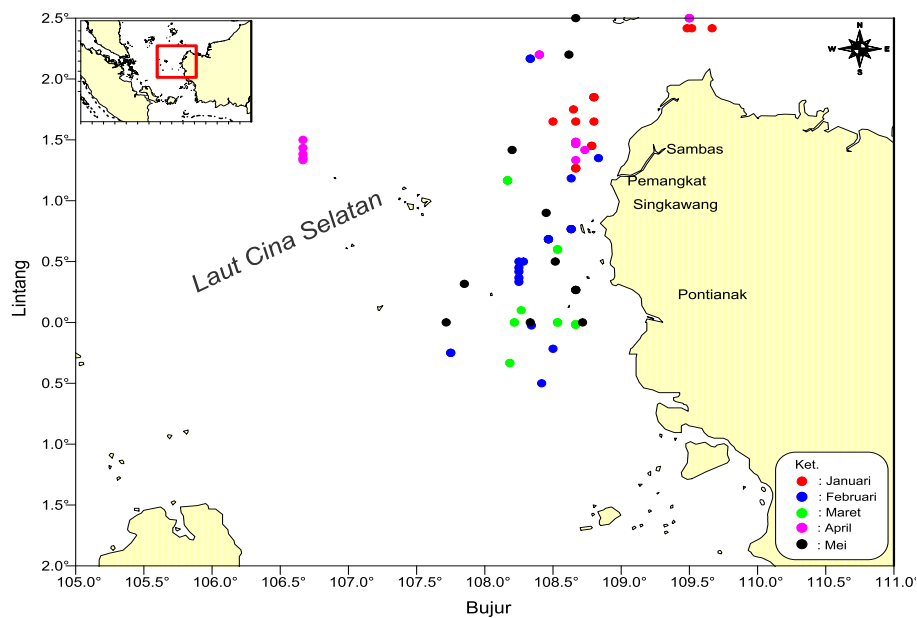


Figure 4. Fishing ground of drift gill net in Pemangkat

Catch composition

Catch composition of gill netter in the South China Sea are kawakawa 40 %, longtail tuna 27 %, Spanish mackerel 18%, sailfish 4%, shark 4% and other 1% (Figure 5). This catch composition shows

the main target of drift gill net are neritic tuna mostly kawakawa and longtail tuna, there is frigate tuna but caught in very small number and include to others.

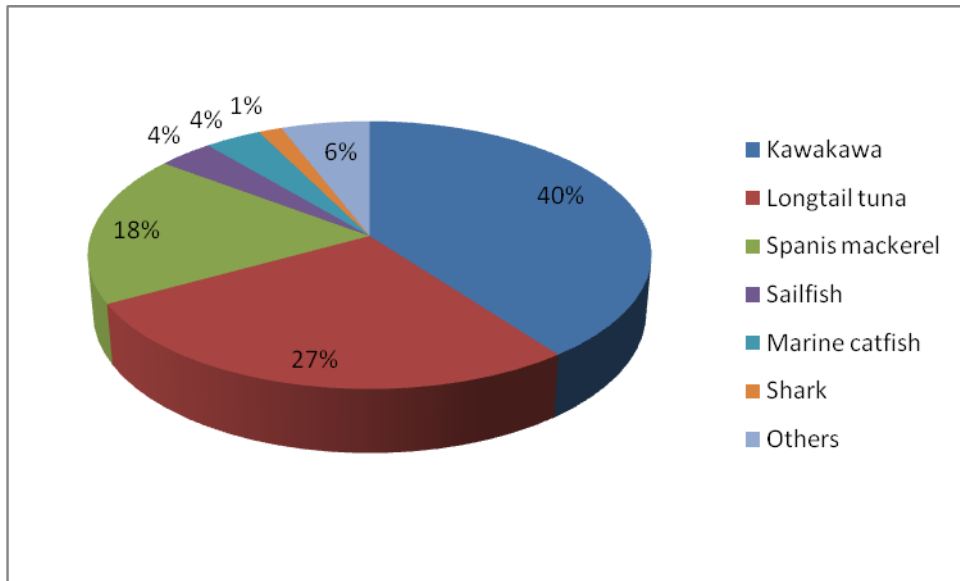


Figure 5. Catch composition of drift gill net

Catch rate of gill netter

The monthly catch rate of gill netter in the Pemangkat fishing port is fluctuative each year, from the 5 years series data the average catch rate is 4086 kg/trip with average 10 days each trip. From this catch rate we can see the peak season of fishing which is occur in August and September (during southeast monsoon) and poor season in May (Figure 6).

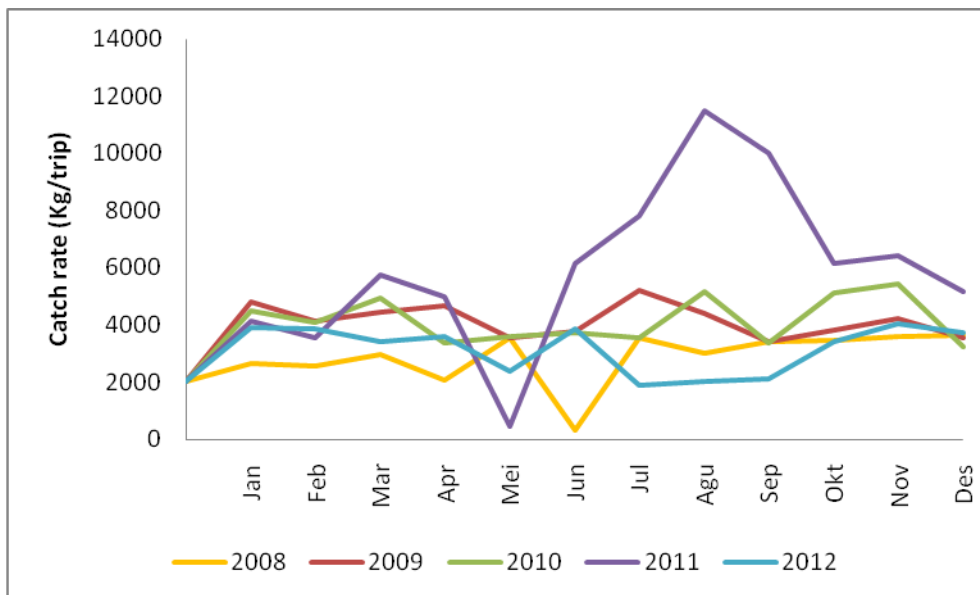


Figure 6. Monthly catch rate of drift gill net

Status of neritic tuna fisheries

Using Surplus Production Model on catch and effort series data 2000-2011, the neritic tuna in IFMA 711 we assessed the MSY is 17.486 ton/year with effort optimum 11.863 unit standard purse seine. According Marine Capture Fisheries Statistics in 2011 the number of fishing gear in this area 7.790 unit standard purse seine, so the level of utilization of neritic tuna 0.66 (moderate). The status of neritic tuna resources in this area are still "healthy".

CONCLUSION

Drift gill net contribute about 84% of neritic tuna catch in pemangkat, so drift gill net is the main fishing gear in the area. Catch composition of gill netter in the South China Sea are kawakawa 40%, longtail tuna 27%, Spanish mackerel 18%, sailfish 4%, shark 4% and other 1%. The average catch rate is 4086 kg/trip with average 10 days each trip, the peak season of fishing is in August and September (during southeast monsoon) and poor season in May. Kawakawa and longtail tuna are the most abundant of neritic tunas in South China Sea. Using Surplus Production Model the status of neritic tuna resources in this area are still "healthy".

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COUNTRY REPORT: MALAYSIA

Hj Samsudin bin Basir¹ and Mohd Noor bin Nordin²

¹Fisheries Research Institute, Kampung Aceh, Kompleks Perikanan, Kg. Aceh, Jabatan Perikanan
32000 Sitiawan Perak, Malaysia, E-mail: s_basir@yahoo.com

²Department of Fisheries Malaysia, Level 1, Tower Block 4G2, Wisma Tani, No. 30, Persiaran
Perdana, Precinct 4, 62628 Putrajaya, Malaysia

INTRODUCTION

Marine fish production from Malaysian waters was 1,428,881mt giving a value of RM 6,651.89 million in 2010. While in 2011, production had declines by 3.9% to 1,373,105 mt. Coastal fisheries has contributed more than 78% of the total marine fish landings and the rest is from high seas 30 nautical miles or more.

Based on the percentage, catches of marine fishes from high seas still low and therefore the government are aiming to increase the catch from that area. This includes oceanic and neritic tuna fisheries. Neritic tuna fishery began in the 80s as by-catch and with the use of tuna purse seine, neritic tuna industry continued to increase since 1987. Neritic tuna catches by trawlers (trawl net), primarily on the West Coast of Peninsular Malaysia are also recorded but the total catch were relatively low compared with catches by purse seiners.

The increase in neritic tuna catches in Malaysia has continued in line with the growth of the processing industry (canning fish) locally. Other than for domestic use, there is also an increasing demand from the canning industry in Thailand. Neritic tuna continuous improvement is aided by increased effort and the use of Fish Aggregating Device (FAD), including the use of spotlight.

Fisheries area in Malaysia can be divided into several sub-regions, namely the West Coast and East Coast of Peninsular Malaysia, Sabah and Sarawak. The Straits of Malacca is located on the West Coast of Peninsular Malaysia and in the north it overlooks the Andaman Sea and the Indian Ocean. Perlis State is the main landing spot for neritic tuna followed by Kedah, Pulau Pinang, Perak and Selangor. Perlis advantage in neritic tuna fisheries is due to the open seas facing Andaman Sea and Indian Ocean

Neritic Tuna Fisheries

Neritic tuna species were part of the small pelagic fish which contributed 4 – 5 % to the total marine landings. The main neritic tuna species found in Malaysian waters were longtail (*Thunnus tonggol*) and kawakawa (*Euthynnus affinis*) and frigate tuna (*Auxis thazard*). Although the percentage is small, neritic tuna landings in the west coast of Peninsular Malaysia contributed about USD 30 million in terms of value.

Generally, neritic tuna were caught by purse seines, trawl nets, drift/gill nets and hook and lines. Purse seines were the main fishing gears followed by trawl nets and for drift/gill nets and hook and lines. Tuna fishing activities by purse seiners in the western coast of Peninsular Malaysia are of two types, namely with the use of FADs and also without FADs or free searching (Free School).

Malaysian Waters

Fisheries area in Malaysia can be divided into several sub-regions, namely the West Coast and East Coast of Peninsular Malaysia, Sabah and Sarawak (Figure 1). The Straits of Malacca is located on the West Coast of Peninsular Malaysia and in the north it overlooks the Andaman Sea and the Indian Ocean. Perlis State is the main landing spot for neritic tuna followed by Kedah, Pulau Pinang, Perak and Selangor. Perlis has its advantage in neritic tuna fisheries as it has deep waters fishing areas which also facing an Andaman Sea and Indian Ocean.

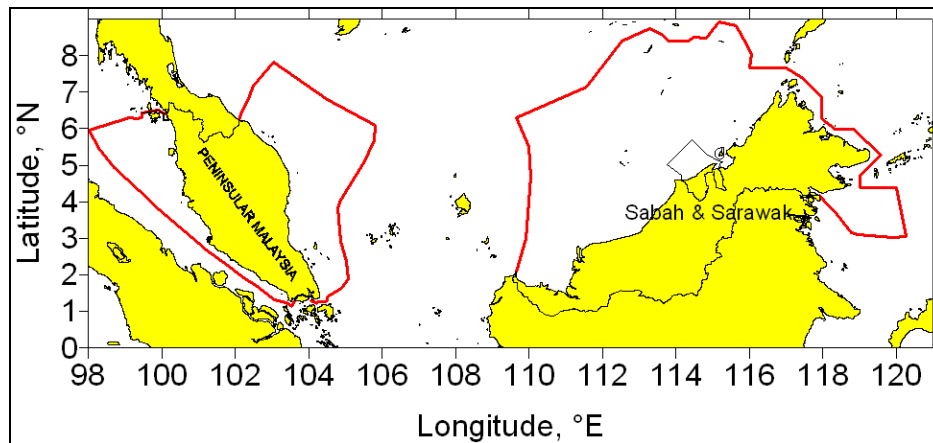


Figure 1: Malaysia EEZ area

3. Management of Neritic Tuna Fisheries

Malaysia has developed a Strategic Action Plan for Development of Tuna Industry 2012-2020. The plan mostly focus on development plan for tuna fisheries; neritic and oceanic, within Malaysia waters and high seas. So far, no management plan was ever developed solely for specific marine fish. Neritic tuna fisheries is only a by-catch fish resources and contributed to less than 5% of total marine catches. Moreover, status of neritic tuna landings catches in Malaysia did not show obvious fluctuation or decreasing trends.

4. Status Neritic Tuna Fisheries

Annual Catches

Landings of neritic tuna for the past 6 years showed little fluctuation ranging between 50,000 – 60,000 mt. except in 2008 where the catch exceeded to over 63,400 mt (Figure 2). The landings represented catches from the Strait of Malacca, South China Sea and Sulu Sulawesi Sea.

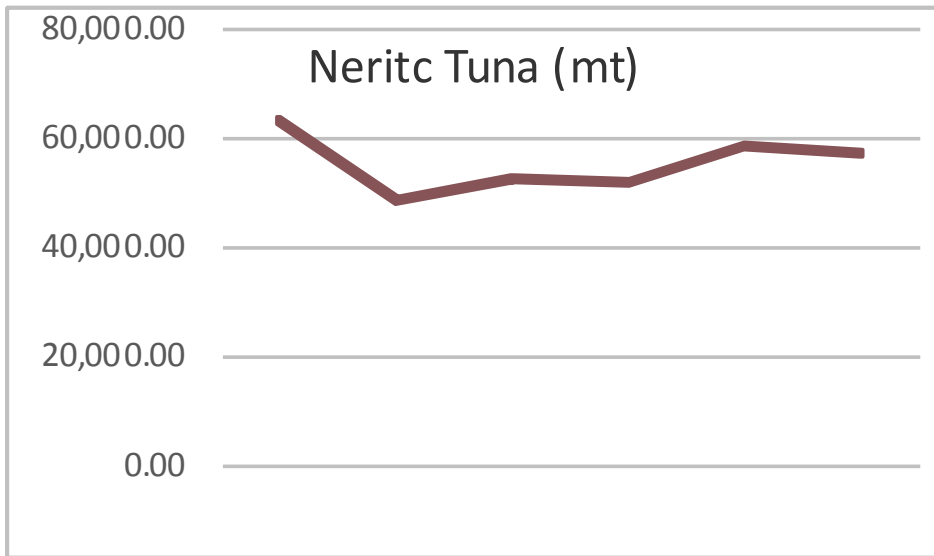


Figure 2: Annual landings of neritic tuna

There were a contrast catch trends between the Malacca Strait and the South China Sea. Figure 3 shows a historical catch of neritic tuna from both Malacca Strait and South China Sea from 2000 to 2011. In the South China Sea, a drastic decreased in catches from 2000 until 2004 before the catches back to nearly a constants state

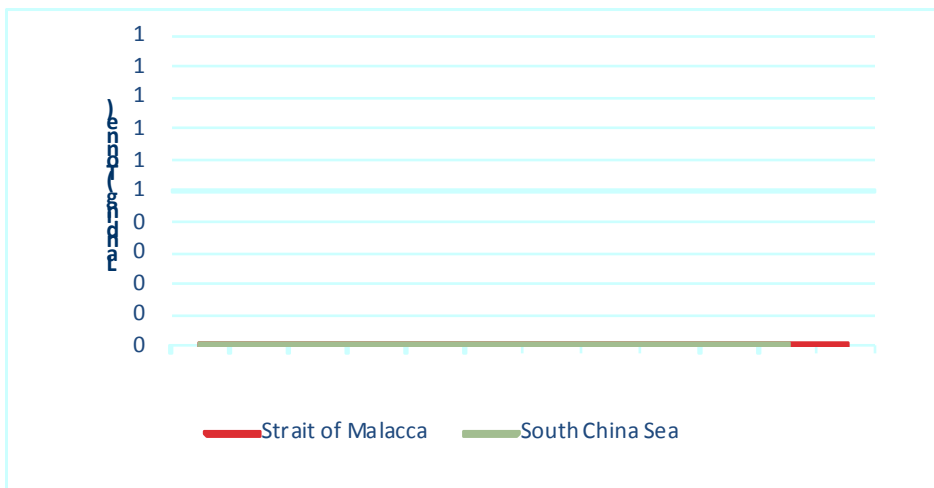
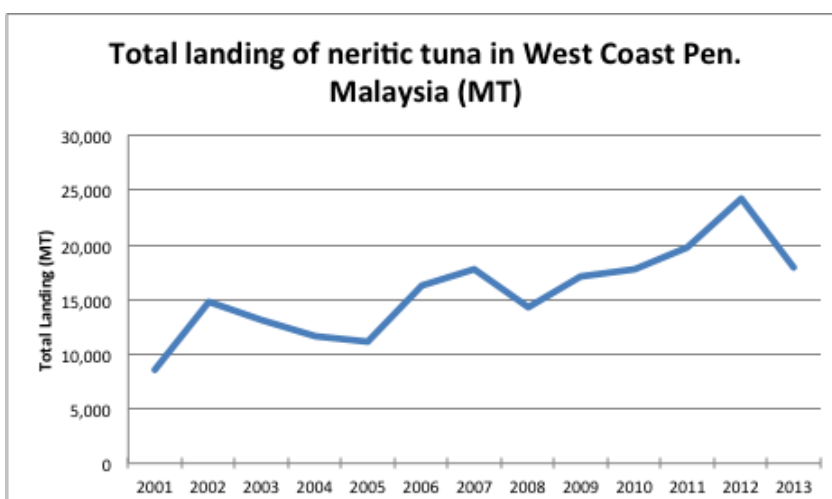


Figure 3: Neritic tuna landings in Straits of Malacca and South China Sea.

In 2013, nearly 50% of neritic tuna landings in Malaysia came from the Straits of Malacca which are facing the Andaman Sea. The rest of the landings come from the East Coast of Peninsular Malaysia, Sabah and Sarawak. Neritic tuna landings in West Coast Peninsular Malaysia showed increasing landings from 2001 until 2012. However, the landings decreased by 25% in 2013 compared to 2012 (Figure 2). The significant decrease in neritic tuna landings were observed in Perak and Perlis, at which they decreased by 38% and 26% respectively compared to 2012.



Landing by species

Monthly landing of neritic tuna in the Malacca Straits is shown in Figure 4. Throughout the monthly landings from January until September, the catch of longtail species surpassed kawakawa species, but there was a sudden increased of kawakawa species in October and November over longtail and followed by a sharp decreased in following month. A sudden fluctuation of significant landing of kawakawa species was never happen before and this type of event might need some explanation and this could be referred to other regional landing trends in the Andaman Sea areas such as in landing trend in Phuket.

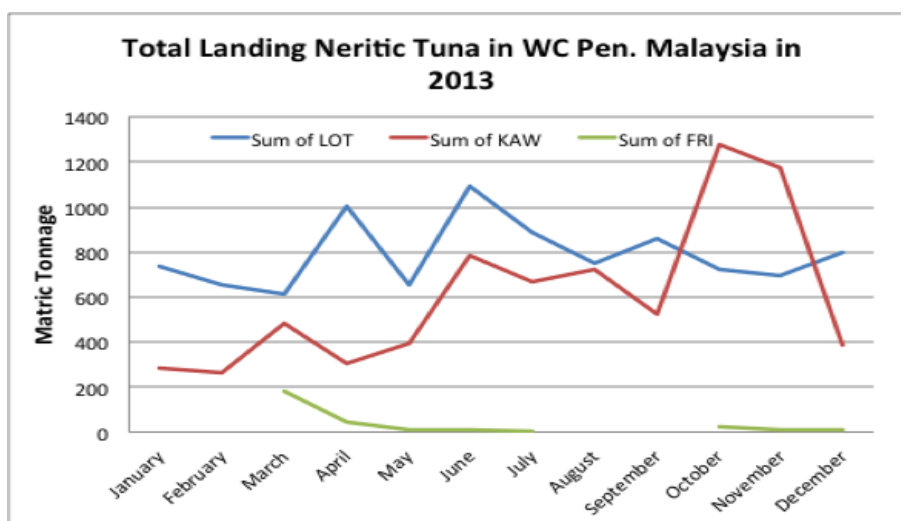


Figure 4: Monthly landings of neritic tuna by species in west coast of Peninsular Malaysia

Fishing Areas

In the west coast of Peninsular Malaysia, main fishing areas for purse seines were toward the northwestern most of the Malaysian waters, near the border of Thailand and Indonesia (Figure 5). These locations are the only fishing areas with over 100m depth.

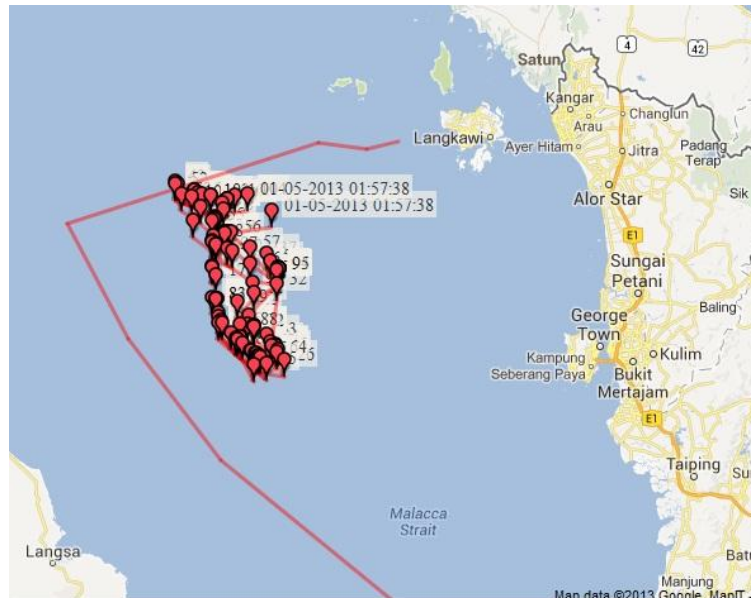


Figure 5: Fishing areas

Catch variation by tonnages

Kawakawa were found to be abundantly caught by bigger vessels (>70 GRT) in the Malacca Strait and South China Sea (Figure 6). Longtail, however, was exceeding the catch in the Malacca Strait by vessels 40 – 70 GRT operating between 13- 30 nm off the shore. Generally, higher landings for all neritic tuna species were from the bigger commercial vessels fishing beyond 30 nm zone.

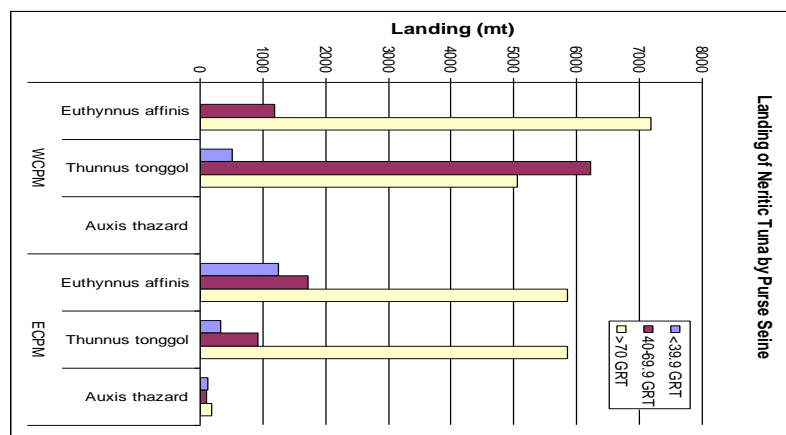


Figure 6: Catch variation by GRT of purse seine vessels.

5. Import and Export

Table below shows quantity and values of imports and exports fish based products which related to tuna species. The records were extracted from Statistical Department where the item of imports and exports were not specify by any specify species. It is hardly the table could describe the status of neritic tuna imports exports in Malaysia.

Year	Export		Import	
	Quantity	Value	Quantity	Value
2008	15,510.81	129,560,167.00	41,731.38	204,647,858.00
2009	25,501.85	135,017,220.00	66,344.64	340,086,668.00
2010	10,512.97	79,780,252.00	50,150.84	256,791,207.00
2011	10,612.73	64,784,373.00	55,283.67	308,893,920.00
2012	12,558.88	71,525,761.00	58,020.74	383,088,239.00

6. Regulation measures for neritic tuna

Under the present fisheries legislation, no regulation ever available to manage the neritic tuna fishery. Indirectly, there is already an initiation by the Department of Fisheries to regulate the use of FADs by purse seiners. The regulation for the use of FADs may be enforced in the coming year as a complement to the existing Fisheries Acts.

7. Current Fisheries Statistic Framework

The present fisheries statistic is mean for all species from marine and freshwaters fisheries. Neritic tuna under pelagic species in the statistic report are separated into 3 major species, namely aya hitam (longtail), aya kurik (kawakawa) and aya selasih (frigate). The record to species level only be practiced from 2008. The annual statistic records also include the 'effort' in term of following units;

- No of Trip
- No of day at sea
- No of fishing days
- No of haul
- No of hour

There is no common/standard effort units used during the past 20 years. The difference in effort units applied from the past years affects the process of standardization of efforts for use in stock assessment. There is an effort with the assistance from IOTC-OCFC to improve the neritic tuna statistical report. Overall, the information from the annual fisheries statistical, provide a general trend of catches of neritic tuna in Malaysian waters.

DoF also enforce the use of Vessel Operation Report for vessels over 70 GRT. This report is a compulsory under license rule. The information obtained from LOV can also be used to determine the status stock of neritic tuna.

8. Issues and Constraint

- Leaking of catches by bigger commercial vessels to other countries.
- IUU (double flagging, transshipment at sea, duplicating vessels)
- Encroachment by foreign and local vessels
- Improving Statistical data framework that can provide a standard format of data for fish stock assessment purposes. .
- Limit in staffing and fund in data collection program.
- Integrating import and export recording system with catch data from Fisheries Department.

9. List of Scientist involve in Stock Assessment of Neritic Tuna.

- | | |
|-----------------------------------|----------------------|
| 1. Samsudin Basir | FRI Kampong Acheh |
| 2. Mr Sallehudin Jamon | FRI Kampong Acheh |
| 3. Mrs Effarina binti Mohd Faizal | FRI Kampong Acheh |
| 4. Mr Richard Rumpet. | FRI Bintawa, Sarawak |
| 5. Mr Raja Bidin Raja Hassan | MFRDMD/SEAFDEC |

10. Conclusion

Management of the fish resources depend on the information on their stock status. To assessment the stock, catch and effort data are amongst the important factor. As for the neritic tuna, shared stocks that inhabits, migrate and straddling within more one area countries, all require data should come from those respective countries and these data should be of the same format. Therefore, level of cooperation between the countries sharing the same fish stocks will determine the success of management process and finally achieve the same goal; having a sustainable utilization of neritic tuna resources.

COUNTRY REPORT: MYANMAR

1. Introduction

Myanmar shares common maritime boundaries in the Bay of Bengal with Bangladesh, India and Thailand. The continental shelf covers approximately 230,000 sqkm with a relatively wider portion in the central and southern parts. The Exclusive Economic Zone (EEZ) is about 486,000 sqkm. From north to south, Rakhine Coast, Ayeyarwady Delta and Tanintharyi Coast are the three coastal zones of Myanmar (Figure 1). The Rakhine Coast stretches 740 km from the Naff River to Mawdin Point. The upper part is shallow and deltaic while the southern part is rather deep and rocky. Compare to the other areas, its continental shelf is rather narrow. Two rivers flowing into this coastal area are Mayu and Kaladan. From Mawtin Point to the Gulf of Mottama lies the Ayeyawady Delta. This deltaic coastal zone expands about 460 km and is outlets of the three major rivers including Ayeyarwady, Sittaung and Thanlwin. The western part is adjacent to Rakhine Yoma and the remainder is a flat alluvial plain with a network of tributaries of the Ayeyarwady River. The annual sediment discharge of 250 million tons of the Ayeyarwady River results in the enlarged delta seaward at the rate of 5 km every hundred years. The Taninthary Coastal area has the longest coastline stretching over 1,200 km from the Gulf of Mottama to Pakchan River. It is fringed in southern part by the Myeik Archipelago and is also home to more than 1,700 inshore and offshore islands. The coastal plain is narrow and gradually rises towards the east, reaching 2,073 m at Myint Moe Let Khat Taung, the highest peak. Rivers including Ye, Dawai, Tanintharyi and Lenya input large volumes of fresh water and sediment into the system (Fig. 1).

Fishery resources in Myanmar waters are typical of Southeast Asia with a large quantity of fish and shrimp in the EEZ. With exclusion of the results of recent Nansen surveys in 2013, existing literature suggest there are approximately 470 species of marine fishes including 67 commercially important pelagic species, and 13 crustacean species. Several species remain to be identified.

In Myanmar, Neritic tunas are gaining more important economically species, and were exploited by variety of fishing gears. The main fishing gears used for catching neritic tunas was the purse seines and king mackerel drift gill net. In the past fisher used small purse seines and traditional fishing gears for the small pelagic fish species in coastal areas. At present fishing gears and techniques are developed by using light luring techniques, FADs and advance technology fish finder equipment.

- Coastline 28320 km; 230,000 Sq-km continental shelf
- Rakhine coastal region(740km;367,780sq-km)
- Ayeyarwady delta zone (35,138sq-km)
- Taninthayi coastal region- 1200km mainland coast; 43,344 sq-km
- Myeik Archipelago(804 islands-34,340 sq-km)

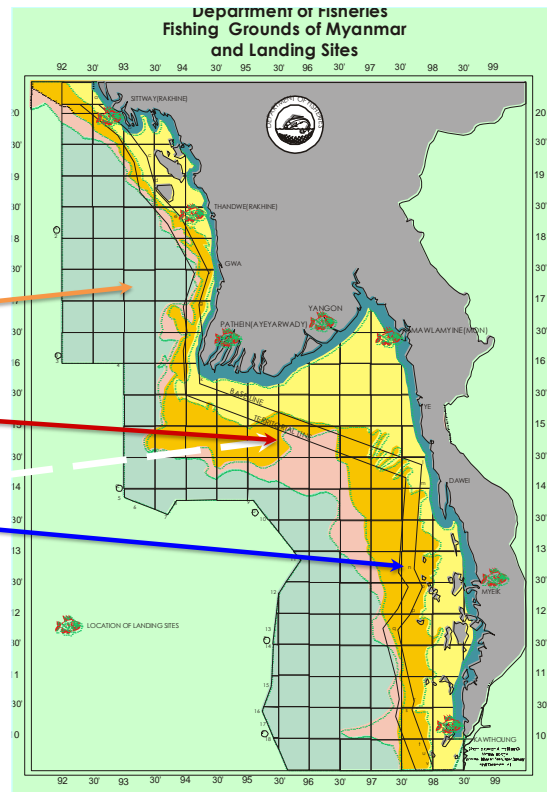


Figure 1. Marine fisheries water of Myanmar

2. Physical characteristics of coastal and offshore area

The Department of Fisheries of Myanmar has created an appropriate legal framework and has formulated and implemented various strategies for the sustainable development and management of marine fisheries. Myanmar endowed with huge fisheries potential marine waters in which fishing zones are located. The territorial fishing zone is within 12 nautical miles offshore from the baseline and the EEZ covers 200 nautical miles offshore from the baseline. The total marine fisheries area in Myanmar including exclusive economic zone (EEZ) is about 486,000 square kilometres.

The possible fish resources still available in order to increase production are the oceanic fish resources and the EEZ. The EEZ of Myanmar occupies the eastern part of Bay of Bengal and northern part of Andaman Sea with area of about 486,000 square kilometres. The physical features of seabeds vary from the inshore to the deep sea. There are large areas of mangroves and coastal mudflats interphase with sandy beaches substrates in the inshore area. The continental shelf with an area of 230,000 sq-km slopes to 200- meter depth, while continental slope dips from 200 to 800 meters depth. Within the EEZ of Myanmar with its diversity of habitats are rich in multi-species fish resources.

3. Management arrangements for neritic tuna fisheries

In Myanmar marine capture fisheries can be categorized into two main types, namely “inshore fisheries” and “offshore fisheries”. Offshore fisheries mean the capture fisheries being operated active fishing gears (e.g. trawl nets, purse seine nets. etc) with fishing vessels more than thirty-feet in over all length and engine power more than 12 H.P. The offshore fishery 6 fishing grounds are from outer area of demarcated in-shore fishery area to end of EEZ. (In-shore fishery areas are the area five nautical miles away from the shore in Rakhine coast and ten nautical miles away from Ayeyarwady and Taninthayi coast.

Number of National off-shore fishing vessels in Myanmar (2013-2014)

No.	Type of Gear	Number of Vessels
1	Trawl	1118
2	Purse seine	278
3	Drift net	708
4	Long line	35
5	Stick-held falling net	349
6	Trap	84
7	Squid cast net	356

Myanmar Government has promulgated “Law Relating to The Fishing Rights of Foreign Fishing Vessels (1989)” and “Myanmar Marine Fisheries Law (1990)”. Under the marine fisheries law, the national fishermen are given priority to fish in all fishing zones. Local offshore fishing vessels are allowed to operate outer area of inshore to the territorial while the operating under fishing rights agreement and foreign joint venture company are allowed to fish from the territorial line to exclusive economic zone (EEZ).

The Department of Fisheries has established an appropriate legal framework and formulated and implemented various strategies for the sustainable development and management of marine fisheries. Fisheries management is pursued by proper licensing, prescribing exploitable species, designating environmental friendly fishing gears and methods, imposing closed area and seasons, etc. The introduction of a Monitoring, Control and Surveillance (MCS) programme for fishery management is another measure taken up by DoF. This program should provide effective and efficient scientific data acquisition for resources evaluation and management of fisheries in Myanmar. It also provides the basis for effective monitoring and control of fisheries enforcement activities, to ensure that only authorized or licence-holding fishing vessels operate within the designated area in the national EEZ. Enforcement of fishing activities involves Myanmar Navy; Myanmar Coast Guard; Department of Fisheries; Myanmar Customs Department; and Myanmar Police Force. Overall, the Myanmar Navy coordinates surveillance efforts. Since there are no fishing vessels working in high sea’s areas, Myanmar has nothing to discuss about the management arrangement for our country’s vessels outside EEZ in high sea area.

4. Status and trends of neritic tuna resources

There are four species of neritic tuna i.e. *Auxis thazard* (Frigate tuna), *Auxis rochei* (Bullet tuna, *Euthynnus affinis* (Kawakawa) and *Scomberomorus commerson* (Narrow-barred Spanish mackerel) are found. The neritic tunas were exploited by variety of fishing gears. The main fishing gears used for catching neritic tunas was the purse seines and king mackerel for drift gill net. As oceanic tuna, Swordfish (*Xiphias gladius*), Yellowfin Tuna (*Thunnus albacares*), Striped marlin (*Tetrapturus audax*) and Sainfish (*Istiophorus platypus*) are inhabiting in Myanmar offshore waters. Bigeye Thresher (*Alopias pelagicus*), Whit-tipped shark (*Carcharhinus longimanus*), Escolar, Pelagic stingray (*Dasyatis sp:*), Common dolphin (*Coryphaena bipinnulata*) and Snake mackerel (*Gympylus surpens*) were also found in EEZ water (Joint survey by SEAFDEC, 2004 &2007). From these two survey results, Swordfish is the most dominant species in Myanmar Offshore waters and it can be considered as one of the commercial fishes for offshore fisheries in future.

Table 2. Number of Foreign Tuna Long-line Fishing Vessel Engage in Myanmar Water and production (2011-2012)

Year	Number of vessels	Production (Kg)		
		Tuna (YF)	Other	Total
2003-04	4	39.50	16.50	56.00
2004-05	15	87.50	30.50	118.00
2005-06	34	310.15	103.00	413.15
2006-07	47	195.78	65.20	261.04
2007-08	11	47.48	15.80	63.28
2008-09	36	91.60	25.50	117.10
2009-10	49	561.75	150.00	711.75
2010-11	109	1123.50	648.50	1772.00
2011-12	56	514.60	231.00	745.60

(YF: Yellow Fin)

Table 3. Summary statistics for neritic tuna in Myanmar (2012-13)

Species	Weight (Kg)
<i>Scomberomorus commerson</i> (Spanish mackerel)	4418201
<i>Auxis thazard</i> (Frigate tuna)	Not available
<i>Auxis rochei</i> (Bullet tuna)	Not available
<i>Euthynnus affinis</i> (Kawakawa)	Not available

5. Recommendations

- A standardised data collection system for neritic tuna fisheries with appropriate data collection forms, correct and transparent raising and estimation procedures and guidelines for data collections should be developed;
- A pilot project in one or two coastal regions should be set up and implemented, to test and gain experience with the uniform data collection system. After a test phase the system could be rolled out over the all divisions;

6. Conclusion

Nowadays, the fishery statistics has been widely accepted as a tool in proving so as to know the current and past status of the fisheries and draw up the short term and long term planning for fisheries including for food security and rural development as well as for conservation of fisheries resources. It is clear that reliable, accurate and timely data and information are needed for the effective fishery management and planning to meet the sustainable fisheries.

In Myanmar, small scale fisheries are of outstanding importance for the protein supply of local populations. However, in most cases the catches of the artisanal fishermen are poorly or not registered and do not appear in any official statistics. The biology, ecology and distribution of neritic tuna species that are exploited are poorly studied or unknown and the study on marine wildlife in their natural habitats in terms of the size of populations, distribution, migratory patterns, threats and conservation status are rather limited. Most of the existing studies are based on reported sightings, reported stranding and reported by-catch. Therefore, we need to be undertaken a wide range of capacity building measures to strengthen the capability of Myanmar to implement a better and sustainable management of neritic tuna resources in Myanmar.

Philippines Neritic Tuna Fisheries: Current Status

Noel C. Barut and Grace V. Lopez

National Fisheries Research and Development Institute (NFRDI), Interim Deputy Executive Director,
Corporate 101 Bldg, 101 Mother Ignacia Avenue Quezon City, Metro Manila
E-mail: necbarut@gmail.com

Philippines Neritic Tuna Fisheries: Current Status

NOEL C. BARUT and GRACE V. LOPEZ
Bureau of Fisheries and Aquatic Resources/
National Fisheries Research and Development Institute

Grand Blue Wave Hotel Shah Alam
Selangor, Malaysia
18-20 November 2014

Outline

1. Introduction of neritic tuna fisheries
2. Physical characteristics of Philippine EEZ for neritic tuna fisheries
3. Management arrangements for neritic tuna fisheries
4. Status and trends of neritic tuna resources
 - Types of fishing gears, Fishing efforts/Number of fishing vessels by gear, Fishing capacity (10 years), Fishing areas, fishing seasons, Species composition, Status and trends of neritic tunas by area by gear (10 yrs)
5. Imports and exports of neritic tunas (quantity and values)
6. Existing national fishery law, regulations, measures for neritic fisheries
7. How current national statistic framework support management of neritic tuna fisheries?
8. Issues and constraints on management of neritic tuna fisheries, and technical matters
9. List of researchers/scientist of fish stock or/and neritic tuna stock
10. Conclusions: (address issues/constraints and how the way forward at national level)

2

Introduction

The Philippine Marine Fisheries

- 7th top fish producing country in the world (2011).
- Fishing industry's contribution to GDP: ~ P194 B (2012)
- Employment: ~ 1.6 M (NSO 2002)

The Philippine Tuna Fishery

- Phil. A major producer of tuna since the 1970s.
- most important sector of the fishing industry in terms of volume and value, employment, and export revenues.

3

The Philippine Tuna Fishery

- Tuna fishing is a long-practised livelihood activity especially in the southern Philippine provinces.
- the main tuna fishing grounds are the Moro Gulf in the south, the Sulu Sea, the eastern waters of the Philippines and the South China Sea/West Philippine Sea.
- Tuna – top export commodity
 - exported in fresh/chilled/frozen, canned and smoked/dried
 - major markets: USA, Japan & United Kingdom

4

Philippine Tuna Fisheries

Distribution/market of tuna catches:

Catch of purse seine and ringnet

- mostly delivered to canneries
- yellowfin and bigeye tunas - target the export market,
- Skipjack - goes to the canneries,
- Frigate/bullet tuna and eastern little tuna - consumed locally.

Municipal Tuna Catch:

- Mostly landed as wet fish in different landing sites of the country.
- processed by drying, salting, smoking etc.
- some would enter large scale commercial processing

5

The Philippine Tuna Fishery

2 Sectors:

- 1) **Municipal sector (small-scale)**
 - use boats of < 3 GT;
 - vessels licensing under the Local Government Units (LGUs);
 - fish within municipal waters, 15 km from shoreline;
 - Handline - the predominant gear (estimated 70% of catches), takes similar quantities of oceanic and neritic tunas.
- 2) **Commercial sector**
 - use boats of 3 GT and above;
 - Commercial Fishing Vessel and Gear License (CFVGL) issued by the Bureau of Fisheries and Aquatic Resources (BFAR), renewal every 3 years;
 - fish outside municipal waters, beyond 15km off the shoreline;
 - provides the majority of the catch of oceanic tunas (about 70% of the official total catch).

6

Common Tunas in the Philippines

Oceanic Tunas

Thunnus obesus
Bigeye tuna

Thunnus albacares
Yellowfin tuna

Katsuwonus pelamis
Skipjack tuna

Neritic Tunas

Auxis thazard
Frigate tuna

Auxis rochei
Bullet tuna

Thunnus tonggol
Longtail tuna

Euthynnus affinis
Kawakawa / Eastern little tuna

7

Philippine Coastal Data (Physical Characteristics)

Number of islands	7,100
Total Territorial Water Area (+ EEZ)	2.2 million km ²
a) coastal	266,000 km ²
b) oceanic	1.93 million km ²
Shelf Area (Depth 200 m)	184,600 km ²
Coral Reef Area	27,000 km ²
Coastline (length)	36,289 km.
Marine waters (from shore)	
Local/Municipal	Up to 15 km.
National	15 km to 200 nmi

8

Fisheries Management

3 legal framework of Philippine fisheries sector:

- The Philippine Fisheries Code of 1998 (R.A. 8550)**
 - the governing law in Philippine fisheries
 - highlights conservation, protection and sustained management of fishery and aquatic resources
- The RA 7160 (Local Government Code of 1991)**
 - devolve the management and regulation of the municipal waters (15 km radius from the shoreline) and its fisheries resources to the **Local Government Units (LGUs)**.
- The Fisheries Modernization Act of 1997 (AFMA)**
 - geared toward industrialization and full employment based on sound agricultural development and agrarian reform.

9

Fisheries Management

Institutional arrangements

Agencies	Key function/s related to tuna fisheries management
DA-BFAR	manage, conserve, develop, protect, utilize, and dispose of all fisheries and aquatic resources beyond municipal waters
DENR	protection of fish habitat
DTI	regulation of fish trade
DFA	fisheries negotiations
MARINA	registration of fishing vessels
PFDA, PPA	management of fish ports
NFRDI, BAS	research and policy support agencies
LGUs	manage, conserve, develop, protect, and utilize all fish and fishery resources within their respective municipal waters
Philippine: Coast Guard, Navy, National Police Maritime Group, and Air Force	enforce fisheries laws
NAFC, FARMCS, PCAMRD, NCIE, MCSCOCs, Sea Watch, NITIC	coordinating bodies have been established to facilitate the implementation of fisheries management measures

10

Data Collection Initiatives

- Port Sampling (NSAP)
- Logsheets
- Philippine Observer Program
- Vessel Monitoring System
- Catch Certification
- Cannery Receipts

Agencies/Organization involve in Tuna Data Collection

Source: Philippine Tuna Fisheries Profile

11

Responsible agencies for collecting tuna data

- BFAR** (Bureau of Fisheries and Aquatic Resources) and **NFRDI** (National Fisheries Research and Development Institute)
 - National Stock Assessment Program (NSAP)* – gather landed catch information,
 - Port sampling, logsheets, observer program, catch certification, cannery receipts, licensing*
- BAS** (Bureau of Agricultural Statistics) now **PSA** (Philippine Statistics Authority)
 - Mandated to compile the Philippine fishery statistics Since 1987*

12

Responsible agencies for collecting tuna data

- Philippine Fisheries Development Authority (PFDA)**
 - supports fishing industry development by providing fish ports, post-harvest facilities, ice plants, cold storage and other facilities, in support to handling and distribution of fishery products.
 - Collect data on the volume of catch by species and value in the PFDA managed ports.
- National Statistics Office (NSO)**
 - maintains the official statistics on fishery exports and imports in the Philippines.
 - provides information vital to monitoring product flows and corroborating production figures
 - conducts national census every (10) years

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Fisheries Management

Management Plans

- National Tuna Management Plan
 - Scope of application:**
 - all forms of municipal and commercial fishing for tuna up to the limit of the Philippine exclusive economic zone (EEZ).
 - the operations of Philippine-flagged vessels fishing outside the jurisdiction of the Philippines.
 - the trade of tuna products originating from the Philippines, which includes fish caught elsewhere but transshipped and/or processed in the country.

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Fisheries Management

Management Plans

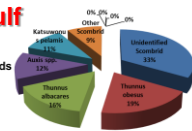
- National Plan of Action to Deter Illegal, Unreported and Unregulated Fishing (NPOA-IUUF)
- National Tuna Fish Aggregating Device (FAD) Management Policy
- Strategic Action Program for the Sustainable Fisheries Management of the Sulu-Celebes (Sulawesi) Sea Large Marine Ecosystem (SCS-LME)

15

Fisheries Management

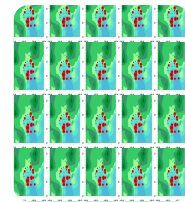
Davao Gulf

Identified Scombrids



Oceanographic survey in Davao Gulf Onboard M/V DA-BFAR

Fish eggs and larvae: Distribution and Abundance of Tuna and Tuna-like Species



FISHING by use of RINGNET and BAGNET is STRICTLY PROHIBITED
Effective JUNE to AUGUST 2014 and every year thereafter

CLOSED SEASON FOR THE CONSERVATION OF SMALL PELAGIC FISHES IN DAVAO GULF
Effectively prohibited from 01 to 31 June

Joint DA-DILG Administrative Order No. 2, 2014
"Establishing a Closed Season for the Conservation of Small Pelagic Fishes in Davao Gulf"

JAO 02

16

Fisheries Management

Completed and On-going Tuna Research, Statistics and Management Programs

- South China Sea Fisheries Development and Coordinating Program, 1974
- Indo-Pacific Tuna Development and Management Program (IPTP), 1980
- Fisheries Sector Program (FSP), 1990-1995 carried out the Philippine Tuna Research Project (PTRP) as major component of the FSP
- Indonesia-Philippines Data Collection Project, 2005-2007
- National Stock Assessment Program (NSAP), started in 1997
- A Pilot Study on the Genetic Variation of Eastern Little Tuna (*Euthynnus affinis*) in Southeast Asia
- West Pacific East Asia Oceanic Fisheries Management Project (WPEA-OFMP)
- Philippine Tuna Data Enhancement and Stock Assessment
- Genetic Stock Structures of Yellowfin (*Thunnus albacares*) and Bigeye (*Thunnus obesus*) Tunas in the Philippines and adjacent waters
- Temporal and Spatial Variation of Ichthyoplankton in Relation to the Oceanographic Conditions in Selected Fishing Grounds in the Philippines
- Distribution and Abundance of fish eggs and larvae of tuna and tuna-like species in Lagonoy Gulf in relation to oceanographic condition
- Technical Assessment of the Effects of Mesh Size and Net Depth of the Catch Composition and Size Structure of Tunas in the Surrounding Nets
- Composition, Distribution and Abundance of Fish Eggs and Larvae in the Philippine Pacific Seaboard and Celebes Sea with Focus on Tuna Larvae (Family: Scombridae)
- Preliminary Assessment of the Handline Fisheries in the Philippines
- Philippine FADs (payaos), monitoring species composition and a pilot project to estimate FAD number and density
- Genetic Population Structure of Some Small Pelagic Fishes in the Sulu-Celebes (Sulawesi) Seas
- Stock detection of *Thunnus albacares* in Western and Central Pacific Ocean (WCPO) using multiple genetic markers
- Oceanographic survey in Davao Gulf on-board M/V DA-BFAR
- Temporal and spatial variation of eggs and larvae of tuna and tuna-like species in relation to the oceanographic conditions in Macajalar Bay, Philippines
- Genetic diversity, population structure, and demographic history of *Auxis thazard* (Perciformes), *Selar crumenophthalmus* (Perciformes), *Rastrelliger kanagurta* (Perciformes) and *Sardinella lemuru* (Clupeiformes) in Sulu-Celebes Sea inferred by mitochondrial DNA sequences

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Fisheries Management

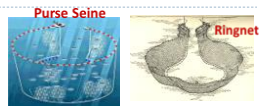
Existing national fishery law, regulation, measures (Fisheries Administrative Order)

FAO 144 s. 1983	Rules and regulations on commercial fishing	FAO 226 s. 2008	Regulation on the Mesh Size of Tuna Purse Seine Nets and Trading of Sma Tuna
FAO 183 s. 1992	Prohibiting the importation of yellowfin tuna and tuna products from 02 countries	FAO 227 s. 2009	Rules and Regulations Governing the Export of Fish and Aquatic Products to European Union Member Countries
FAO 188 s. 1993	Regulations governing the operating of commercial fishing boats in Philippine waters using tuna purse seine nets.	FAO 228 s. 2009	Rules governing the organization and implementation of official controls on fishery and aquatic products intended for export to the EU market for human consumption
FAO 198 s. 2000	Rules and regulations on Commercial Fishing.	FAO 236 s. 2010	Rules and Regulations on the Operations of Purse Seine and Ring Net Vessels Using Fish Aggregating Devices (FADs) locally known as Payaos during the FAD Closure Period as Compatible Measures to WCFCPC CMM 2008-01
FAO 199 s. 2000	Guidelines on Fish Transshipment	FAO 238 s. 2012	Rules and Regulations Governing the Implementation of Council Regulation (EC) No. 1005/2008 on the Catch Certification Scheme
FAO 217 s. 2001	Obstruction to Defined Migration Paths.	FAO 240 s. 2012	Rules and Regulations in the Implementation of Fisheries Observer Program in the High Seas
FAO 223 s. 2003	Moratorium on the issuance of new Commercial Fishing Vessel and gear License (CFVGL) as part of a precautionary approach to fisheries management	FAO 241 s. 2012	Regulation and Implementation of the Vessel Monitoring System (VMS) in the High Seas
FAO 223-1 s. 2004	Amending Sections 1 and 2 of Fisheries Administrative Order No. 223, 2003, re: Moratorium on the issuance of new Commercial Fishing Vess and gear License (CFVGL)	FAO 244 s. 2012	National Tuna Fish Aggregating Device (FAD) Management Policy
FAO 224 s. 2004	Establishment of Tuna Productivity Project in Davao Gulf.	FAO 245 s. 2012	Regulations and Implementing Guidelines on Group Tuna Purse Seine Operations in High Seas Pocket Number 1 as a Special Management Area
FAO 226 s. 2008	Regulation on the Mesh Size of Tuna Purse Seine Nets and Trading of Sma Tuna		
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Major Tuna Fishing Gears

Common commercial gears for catching tunas : purse seines and ringnets



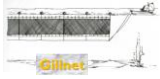
Common municipal gears for catching tunas: hook-and-line or handline.



- All these gears are operated jointly with fish aggregating devices (FAD) locally known as "payao".

Other gears used in catching neritic tunas:

- gillnet, Danish seine, liftnet, Otushi Ami, troll line, Scoop net, and trammel net



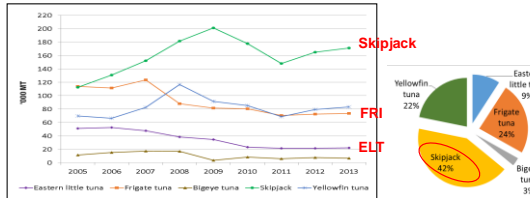
19

Status and Trends of Neritic Tunas

20

Annual Commercial Production of Tunas in the Philippines in mt (2005-2013)

Tuna Species	2005	2006	2007	2008	2009	2010	2011	2012	2013
Eastern little tuna	51,167.30	52,440.06	47,723.92	38,418.39	34,634.50	23,102.83	21,494.62	21,650.28	22,178.89
Frigate tuna	113,839.98	111,674.84	123,636.49	88,244.34	81,492.58	80,621.65	70,462.12	72,572.21	73,647.23
Bigeye tuna	11,599.99	15,334.22	17,325.20	17,173.88	3,701.47	8,575.25	6,021.55	7,889.17	6,886.66
Skipjack	112,696.42	130,930.00	152,098.11	181,562.92	201,262.48	177,698.05	147,979.44	165,105.27	171,261.14
Yellowfin tuna	69,833.06	66,334.03	82,659.88	116,528.50	91,439.84	85,351.55	68,625.29	79,508.70	83,394.40
Total	359,136.75	376,713.15	423,443.60	441,928.03	412,530.87	375,349.33	314,583.02	346,725.63	357,368.32

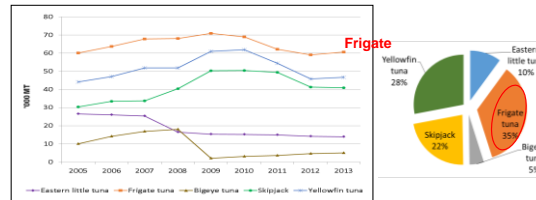


Source: BAS

21

Annual Municipal Production of Tunas in the Philippines in mt (2005-2013)

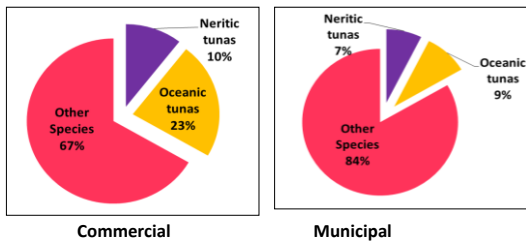
Tuna Species	2005	2006	2007	2008	2009	2010	2011	2012	2013
Eastern little tuna	26,506.75	25,937.21	25,369.62	16,489.04	15,338.51	15,134.15	14,908.30	14,156.44	13,921.64
Frigate tuna	60,119.58	63,673.12	67,835.62	68,056.88	70,844.88	68,245.02	62,167.10	59,118.78	60,520.00
Bigeye tuna	10,085.70	14,136.84	16,890.73	17,966.64	2,034.24	3,070.44	3,590.61	4,588.17	4,961.89
Skipjack	30,267.56	33,395.51	33,765.52	40,446.90	50,261.97	50,480.81	49,403.82	41,355.02	40,968.38
Yellowfin tuna	44,194.09	47,862.74	51,832.18	51,882.30	60,997.16	61,924.35	54,389.17	45,757.33	46,749.94
Total	171,273.64	184,205.42	195,693.67	194,881.76	199,476.76	199,554.82	184,459.00	164,955.74	167,191.85



Source: BAS

22

Contribution of Tuna Production in mt (2005-2013)



Commercial

Municipal

Source: BAS

23

Annual Production of Eastern Little Tuna in the Philippines by Commercial Region (mt), 2005-2013

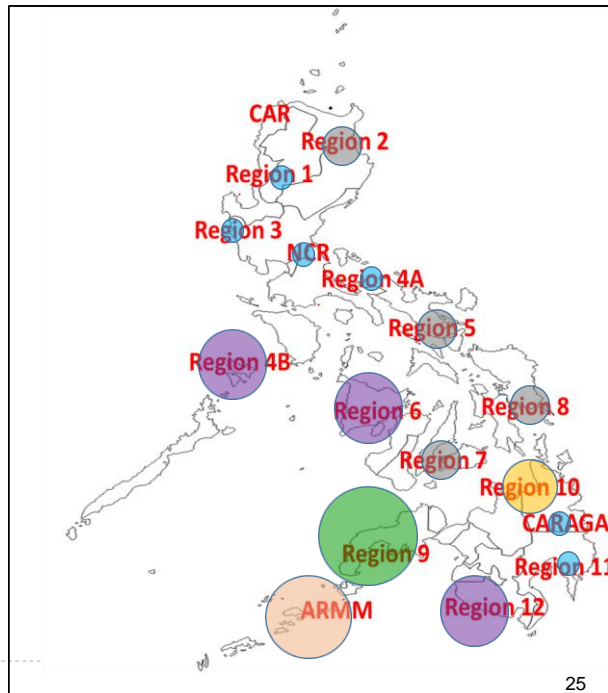
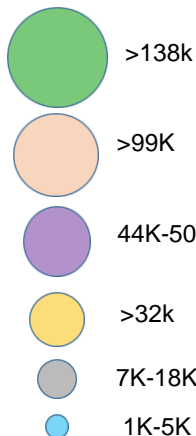
REGION	2005	2006	2007	2008	2009	2010	2011	2012	2013
NCR	144.68	93.12	182.93	35.92	49.60	42.36	67.84	134.60	585.32
I- ILOCOS REGION	48.80	67.14	99.13	86.91	51.22	31.32	5.56	7.29	16.91
II- CAGAYAN VALLEY	25.41	553.00	604.97	533.86	699.31	666.35	542.06	399.35	424.05
III- CENTRAL LUZON	242.21	146.69	182.46	83.48	28.83	281.96	162.57	45.35	181.71
IVA- CALABARZON	5.13	23.66	127.85	182.80	223.00	133.69	3.72	6.12	3.15
IVB- MIMAROPA	81.10	72.74	169.40	136.53	237.74	329.32	323.37	353.81	356.58
V- BICOL REGION	198.00	189.00	169.26	306.15	588.25	641.02	549.71	578.57	441.94
VI- WESTERN VISAYAS	7,234.58	7,662.77	6,742.96	465.41	1,685.04	1,554.51	697.03	403.29	376.68
VII- CENTRAL VISAYAS	637.10	880.84	1,887.63	1,865.88	1,572.85	1,254.85	880.69	825.60	703.00
VIII- EASTERN VISAYAS	721.01	839.98	941.21	999.86	900.07	708.92	673.36	799.80	549.75
IX- ZAMBOANGA PENINSULA	9,453.90	18,309.86	14,196.38	20,215.64	16,802.92	5,471.98	5,889.80	5,021.84	6,126.20
X- NORTHERN MINDANAO	6,376.47	5,459.21	3,726.12	3,022.18	2,358.62	1,742.62	1,358.37	1,387.48	1,028.22
XI- DAVAOREGION	92.86	237.88	382.37	471.19	177.77	220.14	132.15	236.26	175.29
XII- SOCCSKSARGEN	17,409.84	9,729.96	10,558.62	1,300.54	378.03	581.25	476.28	1,512.33	1,087.24
CARAGA	6.73	56.91	20.82	18.97	27.77	28.01	190.62	102.10	75.55
ARMM	8,489.48	8,117.30	7,731.81	8,693.07	8,853.48	9,414.53	9,541.49	9,836.49	10,047.30
TOTAL	51,167.30	52,440.06	47,723.92	38,418.39	34,634.50	23,102.83	21,494.62	21,650.28	22,178.89

Municipal

REGION	2005	2006	2007	2008	2009	2010	2011	2012	2013
NCR	-	-	-	-	-	-	0.28	-	0.60
I- ILOCOS REGION	92.47	94.38	146.78	91.37	225.45	85.26	414.08	186.73	90.44
II- CAGAYAN VALLEY	15.34	17.65	28.77	110.44	484.99	581.47	502.43	519.82	528.24
III- CENTRAL LUZON	74.54	77.65	119.08	264.01	93.79	187.42	119.99	97.39	98.99
IVA- CALABARZON	16.45	0.14	80.57	167.88	63.41	0.92	0.65	-	2.09
IVB- MIMAROPA	5,029.91	7,453.24	6,587.31	5,733.34	3,827.32	3,358.55	4,237.27	3,536.12	2,464.23
V- BICOL REGION	753.60	453.00	430.43	436.26	999.09	1,023.10	955.26	1,157.96	1,391.98
VI- WESTERN VISAYAS	4,399.64	3,956.90	5,953.82	679.11	1,859.95	1,793.90	1,781.71	919.77	1,485.59
VII- CENTRAL VISAYAS	2,483.85	548.06	605.77	791.07	704.20	560.85	523.97	451.86	434.40
VIII- EASTERN VISAYAS	790.81	1,059.75	921.53	1,234.40	1,220.45	1,126.19	969.91	959.75	757.52
IX- ZAMBOANGA PENINSULA	8,217.55	7,020.86	5,665.71	3,010.54	2,510.53	2,468.03	1,574.13	2,923.37	3,201.12
X- NORTHERN MINDANAO	733.55	763.25	877.35	844.53	607.67	611.07	588.04	379.51	308.64
XI- DAVAOREGION	249.66	96.77	259.69	327.49	310.66	393.14	287.15	111.99	138.97
XII- SOCCSKSARGEN	1,635.17	2,061.58	1,465.22	343.96	103.12	164.17	229.50	145.72	187.33
CARAGA	863.63	915.53	415.75	272.07	244.48	324.99	323.67	223.17	227.51
ARMM	1,150.56	1,418.45	1,811.84	2,182.57	2,083.35	2,455.07	2,400.26	2,543.28	2,603.99
TOTAL	26,506.73	25,937.21	25,369.62	16,489.04	15,338.51	15,134.13	14,908.30	14,156.44	13,921.64

Source: BAS

Abundance Distribution of Eastern Little Tuna (*Euthynnus affinis*) in the Philippines, 2005-2013



Source: BAS

25

Annual Production of Frigate Tuna in the Philippines by Region (mt), Commercial 2005-2013

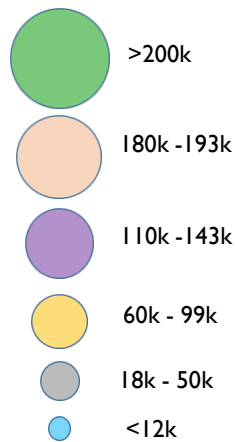
REGION	2005	2006	2007	2008	2009	2010	2011	2012	2013
NCR	9,502.11	6,804.99	7,475.98	4,448.44	2,491.56	5,854.28	3,716.33	3,827.74	5,490.65
I- ILOCOS REGION	22.08	48.10	44.63	59.91	39.64	9.76	13.49	13.31	23.07
II- CAGAYAN VALLEY	1,829.41	3,166.77	3,220.57	2,171.53	1,532.65	1,226.92	1,161.43	853.77	825.13
III- CENTRAL LUZON	225.15	457.91	447.97	336.14	556.39	448.64	494.47	292.74	273.11
IVA- CALABARZON	4,413.48	6,320.40	8,958.14	11,695.86	11,891.27	10,505.90	8,616.79	11,327.12	10,958.27
IVB- MIMAROPA	2,689.77	3,304.48	3,024.84	3,699.10	4,183.33	3,627.56	3,124.26	3,150.31	2,969.83
V- BICOL REGION	2,753.34	2,818.78	3,553.45	3,161.88	3,853.52	3,641.99	3,578.12	3,655.52	4,014.87
VI- WESTERN VISAYAS	1,928.50	2,012.81	1,937.04	1,983.50	2,397.18	2,180.97	1,350.47	1,213.35	2,131.59
VII- CENTRAL VISAYAS	11,926.30	7,147.81	10,160.66	7,042.07	6,667.57	5,385.59	4,340.60	3,970.06	3,918.44
VIII- EASTERN VISAYAS	2,932.86	3,482.59	3,812.76	4,155.29	3,975.50	4,146.27	4,532.84	3,457.14	3,427.89
IX- ZAMBOANGA PENINSULA	13,816.48	15,059.52	16,385.55	13,618.76	10,423.94	12,394.04	10,350.46	8,924.91	9,507.65
X- NORTHERN MINDANAO	7,578.35	7,341.97	9,259.96	9,152.32	11,619.90	5,813.51	7,528.85	6,275.87	5,600.38
XI- DAVAOREGION	663.92	618.14	1,140.73	1,149.69	785.27	547.42	911.46	1,310.34	1,371.63
XII- SOCCSKSARGEN	43,330.08	42,526.22	42,973.63	12,883.47	6,344.96	8,135.90	4,063.96	6,492.17	5,405.03
CARAGA	555.99	596.36	784.10	1,086.16	1,424.81	1,555.60	1,247.66	1,115.53	1,016.26
ARMM	9,672.16	9,967.99	10,456.48	11,600.22	13,305.09	15,147.30	15,430.93	16,692.33	16,713.43
TOTAL	113,839.98	111,674.84	123,636.49	88,244.34	81,492.58	80,621.65	70,462.12	72,572.21	73,647.23

Municipal

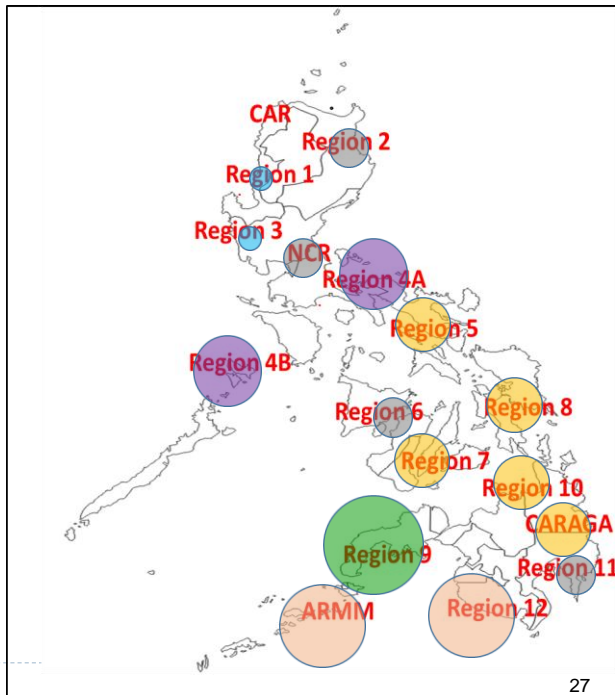
REGION	2005	2006	2007	2008	2009	2010	2011	2012	2013
NCR	3.76	12.32	7.83	0.40	-	1.20	0.68	0.04	3.80
I- ILOCOS REGION	372.86	312.78	288.47	139.09	1,336.65	988.21	602.95	92.75	77.23
II- CAGAYAN VALLEY	701.65	822.70	910.57	813.12	1,243.10	1,217.56	1,352.04	1,117.16	1,315.03
III- CENTRAL LUZON	636.35	604.65	889.41	859.73	872.66	996.82	1,248.17	837.02	821.00
IVA- CALABARZON	1,936.70	1,795.90	3,019.16	2,932.71	5,540.18	4,363.76	3,058.31	3,113.37	3,085.26
IVB- MIMAROPA	9,874.44	14,439.37	13,655.45	16,114.11	14,710.75	12,464.65	10,590.55	9,159.66	11,365.46
V- BICOL REGION	5,140.77	5,317.07	6,229.15	6,489.00	6,288.56	6,461.13	6,224.28	7,106.13	8,597.59
VI- WESTERN VISAYAS	1,079.03	1,078.62	752.15	831.97	3,352.38	4,322.31	4,451.21	2,209.87	2,168.38
VII- CENTRAL VISAYAS	5,683.19	6,262.54	5,564.57	4,051.09	3,978.30	3,550.18	2,944.04	3,063.03	2,358.80
VIII- EASTERN VISAYAS	3,618.23	3,649.83	4,321.00	5,711.25	5,312.00	3,583.19	2,687.10	2,909.83	3,572.20
IX- ZAMBOANGA PENINSULA	10,338.76	9,572.27	11,833.09	12,741.62	11,903.95	14,879.09	12,250.81	10,995.06	9,044.92
X- NORTHERN MINDANAO	2,180.39	1,541.07	1,793.97	1,623.94	1,402.45	1,205.54	1,660.34	2,884.84	2,845.54
XI- DAVAOREGION	1,211.66	1,087.94	1,408.84	1,097.16	1,158.91	1,073.49	719.27	959.46	1,089.44
XII- SOCCSKSARGEN	3,358.49	2,982.24	2,305.65	2,352.33	2,188.09	1,632.05	1,663.15	1,999.32	2,092.36
CARAGA	8,358.75	7,385.35	7,653.81	4,917.36	4,716.44	4,757.39	4,813.55	4,925.02	4,631.80
ARMM	5,624.53	6,808.47	7,202.50	7,422.00	6,840.46	7,448.52	7,900.65	7,746.22	7,521.19
TOTAL	60,119.56	63,673.12	67,835.62	68,096.88	70,844.88	68,945.09	62,167.10	59,118.78	60,526.00

Source: BAS

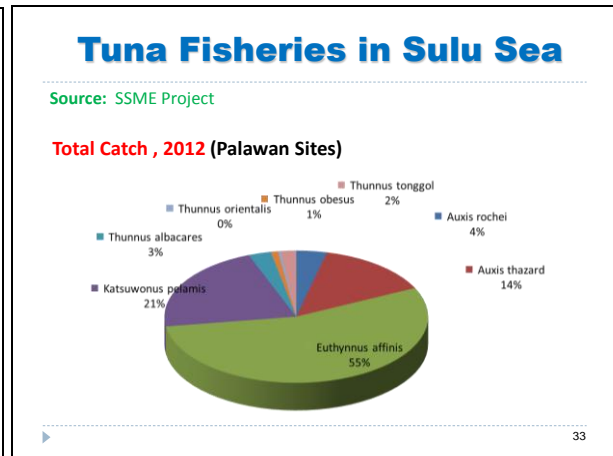
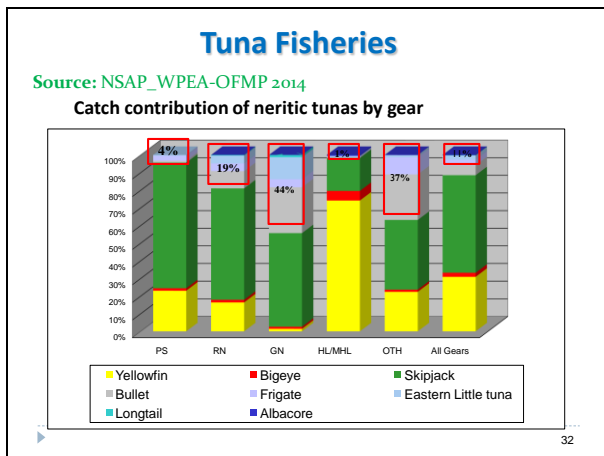
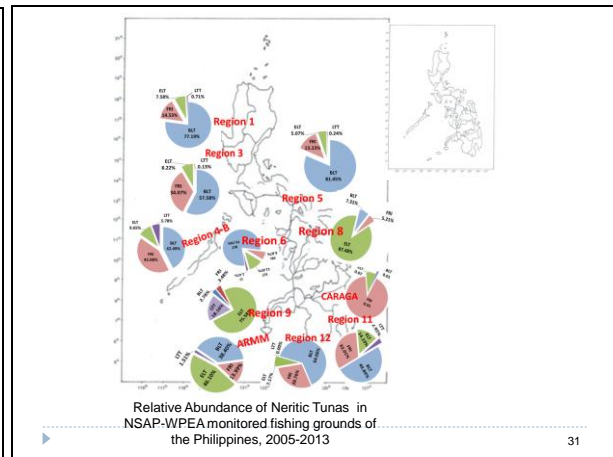
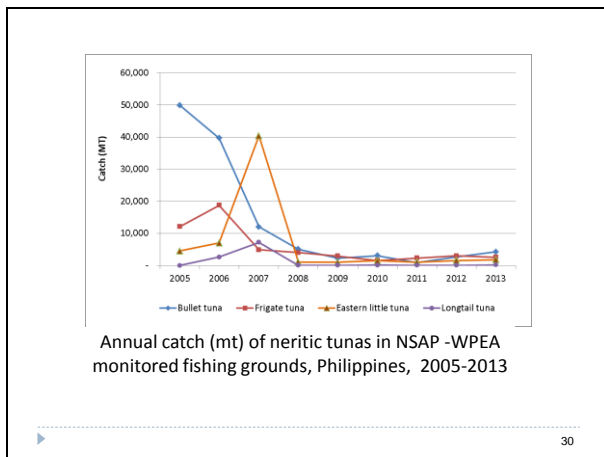
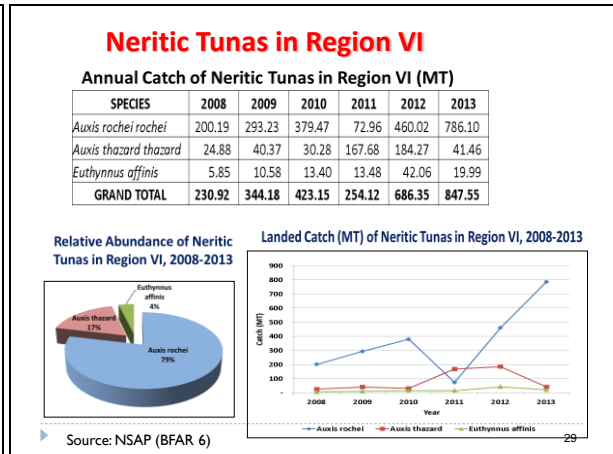
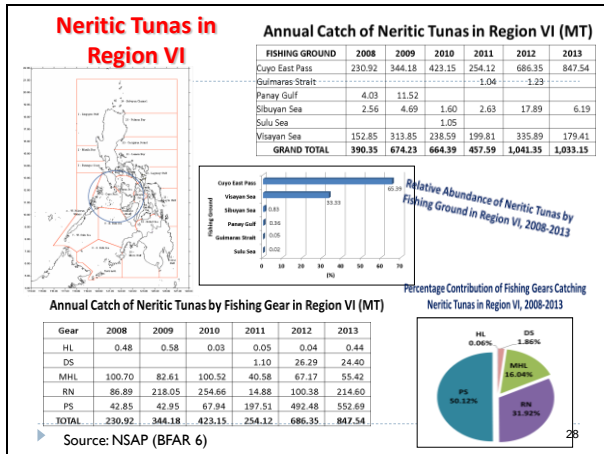
Abundance Distribution of Frigate Tuna (*Auxis* spp.) in the Philippines, 2005-2013



Source: BAS



27



Issues and constrains on management of neritic tuna fisheries, and technical matters

- Since the transfer of the collection of fisheries statistics from the Bureau of Fisheries and Aquatic Resources (BFAR) to the Bureau of Agricultural Statistics (BAS), the collection of tuna statistics is segregated only by species and not by gear anymore. Production for all species of fish is combined together by gear in the report of the BAS i.e. frigate tuna & bullet tuna reported as frigate only

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List of researchers/scientist of fish stock or/and neritic tuna stock

BFAR Regional Personnel (conducting NSAP)

Region	Project Leader	Assistant Project Leader
1	Rosalio Segundino Goerlan	Francis Greg Buccat
2	Angel Encarnacion	Melanie Calicdan
3	Romina Yuluc	Jenelyn Vallejo
4a	Maribeth Ramos	Wilfredo Fajardo Jr.
4b	Myrna Candelario	Lenie Gonzales
5	Virginia Oloño	Aida Andayag
6	Sheryll Mesa	Mateo Dayala Jr.
7	Prudencio Belga Jr.	Bruna Abrenica
8	Nancy Dayap, Ph.D.	Lea Tumabiene
9	Pedling Munap	Romeo de Guzman
10	Gena Babanto	Gigi Albor
11	Jose Villanueva	Daisy [?]
12	Lalla Emperua	Miyang Blaca
CARAGA	Romeo Delligero	Joyce Bacloyo
CAR	Marx Perfecto Garcia	Mary Tauli
ARMM	Macmod Mamanakap	Sammy Ayub

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Conclusions: (address issues/constraints and how the way forward at national level)

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Neritic Tuna Fisheries in Thailand

Praulai Nootmorn¹ and Pakjuta Khemakorn²

¹Marine Fisheries Research and Technological Development Institute, Kaset-Klang, BangKhen, Bangkok 10900 Thailand, E-mail: nootmorn@yahoo.com

²Southern Marine Fisheries Research and Development Center, Muang District, Songkhla 90000 Thailand

1. Introduction

Rapid development of Thailand's fisheries in the past decades has successfully put the country at the top producer of world fishery industry. In 2011 marine fishery accounted for 53.0% of the total fishery production, of which the Gulf of Thailand had 66% share and the Andaman Sea contributed 24% of the catch. The catch of pelagic fish accounted for 22-27% of the marine fishery harvest during 2000-2011. Among these, neritic tunas are considered as the important economic species due to their high price offered by tuna canneries that increasingly need the huge amount of fish supply. Since 1982, neritic tuna has therefore been one of the main target species for Thai fishers. Due to the high demand of neritic tuna consumption and then the increased number of fishing vessels that attempt to harvest fish to supply, neritic tunas in Thai waters have been overexploited (Noranarttragoon et al., 2013), or utilized beyond the level of Maximum Sustainable Yield (MSY), which is 110,000 tons with the effort at MSY of 221,330 days for the Gulf of Thailand (Chullasorn, 1998) and 8,651 tons with the effort at MSY of 71,104 days for the Andaman Sea (Bhatiyasevi, 1997). According to national fisheries statistics, the total catch of neritic tunas in Thailand was 111,673 tons in 2000, and decreased three times to be 35,052 tons in 2010, which contributing 6-18 % of total pelagic fish production. To address this issue, the effective management of neritic tuna fisheries in Thailand is clearly needed to put in place.

2. Fishing areas and seasons for neritic tuna fisheries in Thailand

Neritic tuna fisheries widely occur in Thai waters, both along the Gulf of Thailand and the Andaman Sea. It is due to the fact the geographics of Thailand supports the abundance of marine resources, including the neritic tunas. Thailand locates on the Southern Indo-China Peninsular with two long coasts of 2,615 km in total (i.e. 1,660 km coast along the Gulf of Thailand and 955 km coast along the Andaman Sea). Furthermore, the wide continental shelf of the coast, particularly along the Gulf of Thailand, is suitable for fishing operation. Neritic tunas in Thai waters consist of three main species, i.e. longtail tuna (*Thunnus tonggol*), the eastern little tuna or kawakawa (*Euthynnus affinis*), and frigate tuna (*Auxis thazard*). These species abundantly distribute in coastal areas having more than 20 meters of sea depth.

In the Gulf of Thailand, neritic tunas spread across the coast with the abundance found in the central part of the Gulf. Longtail tuna are abundantly found in deeper water than kawakawa and frigate tunas. According to the fishing grounds relocated by purse seiners, it indicates that the fish harvest is affected by two monsoon seasons (i.e. the Southwest and Northeast monsoons), as well as the availability of target species. Neritic tuna fisheries in the Gulf of Thailand occur throughout the year with the highest season during January to March.

For the Andaman Sea, the fishing grounds for neritic tunas are also widely found along the coast and expanded extensively over the offshore area, where the water depth is more than 40 m. The fishing seasons are all year round with the highest season during November to May while having the Northeast monsoon.

Based on the purpose of recording national statistics of marine fisheries, including neritic tuna fisheries, fishing areas in Thai waters are divided into seven areas, i.e. Area 1-5 within the Gulf of Thailand and Area 6-7 within the Andaman Sea. Adjacent areas of Thai waters are also divided into Area A, B, C, D,

and E (Figure 1). Main landing places for neritic tuna fisheries are concluded in Table 1, as well as located in Figure 1.

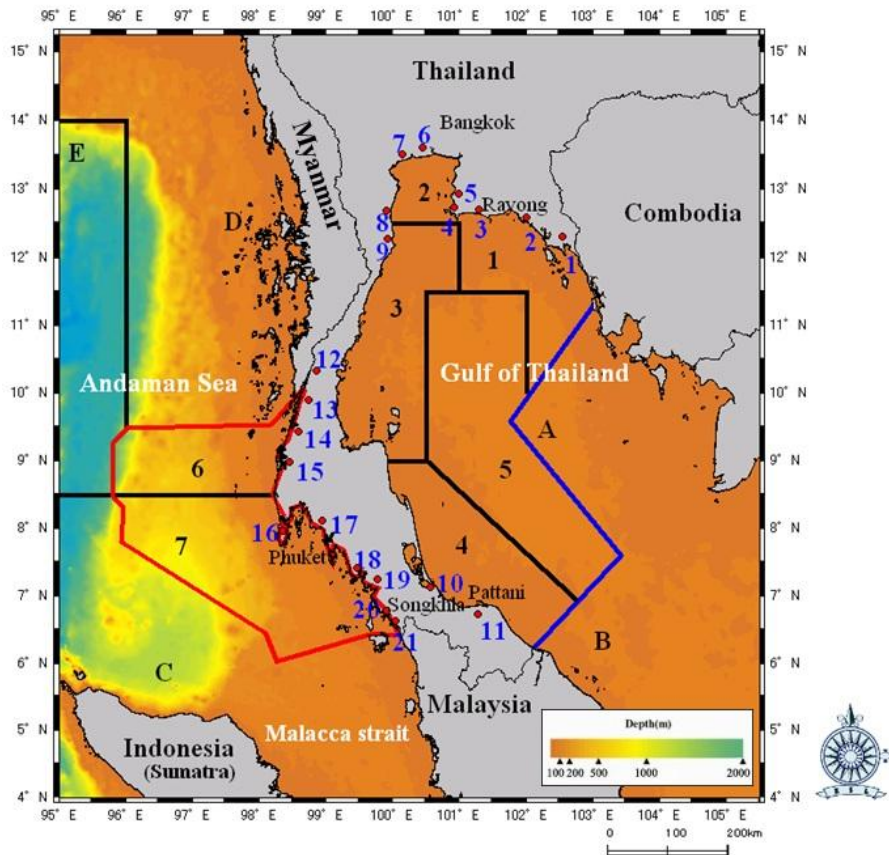


Figure 1. Fishing areas and the main landing places of neritic tuna fisheries along the Gulf of Thailand and the Andaman sea.

Table 1. The main landing places of neritic tuna fisheries in Thailand.

The Gulf of Thailand	The Andaman Sea
1. Laem Ngop, Trat Province	12. Muang, Ranong Province
2. Thamai, Chanthaburi Province	13. Kuraburi, Phang-nga Province
3. Muang, Rayong Province	14. Takuapa, Phang-nga Province
4. Sattahip, Chonburi Province	15. Taimuang, Phang-nga Province
5. Sriracha, Chonburi Province	16. Muang, Phuket Province
6. Pak Nam, Samutprakan Province	17. Muang, Krabi Province
7. Muang, Samutsakhon Province	18. Kantang, Trang Province
8. Cha-Um, Phetchaburi Province	19. Palian, Trang Province
9. Pranburi, Prachuap Khiri Khan Province	20. La-nga, Satun Province
11. Muang, Songkhla Province	21. Muang, Satun Province
12. Muang, Pattani Province	

3. Status and trends of neritic tuna resources in Thailand

The development of pelagic fisheries in Thailand was resulted from high efficiency purse seines used, expansion of new fishing grounds both nearshore and offshore, and new fish luring techniques applied. For instance, drifting coconut fronds are applied as fish aggregating devices for daytime fishing, while lighting techniques developed are used for nighttime fishing. These techniques have been generally adopted by purse seines in order to catch mixed target pelagic species since 1982. Subsequently, larger

purse seiners have been developed to increase the capability of harvesting neritic tunas in deeper water, and the electronic devices (e.g. sonar, depth recorder) have later been installed since 1985.

3.1 Fishing gears and fishing effort

Neritic tunas are exploited by a variety of fishing gears. The main fishing gears, however, are regular purse seines, which can be categorized into four types, including purse seines with fish aggregating devices (FADs), light luring purse seines (LPS), Thai purse seines (TPS), and neritic tuna purse seines (TUNA-PS). Generally, the boat length of FADs, LPS, and TPS is found between 16-25 m (LOA) with 250-600 hp of power engine. Mesh size of the net is approximately 2.5 cm, while the length and depth of the net range from 500 to 1,200 m, and 50 to 150 m, respectively. The number of crews varies in the range 25-40 persons. For TUNA-PS, on the other hand, the boat length is generally longer than 24 m with 300-600 hp of power engine. The net used is 1,200-1,600 m in length, 110-150 m in depth, and has 9.4 cm of mesh size. The number of crews is between 35-45 persons.

According to fishing vessels statistics of Thailand, they show the increased trend of the number of purse seines, from 1,164 vessels in 2006 to 1,371 vessels in 2010, which consisting of 531 vessels in the Gulf of Thailand and 840 vessels in the Andaman Sea (Table 2).

Table 2. The number of purse seines registered during 2006-2010.

Place/Year	2006	2007	2008	2009	2010
The Gulf of Thailand	537	548	501	210	531
The Andaman Sea	627	642	681	696	840
Total	1,164	1,190	1,182	1,206	1,371

3.2 Catch and species composition of neritic tuna fisheries

Annual Production

Tables 3 shows the catch of neritic tunas harvested by Thai fishing vessels and landed in Thailand. The increased trend of the total catch was shown until 2005, and then slightly decreased for few years. In 2008, the huge drop of the catch was recorded, and it is likely to remain stable afterwards. It was based on the fact that during that time Thai fishing vessels that used to operate in Indonesian waters under joint venture arrangement, could not continue fishing as Indonesia has changed the policy. Overall, the catch production of longtail tuna ranges between 13,967-81,531 tones, while the catch production of kawakawa ranges between 21,085-58,004 tones.

Table 3. Total catch (tones) of neritic tunas in the Gulf of Thailand and the Andaman Sea, 2000-2011.

Year	Species	The Gulf of Thailand	The Andaman Sea	Total	Grand Total
2000	Longtail tuna	53,407	4,838	58,245	111,673
	Kawakawa	46,054	7,374	53,428	
2001	Longtail tuna	55,533	1,726	57,259	102,909
	Kawakawa	38,400	7,250	45,650	
2002	Longtail tuna	59,052	3,536	62,588	114,077
	Kawakawa	45,691	5,798	51,489	
2003	Longtail tuna	68,147	3,916	72,063	116,928
	Kawakawa	36,616	8,249	44,865	
2004	Longtail tuna	78,657	2,874	81,531	136,418
	Kawakawa	46,631	8,256	54,887	

2005	Longtail tuna	79,095	1,819	80,914	138,918
	Kawakawa	46,647	11,357	58,004	
2006	Longtail tuna	71,213	2,056	73,269	123,727
	Kawakawa	42,073	8,385	50,458	
2007	Longtail tuna	62,072	4,974	67,046	112,646
	Kawakawa	39,076	6,524	45,600	
2008	Longtail tuna	10,500	3,623	14,123	36,343
	Kawakawa	15,132	7,088	22,220	
2009	Longtail tuna	12,309	4,548	16,587	38,028
	Kawakawa	14,128	7,313	21,441	
2010	Longtail tuna	11,806	2,161	13,967	35,052
	Kawakawa	14,828	6,257	21,085	
2011	Longtail tuna	5,152	9,570	14,722	38,341
	Kawakawa	11,989	11,630	23,619	

3.2.1 The Gulf of Thailand

Catch per unit effort (CPUE) and species composition

The average CPUE of neritic tunas by type of fishing gear in the Gulf of Thailand in Table 4 describes that neritic tunas are only target species of TUNA-PS by catching longtail tuna 982.06 kg/day (66.72%), kawakawa 257.29 kg/day (17.48%) and frigate tuna 232.59 kg/day (15.8%). The CPUE of neritic tunas from FADs was 332.82 kg/day (11.16%), comprising frigate tuna 7.88%, longtail tuna 0.22% and kawakawa 3.06%. LPS caught neritic tuna 274.09 kg/day (10.28%), comprising frigate tuna 6.66%, longtail tuna 0.74% and kawakawa 2.88%. The CPUE of neritic tunas from TPS was 7.51 kg/day (0.25%) with 0.17% of frigate tuna, 0.01% of longtail tuna and 0.07% of kawakawa (Table 4).

Table 4. CPUE (kg/day) of neritic tuna caught by purse seines along the Gulf of Thailand in 2012.

Species/group	FADs	LPS	TPS	TUNA-PS
Frigate tuna	235.00	177.57	5.11	232.56
Kawakawa	91.26	76.79	2.10	257.29
Longtail tuna	6.56	19.73	0.30	982.06
Other pelagic fish	2,241.47	1,826.14	2,908.69	
Demersal fish	360.55	531.92	70.04	
Others	47.42	34.13	19.54	
Total	2,982.26	2,666.28	3,005.78	1,471.91

3.2.2 The Andaman Sea

Species composition

Apart from the three main species of neritic tunas, i.e. kawakawa, longtail tuna and frigate tuna, bullet tuna (*Auxis rochei*) is also greatly found in the Andaman Sea. The species composition is presented in Figure 2. It can be seen that the dominant species is bullet tuna, followed by kawakawa, longtail tuna, and frigate tuna.

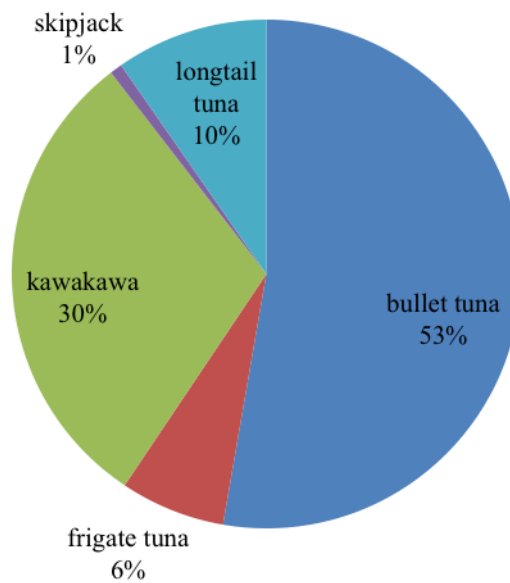


Figure 2. Species composition of neritic tunas caught along the Andaman Sea in 2010.

4. Imports and exports of tunas (quantity and values)

The catch production of tuna (both neritic and oceanic species), the amount and value of imported tuna, and the amount and value of exported tuna by country are presented in Table 5, 6 and 7, respectively. It can be seen that although the catch production of tuna from Thailand accounts for a small portion (0.80% in 2011) of world tuna production (Table 5), Thailand has continuously become the world top exporter of canned tuna (Table 7). It is based on the fact that tuna canneries in Thailand have been well and rapid developed. Therefore, Thailand also needs the huge amount of tuna supply from overseas to serve domestic tuna industry (Table 6).

Table 5. The catch production of tuna (tonnes) by country.

Country	2007	2008	2009	2010	2011	% 2011
Indonesia	989,111	1,086,031	1,092,503	1,079,237	1,178,515	17.35
China	609,709	576,975	589,758	618,435	632,353	9.31
Philippines	657,289	671,509	643,520	608,555	530,617	7.81
Japan	589,550	575,945	522,171	570,861	499,610	7.35
Taiwan Province of China	469,009	372,529	369,765	371,950	360,135	5.30
Korea, Republic of	350,860	340,245	431,306	369,143	299,028	4.40
Spain	237,913	281,359	282,254	286,157	322,446	4.75
USA	104,869	146,547	215,086	250,967	237,659	3.50
Ecuador	200,162	267,169	245,363	213,711	297,587	4.38

Papua New Guinea	230,383	205,953	213,333	208,639	165,043	2.43
Iran (Islamic Rep. of)	154,650	143,632	158,219	163,991	183,030	2.69
Mexico	156,253	145,227	157,645	154,392	145,668	2.14
Sri Lanka	124,070	126,792	126,931	149,960	145,588	2.14
Thailand	149,667	59,874	63,963	58,934	54,314	0.80
Other	1,598,055	1,603,190	1,623,145	1,628,301	1,741,318	25.63
Grand total	6,621,550	6,602,977	6,734,962	6,733,233	6,792,911	100.00

Source: FAO

Table 6. The amount (tonnes) and value (1,000 USD) of tuna imported by country.

Country	2009		2010		2011		2012	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Thailand	829,621	1,040,400	831,008	1,135,343	787,089	1,416,558	728,367	1,646,591
Japan	234,148	1,398,059	249,329	1,481,390	210,724	1,625,024	213,297	1,641,423
Spain	148,942	307,396	150,080	316,622	172,092	449,884	162,398	476,562
USA	27,452	254,165	26,446	253,440	27,870	268,587	26,389	294,120
Mauritius	85,238	119,759	105,416	156,822	115,090	223,907	112,707	269,387
Viet Nam	33,007	60,440	55,482	90,354	0	0	0	172,410
China	34,768	37,634	22,588	30,618	30,285	53,269	62,045	133,491
Italy	19,166	57,100	25,242	77,881	27,887	108,244	30,785	130,375
Fiji	5,751	6,631	14,156	19,314	0	0	44,085	102,003
Mexico	11,586	13,179	31,018	40,500	37,078	62,286	40,939	93,221
Republic of Korea	7,317	53,339	5,827	44,946	10,389	81,750	12,429	93,117
France, Monaco	15,265	70,254	13,923	71,549	14,402	72,980	14,829	75,038
Malta	714	6,902	1,655	18,096	618	10,621	2,178	41,255
Canada	4,982	23,620	5,539	28,396	7,073	39,167	7,509	39,881
Portugal	17,871	27,409	13,525	19,788	11,925	26,365	13,273	35,409
Colombia	5,908	15,623	5,782	13,929	5,725	17,201	10,709	35,394
Madagascar	14,208	16,771	16,972	24,580	19,585	37,267	13,755	31,068
Other	354,246	539,642	307,923	480,688	367,471	557,855	80,010	258,014
Grand total	1,850,190	4,048,324	1,881,911	4,304,256	1,845,303	5,050,964	1,575,705	5,568,759

Source: www.uncomtrade.org

Table 7. The amount (tones) and value (1,000 USD) of canned tuna exported by country.

Country	2009		2010		2011		2012	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Thailand	534,700	1,684,363	588,727	1,879,316	576,241	2,297,696	559,493	2,673,478
Spain	68,925	394,265	74,396	402,547	81,327	509,894	85,871	573,098
Indonesia	0	0	54,767	186,178	69,989	279,151	72,185	351,535
Mauritius	55,587	211,042	61,693	242,905	59,944	264,350	59,954	329,206
China	26,929	91,395	36,631	132,994	52,163	241,130	56,856	313,144
Viet Nam	21,937	87,851	23,442	117,012	0	0	0	214,108
Italy	16,760	130,673	14,556	108,647	14,759	119,523	17,078	137,137
Netherlands	29,173	116,830	18,986	79,116	18,741	91,012	19,810	111,464
Papua New Guinea	0	0	0	0	0	0	19,249	102,366
El Salvador	18,190	73,686	14,222	65,022	14,308	67,706	17,475	96,977
Germany	13,078	57,033	10,701	40,076	14,329	58,650	12,941	62,940
Portugal	4,465	33,721	3,886	24,122	7,103	44,086	8,477	56,996
Other	162,099	662,919	166,062	621,124	200,923	894,449	64,079	335,244
Grand total	951,843	3,543,779	1,068,069	3,899,061	1,109,827	4,867,647	993,467	5,357,693

Source: www.uncomtrade.org

5. Existing national fishery law, regulations, measures for neritic tuna fisheries

Currently, there is none of fishery law or regulations specially governing neritic tuna fisheries in Thailand. Nonetheless, a number of legislation essentially enforced by six Marine Fisheries Management Centers nationwide can be beneficial for the status of neritic tuna resources. Such legislation is as follows:-

1. Notification of the Ministry of Agriculture and Cooperatives Re: Prohibition of certain kinds of fishing appliances in spawning and breeding seasons in some localities of Prachuap Khiri Khan, Chumphon and Surat Thani Provinces, given on 24 January B.E. 2550 (2007)
2. Notification of the Ministry of Agriculture and Cooperatives Re: Prohibition of certain kinds of fishing appliance in spawning and breeding seasons in some localities of Phuket, Phang-nga, Krabi and Trang Provinces during specified period, given on 24 October B.E. 2551 (2008).
3. Notification of the Ministry of Agriculture and Cooperatives Re: Prohibition of surrounding nets having meshes of smaller than 2.5 cm in width in fishing at night, given on 14 November B.E. 2534 (1991).

Apart from the fishery law and regulations enforced, the Department of Fisheries has conducted researches on neritic tuna resources since 1981. Additionally, the catch production of neritic tunas is continuously recorded and annually published in national fisheries statistics of Thailand. Moreover, Marine Fisheries Research and Development Bureau on behalf of the Department of Fisheries assigns the concerned authorities to constantly monitor purse seine fisheries in order to examine the state of important pelagic resources, including neritic tunas. Subsequently, all of relevant data and information obtained will be together analyzed and used in preparing the sustainable management plan for neritic tuna fisheries in Thailand.

For example, Thailand has now drafted the action plan of the sustainable management for longtail tuna. The main objectives of this action plan are: 1) to conduct sustainable management of longtail tuna resource; 2) to rehabilitate the abundance and balance of longtail tuna resource and ecosystem; 3) to improve the capacity of fisheries organizations, and encourage their participation in longtail tuna management; 4) to strengthen the capability and efficiency of longtail tuna industry; and 5) to establish the plan for follow-up and evaluation of longtail tuna management.

6. National statistic framework that supports the management of neritic tuna fisheries

Based on the current national statistic framework, the Department of Fisheries by fisheries Provincial Fishery Office monthly records the fisheries statistics and has them published annually. These fisheries statistics include, for examples, the number of registered fishing vessels and relevant information that are categorized by type and size of fishing vessels, catch production by species and type of fishing gears, fishing days and fishing grounds of each type of fishing vessels. In terms of neritic tuna fisheries, the fisheries statistics and relevant information of main fishing gears (e.g. purse seines) are monthly recorded and monitored.

7. Issues and constrains on management of neritic tuna fisheries

A number of issues and constrains on management of neritic tuna fisheries in Thailand can be described as follows:-

1. As mentioning earlier under Section 5, there is none of specific fisheries laws or regulations used to control neritic tuna fisheries in Thailand. For instance, there is no regulation to set either catch or size limit of any species of neritic tuna, and thus, as long as fishers do not violate any existing laws, they can harvest neritic tunas as much as they wish. This could easily worsen the state of neritic tuna resources in Thai waters.

2. Under the national fisheries statistics of Thailand, the catch of neritic tunas is classified as “bonito” catch without breaking down into species. Unless species composition of neritic tunas received from fisheries researches is applied, to break down the annual catch of bonito into the catch of each species could be problematic.

3. Due to the fact that neritic tunas are considered as transboundary species, conducting fisheries management by one country may not be sufficient. The cooperation among neighboring countries should be sought, particularly in the South China Sea area.

8. Researchers/scientists on assessment of fish stock or/and neritic tuna stock

Marine fisheries researches of the Department of Fisheries are basically under the responsibility of Marine Fisheries Research and Development Bureau. For neritic tuna fisheries, longtail tuna in particular, the Department of Fisheries has appointed a subcommittee to study all related issues and then draft a sustainable management plan for the species. The subcommittee consists of a group of researchers who work on assessment of neritic tuna stock both in the Gulf of Thailand and the Andaman Sea.

9. Conclusions

In order to address the above issues and constrains mentioned, actions need to be taken as the following:

1. The fisheries management plan specifically for neritic tuna resources, should be developed. Such management plan, however, should concern on all legal, institutional and implementation aspects, as well as be carried out with stakeholder involvement. Stakeholders are including the government agencies, fishers, fisheries organizations, fishery processing and exporters. Thailand has now attempted to carry out the management plan on longtail tuna fisheries.

2. National statistic framework used for marine fisheries should be able to accommodate all types of important fisheries, including neritic tuna fisheries.

3. In terms of fisheries management for neritic tuna resources, cooperation among neighboring countries concerned should be established and kept going.

4. Standard practices for neritic tuna fishing should be adopted. These practices include having tuna fishing vessel registered, having Vessel Monitoring System (VMS) installed on each vessel, being a member of fisheries association, not conducting IUU fishing, and fishing in sustainable way.

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COUNTRY REPORT
NERITIC TUNA FISHERIES IN VIET NAM

Nguyen Viet Nghia

Research Institute for Marine Fisheries (RIMF, MARD)

Pham Hung

Department of Capture Fisheries and Resources Protection (DECAFIREP, D-Fish)

1. Introduction of neritic tuna fisheries

Viet Nam has a long coastline of 3,260 km and the large Exclusive Economic Zone covers more than one million square kilometers. Based upon the natural characteristics of the sea areas, the Vietnamese sea can be divided into the following regions: Tonkin Gulf, the Central waters, the Southeast waters, the Southwest waters and the Central of Bien Dong.

The fisheries sector plays an important role in the social and economic development of Viet Nam. The sector is estimated to contribute 3% to the Vietnamese GDP, and fish provides about 40% of the animal protein consumption. Originating from traditional fishing with small artisanal boats operating mainly in near-shore areas, up to now marine capture in Viet Nam has developed rapidly. A number of fishing boats equipped with engine of higher capacity is increasing in offshore areas. Fishing efficiency and the quality of marine catch have improved considerably. The policy on development of offshore fishing and stability of proper marine capture in coastal areas encouraged fishers in investment in building of new boats with high engine to fish in open sea. A number of fishing boats with engine of over 90 hp increased from 1,000 fishing boats in 1997 to over 14,000 fishing boats in 2007, and up to 28,237 fishing boats in 2014 (DECAFIREP, 2014).

Table 1: The total numbers of fishing boats in Viet Nam

Year	Numbers of fishing boats				
	Tonkin Gulf	Central	Southeast	Southwest	Total
2002	21,055	31,795	16,008	11,138	79,996
2003	21,474	30,483	11,418	11,678	75,053
2004	21,789	27,887	11,516	10,713	71,905
2005	21,990	30,383	17,647	10,948	80,968
2006	25,170	31,103	18,740	10,692	85,705
2007	22,023	32,511	19,099	10,591	84,224
2008	25,817	35,888	21,925	15,959	99,589
2009	34,611	45,186	24,570	15,959	120,326
2010	39,511	47,220	21,490	19,800	128,021
2011	42,659	42,580	26,368	16,756	128,363
2012	40,167	40,713	25,163	17,082	123,125
2013	38,836	38,734	24,065	15,381	117,016

During 2002 to 2011, the numbers of fishing boats has been increased continuously, from 79,996 fishing boats in 2002 up to 128,363 fishing boats in 2011. In the Gulf of Tonkin, the percentage of increase was about 10.0 % per year; in the Central waters: 3.4 % per year; in the Southeast waters: 6.5 % per year; and in the Southwest waters: 5.0 % per year.

In the Gulf of Tonkin, gillnet is the most important fishery which contributes the largest proportion of the fishing boats, with about 23-36% total numbers of fishing boats. Meanwhile in the Southeast and the Southwest waters, the trawl fisheries are more important (33-35% total numbers of fishing boats). Since 2007, fisheries are shifting from the demersal fisheries (such as, bottom trawls, bottom gillnet) into

pelagic fisheries (such as, floating gillnet, purse seine, lift net) in the Gulf of Tonkin, the Central and the Southwest waters.

Marine catch from offshore fishing occupied about 40 % of total marine catch. Some fishing ports have started operation effectively. A system of fisheries logistics and services in coastal provinces has been improved. Many forms of cooperation between fishermen have been established in order to set up fisheries services at sea and to assist each other in fishing and at risk.

Annual catches of the marine capture fisheries in Viet Nam were increased during past decade. The total catch in 2005 was about 1.99 million tons; up to 2.59 million tons in 2007; then it was 3.12 million tons in 2009. During 2007-2009, the catches from bottom trawl fisheries were about 39-49% of annual catches; it was about 16-22% of annual catches from purse seine fisheries.

Table 2: Annual catches of the marine capture fisheries in Viet Nam during 2007-2009.

Year	Annual catches (tones)				Total
	Gulf of Tonkin	Central waters	Southeast waters	Southwest waters	
2007	386,838	724,097	937,903	544,829	2,593,667
2008	416,507	1,100,997	918,066	436,860	2,872,430
2009	553,377	1,103,883	910,130	550,164	3,117,554

During the period from 2007 to 2009, the total catches were increased in the Gulf of Tonkin, the Central waters and the Southwest waters. However, the total catch of the Southeast waters was decreased. In the Gulf of Tonkin, the total catches were increased during 2007 to 2009, due to the increase of fishing pressure in trawl, gillnet, falling net, lift net fisheries. However, the catch rates of almost all fisheries were reduced. In the Central waters, the total catches were also increased, due to the increase of catches from gillnet, purse seine fisheries.

Tuna species in the marine waters of Viet Nam are founded about 16 species, which belong to the family Scomberidae. Neritic tunas include 5 main species, such as, bullet tuna (*Auxis rochei*), little tuna/kawa kawa (*Euthynnus affinis*), longtail tuna (*Thunnus tonggol*), frigate tuna (*Auxis thazard*) and striped bonito (*Sarda orientalis*). These neritic tunas are caught by two main fisheries, such as, drift gill-nets and purse seines (including luring light purse seines and searching purse seines).

2. Physical characteristics of coastal and offshore area

The Marine Waters of Viet Nam are divided into five main areas, based on the management purposes. These five management areas are: i) Tonkin Gulf; ii) Central wtaers; iii) Southeast waters; iv) Southwest waters; and v) Centre of Bien Dong (including Paracel and Spratly islands).

Based on the fisheries management purposes, the EEZ of Viet Nam are divided into 3 areas, including: i) coastal area; ii) in-shore area; iii) off-shore area.

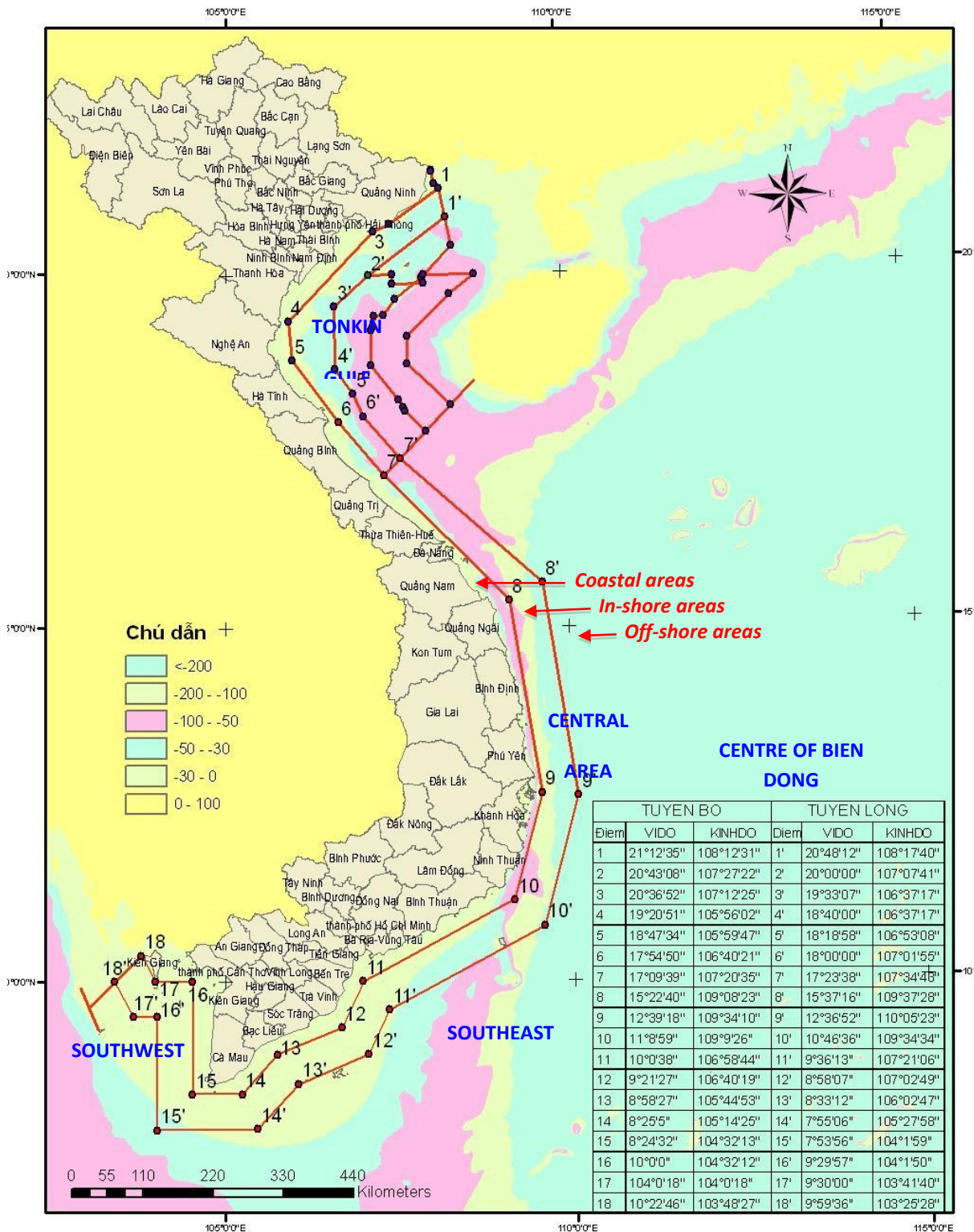


Figure 1: Fisheries management areas in the marine waters of Viet Nam.

3. Management arrangements for neritic tuna fisheries

- *General arrangement for Fisheries Management*

The government agency that is responsible for the administration, development and management of the fisheries is the Directorate of Fisheries (D-Fish), under the Ministry of Agriculture and Rural

Development (MARD). Under D-Fish, the Department of Capture Fisheries and Resources Protection (DECAFIREP) is responsible for the administration and management of the capture fisheries (see Figure 2). Along with the D-Fish, there are several Research Institutes acting as consultative agencies, such as, Research Institute for Marine Fisheries (RIMF), Viet Nam Institute of Fisheries and Economic Planning (VIFEP).

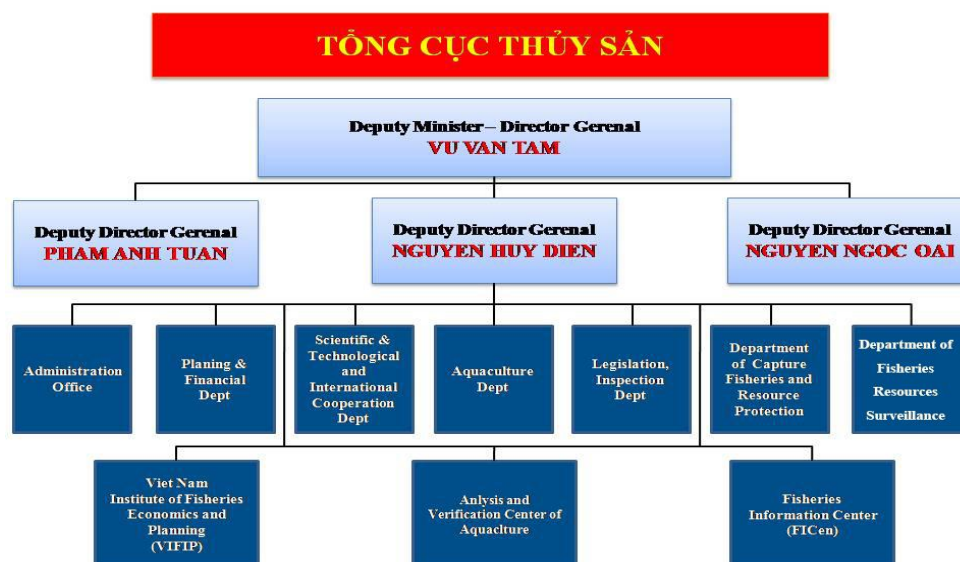


Figure 2: Organization chart of the D-Fish

At provincial level, the administration of the local fisheries is comes under the responsibility parallel of the Provincial People’s Committee (PPC) and MARD/D-Fish. At the most coastal provinces, there are existing Sub-DECAFIREPs, under the Provincial Department of Agriculture and Rural Development (which belongs to Provincial People’s Committee). People’s Committees (PC) of provinces are the administrative authorities to implement the Fisheries Ministry’s policies and regulations. PCs can make resolutions, decisions, standards and quotas on fisheries within the provinces, but not in conflict with the regulations of the Ministry.

At the local level, Provinces are not permitted to set up official fisheries offices at district level. Fisheries units are often combined with others to form district agriculture department or district forestry – fisheries department. There is 1 – 2 staff responsible for fisheries, agriculture and extension in the whole district.

In communes where fisheries are major earning resources, one or two members of the commune are appointed to be in charge of fisheries management. In the district and communes levels, the fisheries staff usually works on statistics, introduce government policies and regulations, and assist farmers to assess credits, and licences.

- *Arrangement for Neritic Tuna Fisheries Management*

There was no specific system/arrangement for managements of Neritic Tuna Fisheries (MARD => D-Fish => DECAFIREP => Sub- DECAFIREP => Local).

4. Status and trends of neritic tuna resources

There was no specific neritic tuna fishing fleets in Viet Nam. Neritic tunas are caught by two main fisheries, such as, drift gill-nets and purse seines (including luring light purse seines and searching purse seines). However, gill-net and purse seine fisheries are not targeted only on neritic tunas, but also many other small pelagic species. Normally, offshore fishing vessels, which are larger than 90 horse powers can fish neritic tunas.

4.1. Purse seine fisheries

Purse seine is one of the most important types of fishing gear in the marine fishing sector of Viet Nam. It is the fishing gear having the potential for operation in offshore areas. The marine product from the purse seine is about 20.6% of the total catch. The main species of the local and commercial types of surrounding net are small pelagic fish and include: sardine, mackerel, round scad, neritic tunas, anchovy etc. Most purse seiners in the Gulf of Tonkin and the Central waters are of small size ranging 13-16 m in length with engines of less than 90 Hp. In the Southeast and Southwest waters, the sizes of purse seiners are bigger and there is many of 16-23 m in length with engines of 90-450 HP. Purse seine fishery in Viet Nam uses two fishing methods. These are the luring method and searching method.

i) The luring purse seiner:

This is very popular throughout the whole country. The length of the purse seine in the luring method is usually about 250-500 m and the depth of the net is about 45-70 m;

- Anchovy purse seiner: The net can operate in the deeper fishing grounds. The net is 200-450 m long and 40-60 m deep. Mesh sizes range from 6-10 mm, the materials used for the net are 210D/6-210D/ 12. The Anchovy purse seiners are 11-21 m long with engines of 33 - 330 Hp and have generators with a capacity of 3-5 kW that are used for luring anchovy and other fish schools.
- The luring purse seiner: The luring purse seiners have engines of 20-350 Hp and generators with a capacity of 310 kW are used for the lure lights. Each boat has between 2-7 fish shelter groups. The net is of a rectangular-shape with a head-rope 300-500 m long and the net is 40-160 m deep. The mesh sizes are 18-15 mm in the bunt and 22 - 35 m in other parts. The luring purse seiners normally conduct fishing operations in waters of 20 - 80m deep.

ii) The searching purse seiner:

According to the structure and size of the net, the searching purse seines may be classified into two groups: searching purse seine for catching small pelagic fish and for catching tuna.

- Small pelagic fish purse seiners: For the searching method, the purse seiners must have powerful engines, of a size suitable for operating in the offshore fishing grounds. The boats often use engines of more than 60 up to 450 Hp. The sizes of the nets are 450-700 m long and 50-90 m deep. Mesh sizes are the same as for the luring method. Fishing operations are conducted during the day or at night time.
- Tuna purse seine: Tuna are one of the species that move at high speed so the purse seines for catching them often have a length of 500-1200 m and a depth of 70-120 m. The mesh size is about 30-35 mm in the bunt and 40-60 mm in other parts. At present, there are many new types of equipment used including: radar, GPS, fish finders, winches and power-blocks that are useful during fishing operations.

a. Fishing efforts

The total purse seine fishing boats were varied from 4,471 (in 2003) to 8,348 (in 2010), which contribute about 4.1% to 6.9% of total fishing boats in Viet Nam. However, there was lack of information on the number of fishing boats by the type of purse seiners.

The purse seine fisheries were well developed in the Central and the Southeast waters. The purse seine fisheries in the Gulf of Tonkin and the Southwest waters were quite stable through the last decade. In the Central waters, the purse seine fisheries were tended to increase from 2002 to 2010; while in the Southeast waters, the fisheries were decreased.

Table 3: Total numbers of fishing boat of purse seine fisheries

Year	Numbers of purse seine fishing boats (*)
------	--

	Tonkin Gulf	Central	Southeast	Southwest	Total
2002	328	2,106	1,647	460	4,541
2003	363	2,409	1,258	441	4,471
2004	365	2,595	1,283	409	4,652
2005	356	2,845	1,601	412	5,214
2006	377	3,106	1,801	440	5,724
2007	372	3,091	1,882	445	5,790
2008	386	3,270	1,942	435	6,033
2009	418	5,300	1,002	435	7,155
2010	849	5,784	1,076	639	8,348
2011	326	3,496	962	477	5,261

(*) Note: There was no data on the tuna purse seine fishing fleets. This figure is combined all luring light and searching purse seines.

b. Fishing areas

Gulf of Tonkin: The purse seine fisheries in the Gulf of Tonkin were operated in two main fishing grounds: i) waters around the Bach Long Vy island; ii) off-shore area from Thanh Hoa to Ha Tinh provinces. The fishing grounds of the purse seine fisheries were changed by the two main monsoons. During the southwest monsoon, it was mainly operated in off-shore area from Thanh Hoa to Ha Tinh provinces. While during the northeast monsoon, they were operated mainly in Bach Long Vy island areas.

Central waters: The small purse seiner (20-50HP) were operated in three main fishing grounds: i) off-shore waters of Quang Tri province; ii) off-shore waters of Quang Nam province; and iii) off-shore waters of Phu Yen - Khanh Hoa provinces. The larger purse seiners were operated in further off-shore waters from Quang Tri to Binh Dinh and from Quang Nam to Khanh Hoa.

Southeast waters: The purse seiner was operated in two main fishing grounds: i) off-shore waters of Binh Thuan; ii) waters around Con Son islands.

Southwest waters: The purse seiners were operated in two main fishing areas: i) central waters of the Gulf of Thailand; ii) the southern waters of Hon Khoai islands.

c. Fishing season

Depending on areas, fishing season of the neritic tuna can be varied. There were two main fishing seasons by the monsoon, such as, the Northeast monsoon season (November - March) and the Southwest monsoon season (April - October).

Table 4: Season for purse seines fishing fleets targeted on tuna species.

<i>Area</i>	Tuna species	Month (Lunar Calendar)											
		1	2	3	4	5	6	7	8	9	10	11	12
Tonkin Gulf	Kawa kawa												
	Longtail tuna												
	Frigate tuna												
	Skipjack tuna												
Northern Central Waters	Bigeye tuna												
	Yellowfin tuna												
	Kawa kawa												
	Longtail tuna												
	Skipjack tuna												
	Frigate tuna												

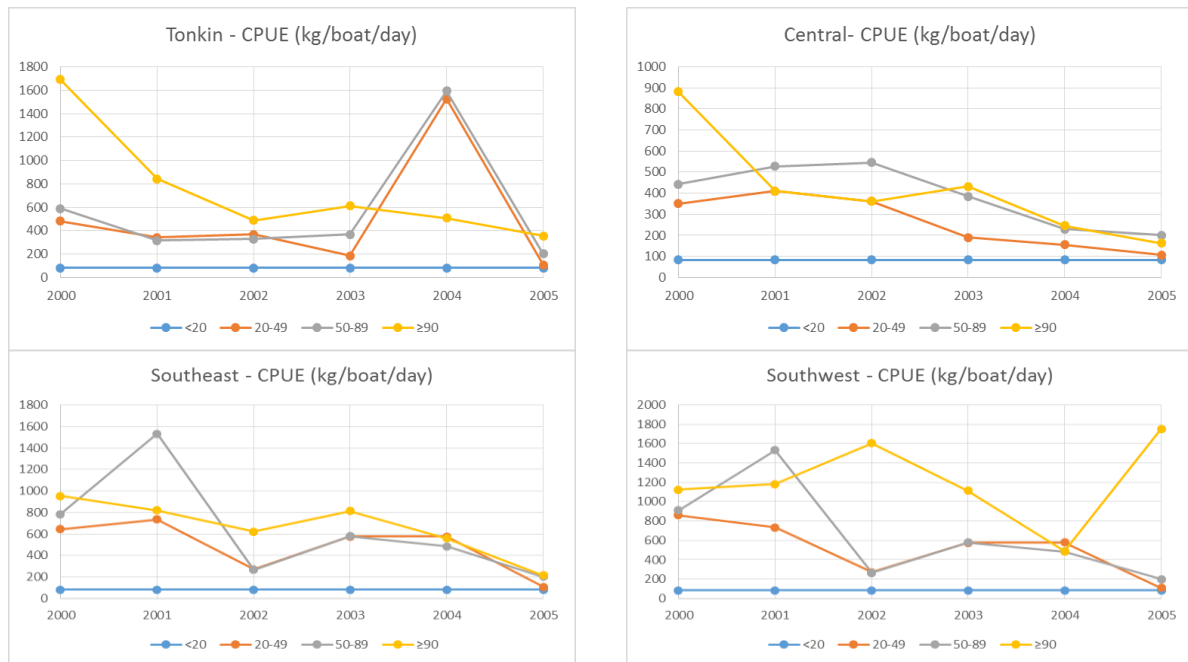


Figure 3: Trend of CPUE (kg/boat/day) for the purse seine fisheries in the marine waters of Viet Nam, by the horse power classes, during 2000-2005.

4.2. Gillnet fisheries

Gill-nets are important types of fishing gear in the marine fisheries in Viet Nam. There are many types of gill-nets operating in Viet Nam, such as, drift gillnet, bottom gillnet, trammel net, drift gillnet with bag, mixed gill net.

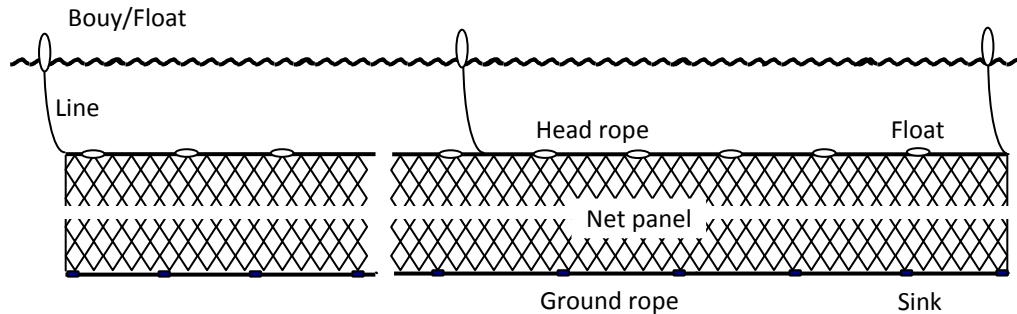


Figure 4: Basic structure of drift gillnets.

- Drift gillnets: Drift gill nets target on the tuna/tuna-like species operating in off-shore areas, while these gillnet target on small pelagic species operating in coastal areas.
- Bottom gillnets: Bottom gillnets target on the demersal species, such as, grouper, snapper, threadfin bream, lizardfish, cuttlefish, etc.
- Trammel nets: Target species of trammel nets are including small pelagic, cuttlefish, demersal fishes, shrimp, etc. These fleets often operate in coastal areas.

a. Fishing efforts

The total gill-net fishing boats were varied from 17,655 (in 2004) to 47,295 (in 2011). However, there was lack of information on the number of fishing boats by the type of gill-nets. Most of the gill-net fishing boats are small scall fishing fleets, which target on the small pelagic and demersal species in the coastal areas. The drift gill-nets, larger than 90 horse power usually target on tuna and tuna like species.

Table 6: Total numbers of fishing boat of gill-net fisheries

Year	Numbers of gill-net fishing boats (*)				
	Tonkin Gulf	Central	Southeast	Southwest	Total
2002	6,826	7,381	3,252	2,920	20,379
2003	7,345	5,067	2,462	3,256	18,130
2004	7,788	5,184	2,410	2,273	17,655
2005	8,067	5,695	2,628	2,459	18,849
2006	8,348	5,507	2,771	2,566	19,192
2007	7,941	5,760	2,858	2,506	19,065
2008	9,454	6,008	3,709	7,256	26,427
2009	11,727	15,426	5,781	7,256	40,190
2010	13,556	14,751	4,782	8,272	41,361
2011	18,897	14,711	6,132	7,555	47,295

(*) Note: This figure is combined all gill-net fishing fleets.

b. Fishing areas

Fishing grounds of gill-net fisheries spread across coastal waters of Viet Nam. Main Fishing grounds including: offshore waters from Thai Binh to Thanh Hoa, the waters from Quang Binh to Da Nang; northeastern and southwestern of Con Son Island; southern and south western of Ca Mau (Figure 5).

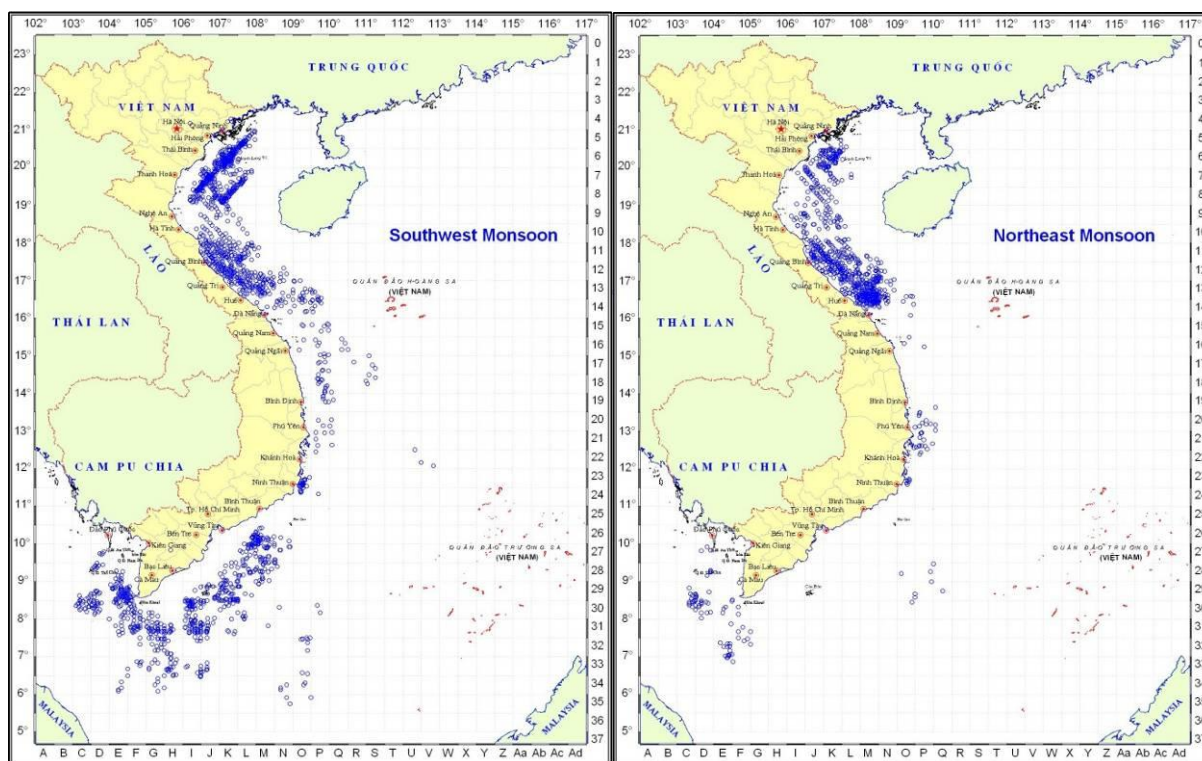


Figure 5: Fishing ground of neritic tunas based on logbook data

c. Fishing seasons

Depending on areas, fishing season of the neritic tuna can be varied. There were two main fishing season by the moonson, such as, the Northeast moonson season (November - March) and the Southwest moonson season (April - October).

d. Catch and trends of gill-net fisheries

Total catches of gillnets fisheries during 2007-2009 showed in the Table 7. There is lack of information on the catch of neritic tuna from gillnets fishing fleets.

Table 7: Annual catches (tonnes) of drift/bottom gill-net in Viet Nam during 2007-2009.

Gear type	Year	Gulf of Tonkin	Central waters	Southeast waters	Southwest waters	Total catches
Drift gillnets	2007	13,980	51,202	87,384	16,644	169,210
	2008	25,723	101,746	101,513	32,939	261,921
	2009	61,944	149,139	152,334	31,297	394,714
Bottom gillnets	2007	42,784	34,141	27,879	8,755	113,559
	2008	24,996	44,729	26,374	25,860	121,959
	2009	51,759	48,227	32,353	52,791	185,130

Based on the logbook data conducted during 2000-2009, catch rates (CPUE - kg/km of net) of drift gillnets were highly fluctuated.

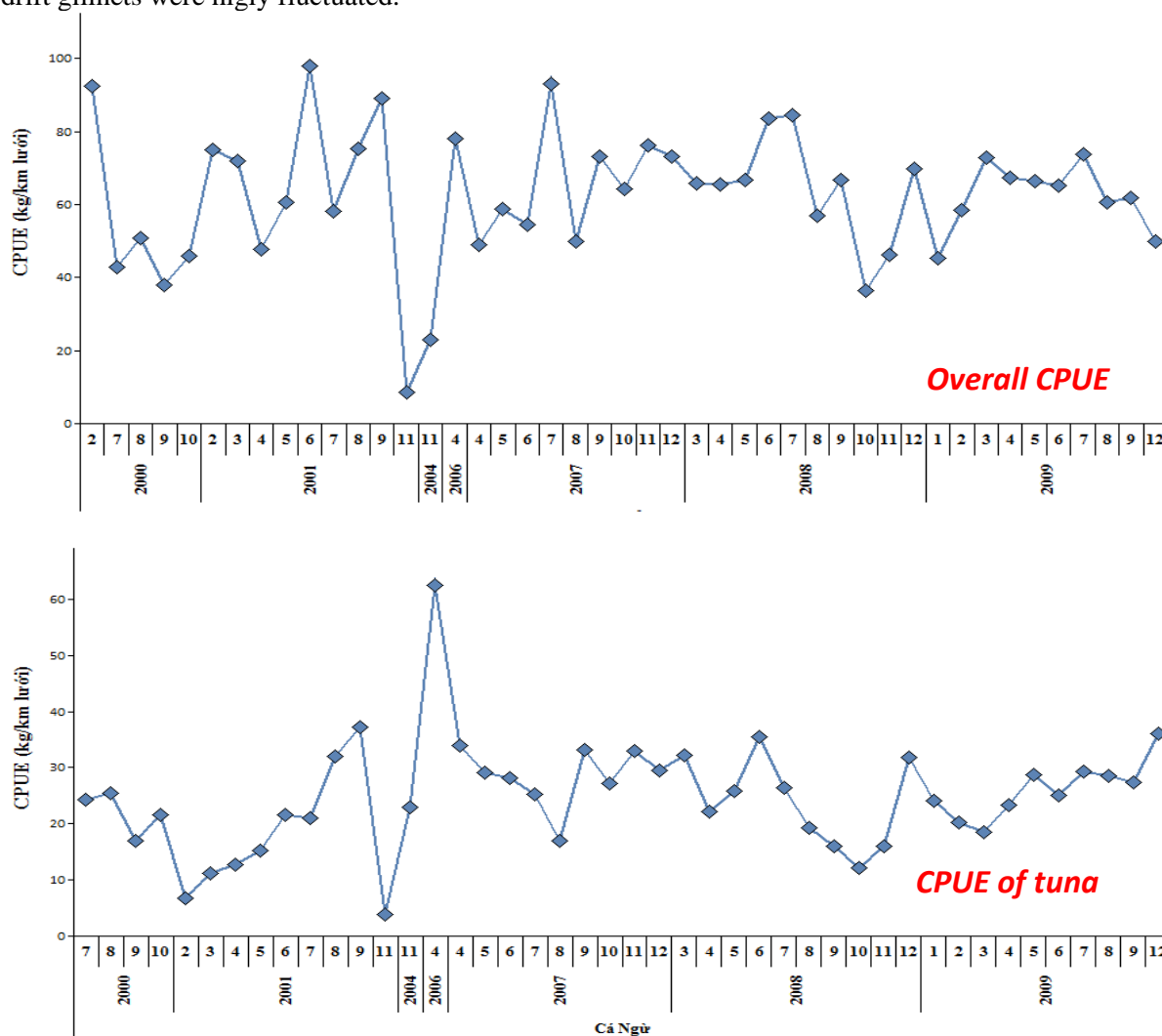


Figure 6: Catch rate (CPUE - kg/km) of the drift gillnet fisheries operated in offshore waters of Viet Nam.

4.3. Neritic tuna resources

During period from 2000 to 2012, surveys on the pelagic resources, including neritic tunas, were conducted in the marine waters of Viet Nam by using gill-nets with different mesh size (2a=73, 85, 100, 123 and 150 mm).

It was found that, neritic tunas in Vietnamese waters included 5 main species, such as, bullet tuna (*Auxis rochei*), little tuna/kawa kawa (*Euthynnus affinis*), longtail tuna (*Thunnus tonggol*), frigate tuna (*Auxis thazard*) and striped bonito (*Sarda orientalis*).

Table 8: Neritic tuna found in the marine waters of Viet Nam

No	English name	Scientific name	Viet Nameese name
1	Bullet tuna	<i>Auxis rochei</i>	Cá ngừ ò
2	Little tuna/ Kawa Kawa	<i>Euthynnus affinis</i>	Cá ngừ chám
3	Longtail tuna	<i>Thunnus tonggol</i>	Cá ngừ bò
4	Frigate tuna	<i>Auxis thazard</i>	Cá ngừ chù
5	Striped bonito	<i>Sarda orientalis</i>	Cá ngừ phương đông

a. Species compositions

The total sampled catches of neritic tunas in gillnet surveys were normally low compared to some other species. Catch proportion of neritic tuna ranged from 2.3 to 17.7%, the average 7.9% of total sampled catches in the southwest monsoon and ranged from 0 to 22.2%, the average was 5.8% in the northeast monsoon (Figure 7).

Frigate tuna and kawakawa are the two main species of the neritic tunas in Viet Nam waters. Frigate tuna accounts for the highest catch composition, average 4.0% total catches of surveys conducted in the southwest monsoon and 3.2% total catches of surveys done in the northeast monsoon. Similarly, kawakawa accounted for about 2.8% total surveyed catches in the southwest monsoon and 1.8% in northeast monsoon, respectively. Normally, catches of bullet tuna accounted for below 1% of total surveyed catches.

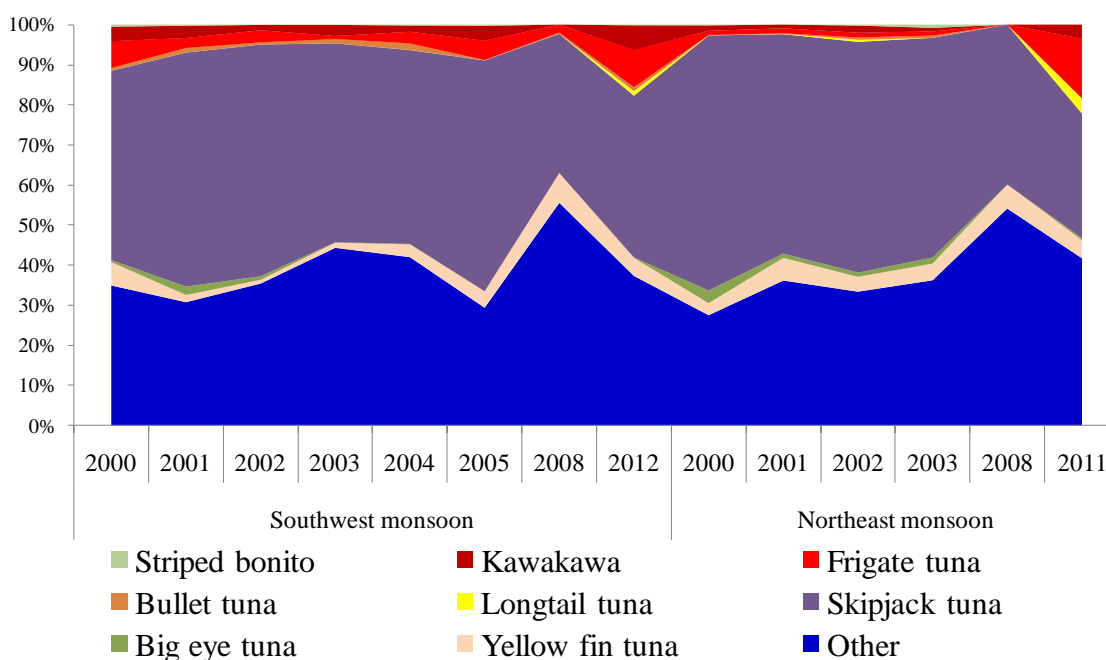


Figure 7: Catch composition of the gill-net surveys on the pelagic resources conducted in the marine waters of Viet Nam during 2000-2012.

b. Trend of the neritic tuna resources

The average CPUE (kg/km of gill-net) of the group of neritic tunas regardless of sampled gears varied from 3.3 to 8.4 kg/km, mean value of 5.5 kg/km in the southwest monsoon. Similarly, it varied from 1.9 to 5.0 kg/km, average of 3.6 kg/km in the northeast monsoon. The seasonal and annual variations in CPUE of the neritic tunas caught in the surveys mentioned were described in the Figure 8.

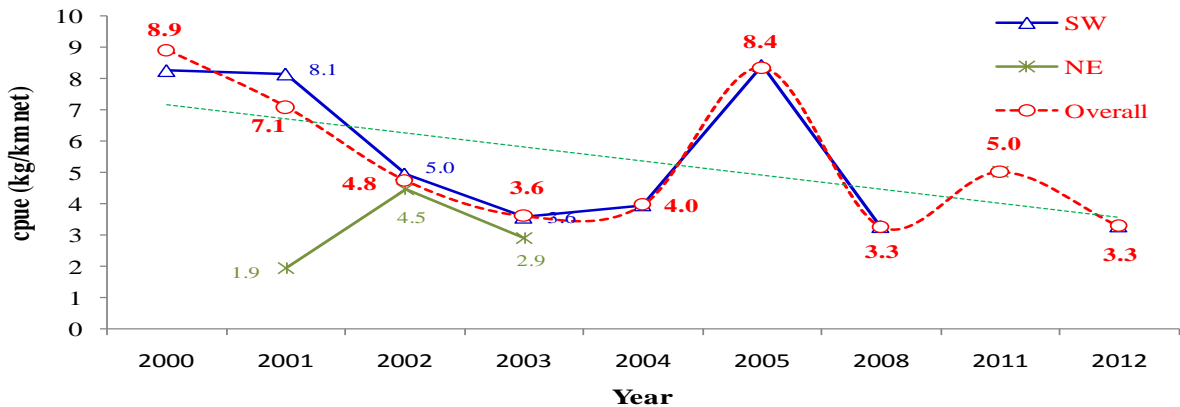


Figure 8: Variation in catch rate (CPUE - kg/km) of neritic tuna by time series

c. Spatial distribution of neritic tunas

Spatial distribution of the neritic tuna resources shows clearly seasonal changes. In the southwest monsoon, the highest sampled CPUE was found in the area from Quang Tri to Da Nang; from Binh Dinh to Ninh Thuan and south-eastern areas of Con Son Island. In the northeast monsoon, distribution is sparse, lower catch rates occurred in southwest monsoon, which mainly concentrate in areas from Da Nang to Binh Dinh and east-southeast Con Son Island.

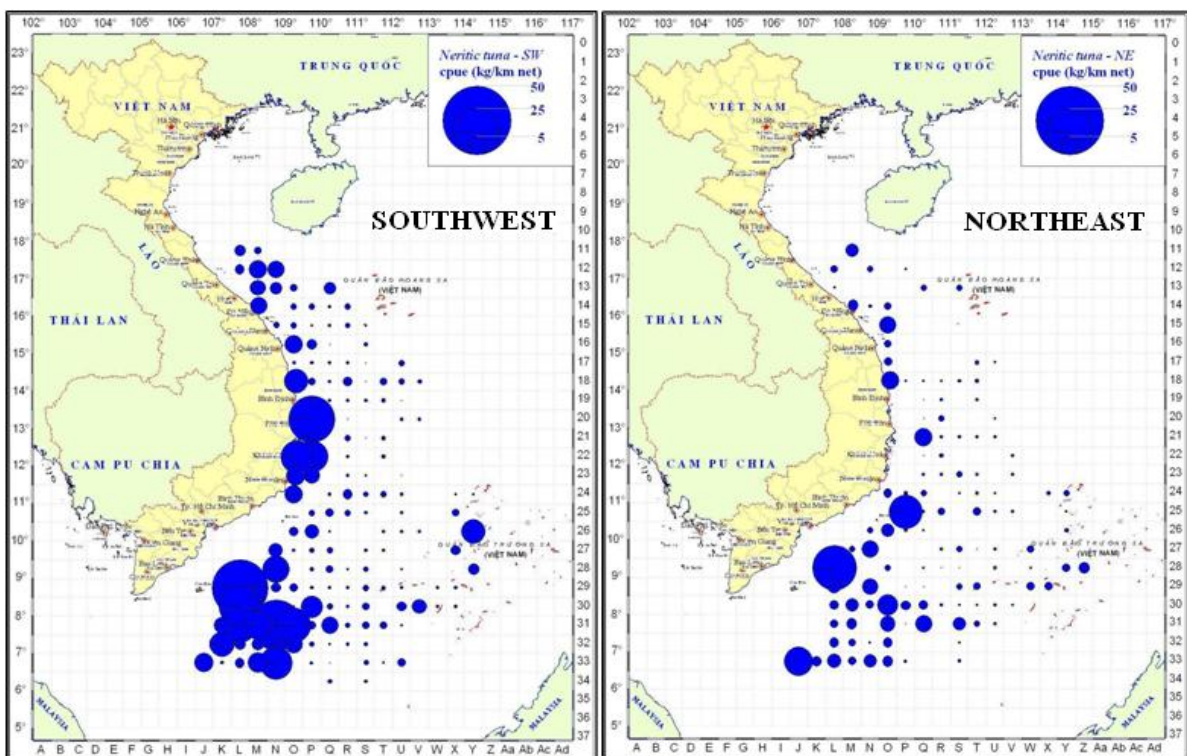


Figure 9: Spatial distribution of neritic tuna caught by gill-nets in Viet Nam waters

Figure 10 and Figure 11 show a commonly spatial distribution of the neritic tunas which kawakawa, bullet tuna and frigate tuna are considered as dominant species. Bullet tuna and striped bonito mostly distribute in the area from Binh Dinh to Phu Yen, south-eastern Phu Quy and Con Son islands (Figure 12 and Figure 13). Longtail tuna appeared very few in the waters of Viet Nam.

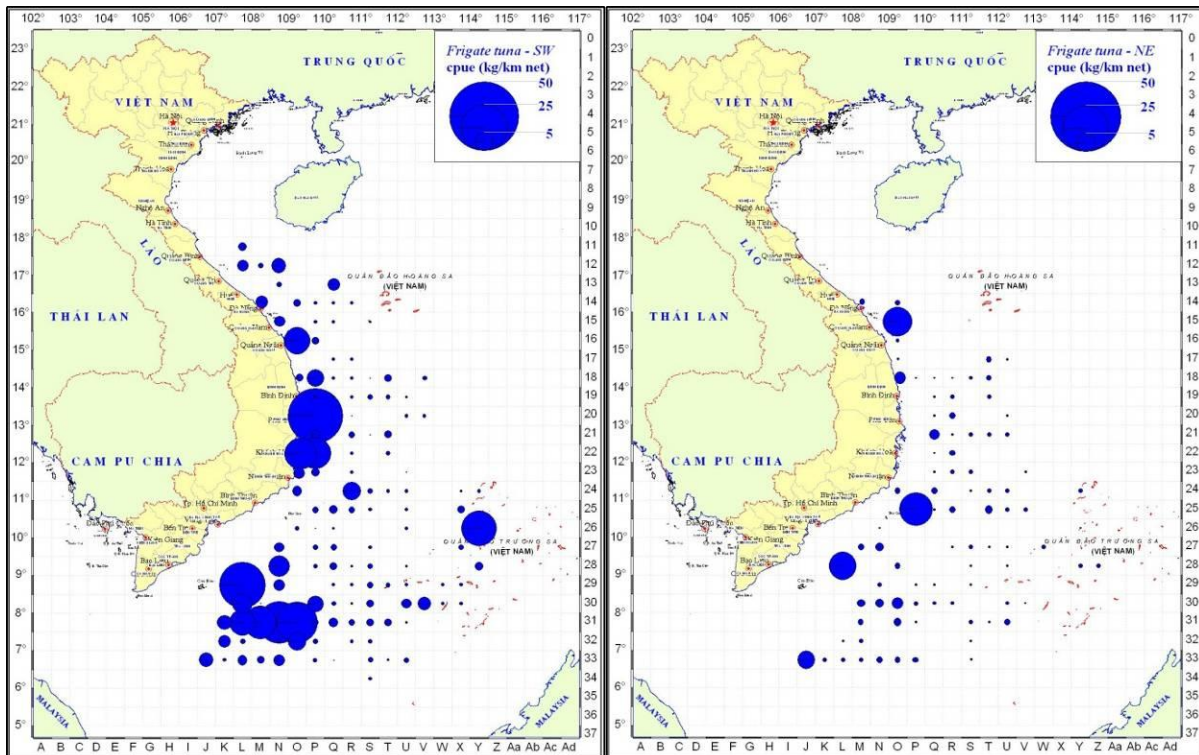


Figure 10: Spatial distribution of Frigate tuna in Viet Nam waters

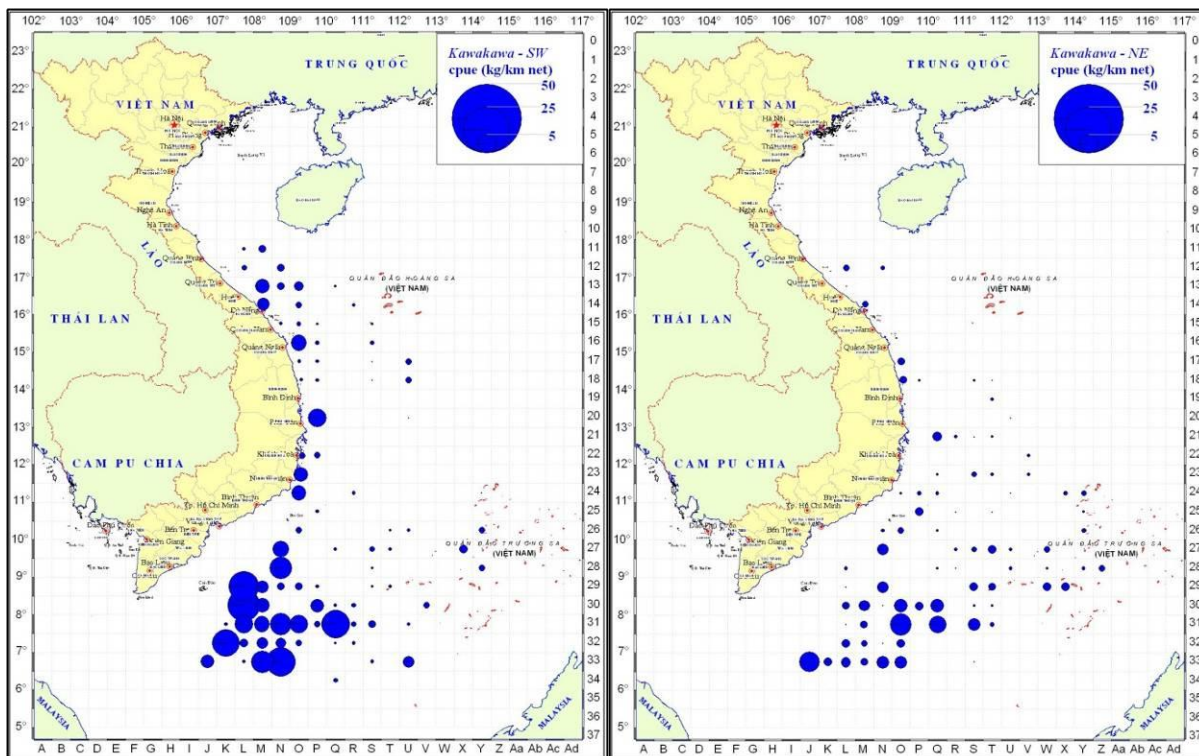


Figure 11: Spatial distribution of kawakawa in Viet Nam water

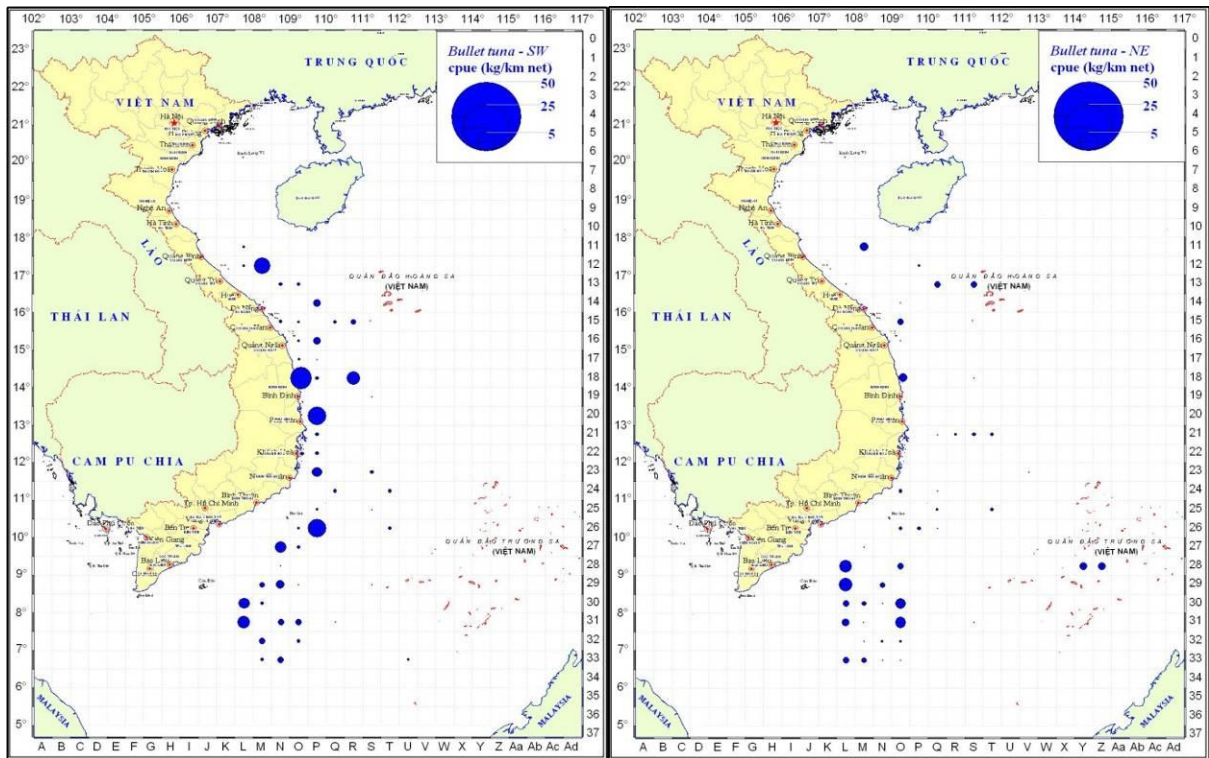


Figure 12: Spatial distribution of Bullet tuna in Viet Nam waters

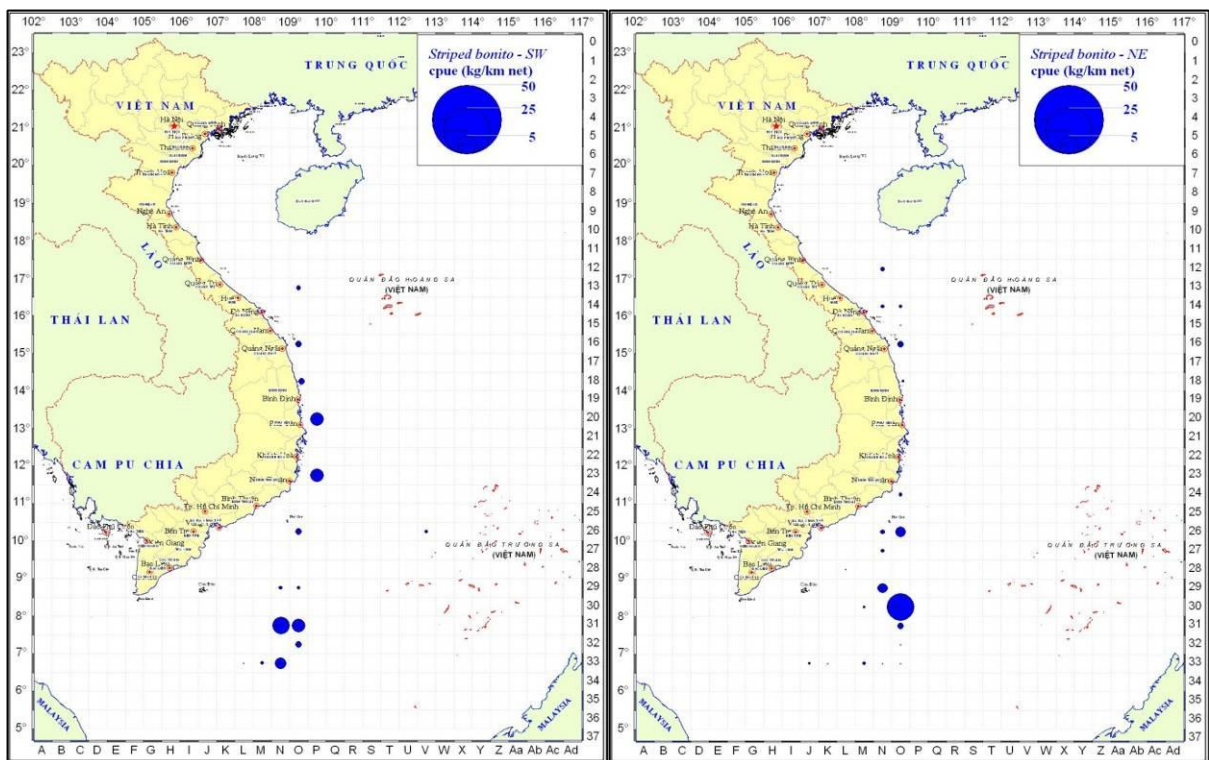


Figure 13: Spatial distribution of Striped bonito in Viet Nam waters

d. Biological information

Estimated mature length and length frequency of some neritic tuna species in Viet Nam waters are shown in Figure 14. The catch proportion of fish which is smaller than the length of first mature in gillnet accounted for 37.3% for total sampled catch of bullet tuna, 15.2% (frigate tuna) and 26,9% (kawakawa) respectively.

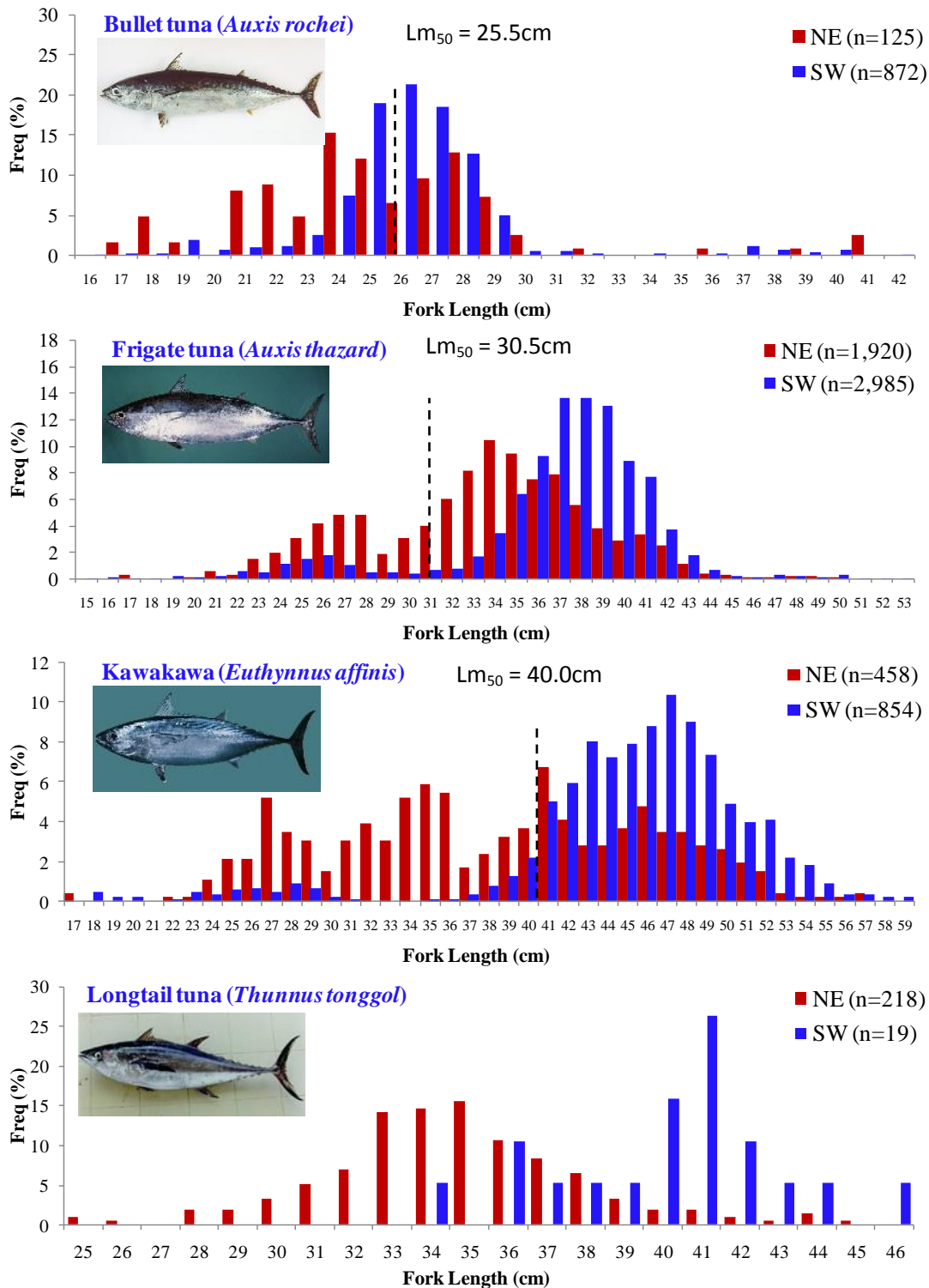


Figure 14: Length frequency distribution of neritic tuna based on gillnet surveys in Viet Nam waters

e. Biomass estimation

Resource of large pelagic fish in Viet Nam offshore waters was estimated at 1.1 mill. MT (Dao Manh Son et al., 2005). Biomass estimated of the neritic tunas in the national water was approximately 90,000 MT, accounted for about 7.9% total biomass of the large pelagic fishes (Figure 15). Of which, the bullet tuna was the largest stock biomass about 47,000 MT, accounted for 51.0% total biomass of neritic tunas (Figure 15), followed by frigate tuna, stock biomass estimated of about 16,000 MT (18.0%). The three other neritic tunas including kawakawa, striped bonito and longtail tuna was estimated about 28,000 MT, accounted for 31.0 % of total biomass of neritic tuna.

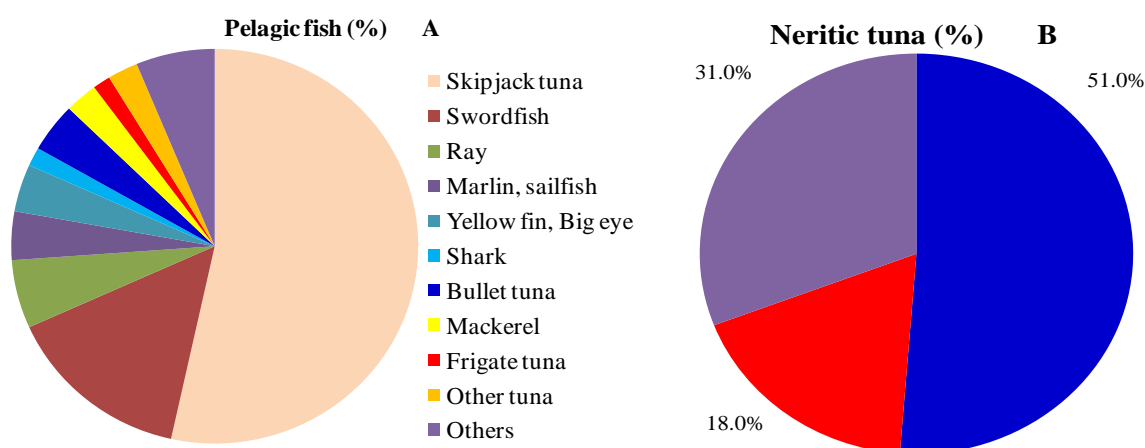


Figure 15: Species/group composition by stock biomass estimated based on surveys.

5. Imports and exports of neritic tuna

Tuna resources of Viet Nam are estimated at over 600 thousand MT; in which skipjack is the major species, accounting for more than 50% of the total pelagic fish stocks. Annual landings are more than 200 thousand MT, yellow fin tuna and bigeye tuna have average stock of over 45 thousand MT, with annual catch of 17,000 to 21,000 MT. Tuna concentrates mainly in the Central Viet Nam and the center of East Sea. In recent years, Viet Nam's tuna export contributes around 8% of total national seafood exports, ranking the 3rd in top seafood export goods of Viet Nam. In 2013, tuna from Viet Nam was exported to 112 markets with US\$ 526 million in revenue. There are no detailed information of exported volume and turnover by species. There are two main exported product categories as fresh, freeze and frozen tunas (HS 03) and processed tuna products (HS 16).

Table 9: Exported all tuna products in 2012.

Tuna Products	Volume (MT)	Value (mill. USD)
Cannery (HS Code16)	75,556	185,112
Other processed tuna products (HS code16)	8,315	29,974
Fresh, freeze, frozen (HS Code 03) (except HS code 0304)	34,914	158,965
HS code 0304 (except surimi)	40,843	195,354
Total	159,628	569,406

(Source: VASEP, 2013)

Table 10: Growth in all tunas exported (VASEP, 2013)

Year	Volume (MT)	Value (mill. USD)	Proportion in total exported turnover (%)
2008	52,818	188,694	4.2%
2009	55,814	180,906	4.3%
2010	83,863	293,119	5.8%
2011	107,807*	379,364	6.3%
2012	159,628*	569,406	9.3%

* Data were estimated, insufficient information from Custom Office

Table 11: Export market for Viet Nam tuna in 2013

Markets	Jan – Dec 2013 (Value)	Proportion (%)	Variation (%)
The US	187.416	35.6	-23.4
EU	140.733	26.7	+24.1
<i>Germany</i>	<i>42.936</i>	8.2	+32.9
<i>Italy</i>	<i>26.552</i>	5.0	-0.1
<i>Spain</i>	<i>15.714</i>	3.0	+6.9
Japan	42.030	8.0	-22.1
ASEAN	35.505	6.7	-3.6
<i>Thailand</i>	<i>25.044</i>	4.8	-22.1
Israel	17.906	3.4	+39.2
Tunisia	10.593	2.0	+4.7
Canada	10.331	2.0	+2.0
Mexico	7.385	1.4	+10.8
Others	74.786	14.2	-5.0
Total	526.685	100	-7.2

(Source: VASEP 2013)

Table 12: Tunas imported in Viet Nam.

Year	Tuna Imported Volume (MT)	Tuna Imported Value (mill.USD)
2008	37,234	81.717
2009	42,653	66.193
2010	52,217	94.908
2011	67,329	122.377
2012	103,762	188.536

(Source: VASEP, 2013)

6. Existing national fishery law, regulation, measures for neritic tuna fisheries

For tuna management, Viet Nam has issued legal documents such as Fisheries Law and Decrees, Circulars specified: production, business conditions including fisheries; ensuring safety for fisher and fishing vessels; the management of fishing activities of organizations/individuals in Viet Nam waters; administrative sanctions regulations in the fisheries sector.

Recently, Viet Nam Government has issued the Decisions on the restructuring agricultural, fishing ports and landing sites system to 2020, orientation to 2030 and implement the scheme on "reorganize production in fisheries".

Fisheries Directory has drafted and submitted the Minister of Agriculture and Rural Development (MARD) for approval NPOA-IUU. Schemes on "Piloting the organization, exploitation, acquisition and consumption of tuna by chain" are under constructed by D-Fish.

In addition, Viet Nam Government has acceded to the provisions of the agreement, international agreements such as the UNCLOS – 1982, CoC – 1995, CITES, Catch Certificate with EU 2010 etc.

Currently, Viet Nam still lack of the conditions for the investigation, data statistics, resources database, vessels and tuna catches; difficulties in management capacity, human resources, finance, facilities and lack of in-depth research on fisheries forecasting, resource, harvesting techniques and tuna products post-harvest preservation.

In the coming years, the MARD will focus on implementing the scheme "Re-organize production in fisheries", in which concentrating on reviewing, amendment and development promulgating mechanisms and policies, completing the legal documents to strengthen fisheries management and development forwards sustainability; enhancing the management, resources investigation, fisheries

forecasting, science – technology application, trade promotion and international cooperation; improving the quality, value added and reduce post-harvest losses;

7. National statistic framework support management of Neritic tuna fisheries

General statistic system

Fisheries statistics

Fisheries Law, Decree and Regulation request all fishing fleets to deliver logbook and catch report. However, this has not been applied in practices.

There is no current framework for national fisheries statistic. The data and information for fishery managements, such as, annual catches, fleet structures, fishing activities, etc. were reported from the local villages to Sub-DECAFIREP, then being summarried at the national level by DECAFIREP (D-Fish).

Landing and Resources survey

During 1996-2005, the "Assessment of the living marine resources in Viet Nam" project funded by DANIDA (ALMRV) was carried out to establish a so-called "fisheries statistic system". Unfortunately, the system stopped when the ALMRV project was terminated.

Recently, several projects have been trying to setup the enumerator programme to collect the data from landing sites. However, the data are still quite scattering.

i) WPEA project funded by WCPFC: This project has conducted by D-Fish since 2009 to collect landing data and biological samples from tuna fishing fleets at landing sites. At the begining, the data was collected at 3 provinces, including Binh Dinh, Phu Yen and Khanh Hoa from longline and handline fishing fleets.

ii) The project I.9/DA47 funded by the Gov. of Viet Nam: This project has conducted by RIMF since 2011. During 2011-2013, the project activities focus on the resources surveys, including bottom trawl surveys for demersal resources; hydro-acoustic surveys for small pelagics; gillnets, longline surveys for tuna/tuna-like and large oceanic pelagic fishes.

8. Issues and constrains on management of neritic tuna fisheries, and technical matters

Management issues

- Lack of specific legal framework for tuna fisheries management;
- Weak and poor essential resources, minor role/power and involvement of fishery authorities;
- Weak MCS system (implementation of current regulations);
- IUU fishing increased;
- Poor infrastructure for fishery;
- Middlemen play an important role and take the most benefit while fishermen normally fishing with loss or marginal benefit;

Technical matters

- Overfishing capacity; mostly, fisheries resources are being overfished;
- Poor handling practices and high proportion of post harvest lost;
- VMS, under MOVIMAR project, 3000 units of offshore fishing vessels installed VMS, not all fishers comply and willing to use;
- “Top down” approach in data collection;
- Insufficient data for stock assessment: Logbook applied but poor coverage; Port sampling uncontinuous collected; On boat observers not implemented;
- Stock assessments with high variation and uncertainty;
- Database is not well handling and frequently updated;

9. List of researchers/scientists on assessment of fish stock and neritic tuna stock

The Research Institute for Marine Fisheries (RIMF) has been assigned to be the research agency for fisheries managements and developments. There are numbers of researchers/scientists of RIMF, D-Fish and other institution, who work close to the fish stock assessments, including oceanic and neritic tuna stocks. The list of major group of researchers/scientists on assessment of fish stock (or/and neritic tuna stock) and related field are showed below.

Table 13: List of researchers on assessment of fish stock and neritic tuna stock

No	Name of researcher	Institution	Note
1	Nguyen Viet Nghia	Research Institute for Marine Fisheries	- stock assessments; - hydro-acoustic surveys; - ecological risk assessments.
2	Nguyen Khac Bat	Research Institute for Marine Fisheries	- population biology; - stock assessments of squids.
3	Vu Viet Ha	Research Institute for Marine Fisheries	- stock assessments; - hydro-acoustic surveys.
4	Tran Van Cuong	Research Institute for Marine Fisheries	- population biology; - stock assessments.
5	Chu Tien Vinh	Research Institute for Marine Fisheries	- population biology; - stock assessments. (retired)
6	Dang Van Thi	Research Institute for Marine Fisheries	- population biology; - stock assessments. (retired)
7	Doan Van Bo	Hanoi National University	- fisheries oceanography; - stock assessments.
8	Nguyen Xuan Huan	Hanoi National University	- population biology; - stock assessments.
9	Dao Manh Son	Research Institute for Marine Fisheries	- population biology; - stock assessments.
10	Pham Viet Anh	D-Fish	- population biology; - stock assessments.

10. Conclusions and recommendation

Conclusion (issues/constrains)

- There is lack of legal framework for the neritic tuna fisheries managements;
- Weak MCS system (implementation of current regulations); IUU fishing increased;
- There is lack of information (resources status, landing data, biological information) for stock assessments of the neritic tuna (logbook applied but poor coverage; Port sampling uncontinuous collected; On boat observers not implemented);
- Poor handling practices and high proportion of post harvest lost;
- Overfishing capacity; mostly, fisheries resources are being overfished;

Recommendation

- Developing management mechanism and policy and develop neritic tuna production, enhancing capacity through training course for neritic tuna manager at both central and local level.
- Experience, neritic tuna management methods; transfer scientific technical advances, training, provide exploitation technical guidance; tuna preservation after harvesting.
- Collaboration in resources surveys, forecasting tuna fisheries grounds; data collection and database development for management of neritic tuna fisheries.

Future works

- Strengthening capacity for various stakeholders;
- Collaborative comprehensive study for managements;
- Application of EBFM, AFM, CBM, etc as the tools for managements.

CONSERVATION OF NERITIC TUNA

**STATUS OF NERITIC TUNAS
PRODUCTION IN SOUTHEAST ASIA**

DR. SOMBOON SIRIRAKSOPHON

The 1st SWG-Neritic Tuna 18-20 November 2014



NERITIC TUNA IN REGION

- ◇ Neritic tuna study was initiated under ASEAN-SEAFDEC program, 2008-2012 in 5 major countries,
- ◇ Focusing exploitation of neritic tuna within EEZ waters,

Bullet tuna
Auxis rochei

Eastern little tuna
Euthynnus affinis

Frigate tuna
Auxis thazard

Longtail tuna
Thunnus tonggol

SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER
UNDER THE ASEAN-SEAFDEC STRATEGIC PARTNERSHIP

Identify Fishing Areas & others

- National Focal Points Meeting, Data collection/landing sites, Justify catch from FG

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Data for Analysis: Philippines

- ✓ Data from 2004-2010:
- ✓ Two neritic tuna species are
 - ✓ Eastern Little tuna
 - ✓ Frigate tuna
- ✓ 10 fishing grounds were identified :
 - ① Area 1 Western Luzon
 - ② Area 2 Central Visayas
 - ③ Area 3 Northern Luzon
 - ④ Area 4 Pacific Ocean
 - ⑤ Area 5 Sulu Sea
 - ⑥ Area 6 ARMM Area
 - ⑦ Area 7 Mindanao Sea
 - ⑧ Area 8 Southern Luzon
 - ⑨ Area 9 Northern Mindanao
 - ⑩ Area 10 Moro Gulf

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Data for Analysis: Indonesia

- ✓ Data from 2004-2010: < before 2004 unidentified species >
- ✓ Bullet tuna Frigate tuna Eastern little tuna Longtail tuna

- ✓ 10 Fishing Areas were :

① West Sumatera	⑥ Bali-Nusatenggara
② South Java	⑦ South/West Kalimantan
③ Malacca Strait	⑧ East Kalimantan
④ East Sumatera	⑨ South Sulawesi
⑤ North Java	⑩ North Sulawesi
	⑪ Maluku-Papua

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Data for Analysis: Malaysia

- ✓ Data from 2004-2010: (before 2003, recorded only Tongo tuna)
- ✓ Bullet tuna Eastern little tuna Longtail tuna

- ✓ 5 Fishing Areas were :
 - ① West Coast Peninsular
 - ② East Coast Peninsular
 - ③ Sarawak
 - ④ Sabah
 - ⑤ Labuan

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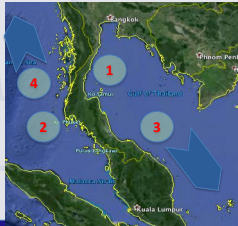
Data for Analysis: Thailand

- ✓ Data from 2004-2010: (since 2009, recorded 4 species)
- ✓ Bullet tuna Frigate tuna Eastern little tuna Longtail tuna



- ✓ 4 Fishing Areas were :

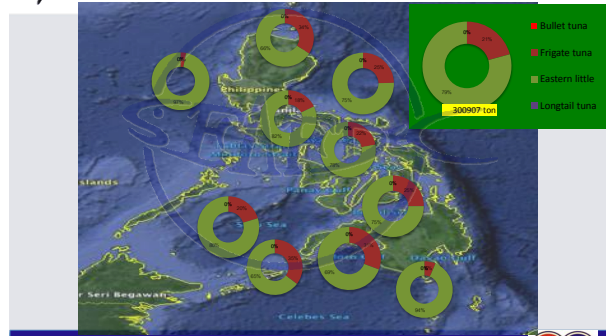
- ① GOT
- ② Andaman Sea
- ③ E+S GOT
- ④ N + S Andaman sea



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Catch Composition: Philippines 2010



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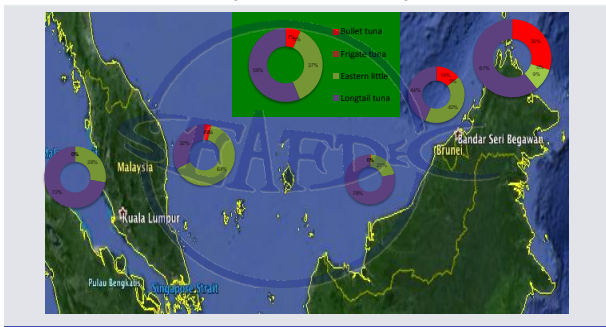
Catch Composition: Indonesia 2010



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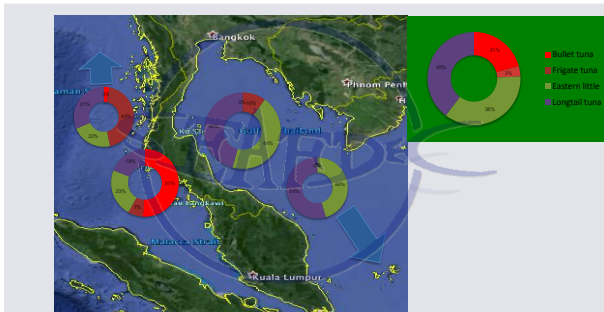
Catch Composition: Malaysia 2010



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Catch composition: Thailand 2010



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Relative Distributions of Longtail Tuna: 2010



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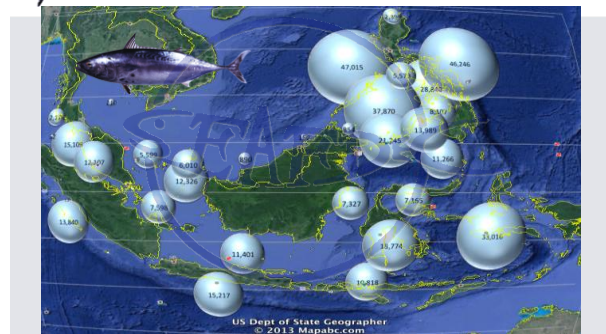
Relative Distributions of Bullet Tuna: 2010



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Relative Distributions of Eastern Little Tuna: 2010

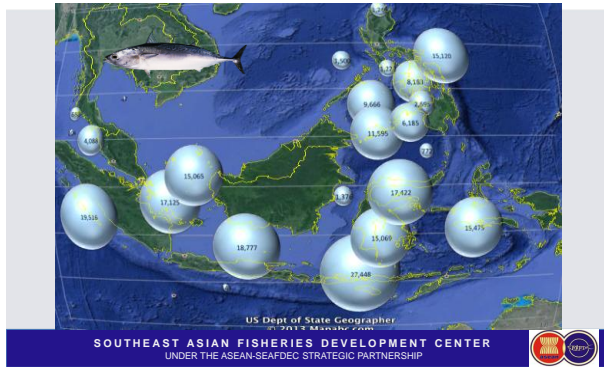


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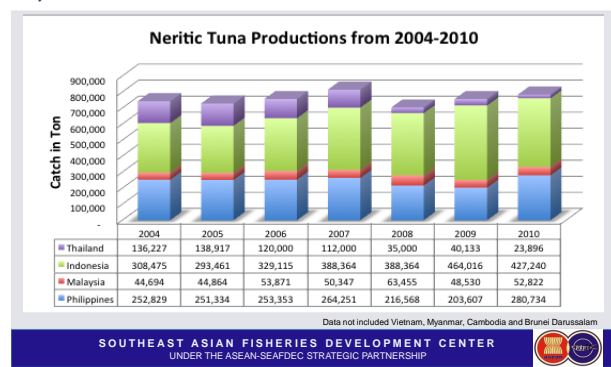




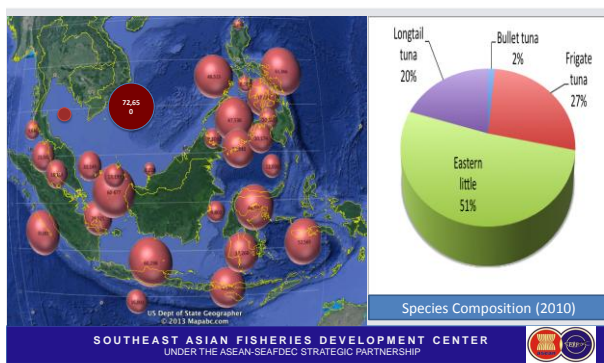
Relative Distributions of FrigateTuna: 2010



TRENDS OF NERITIC TUNAS PRODUCTIONS



PRODUCTION OF NERITIC TUNAS (2010)

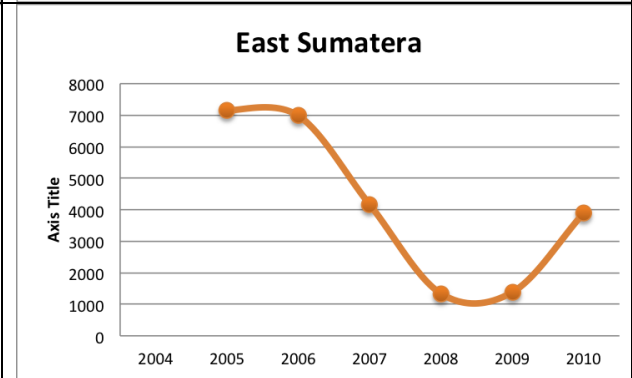
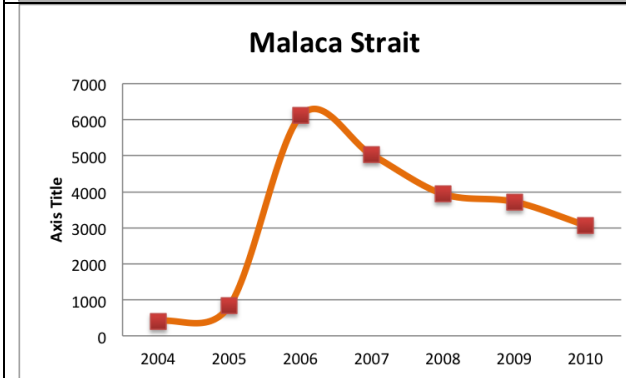
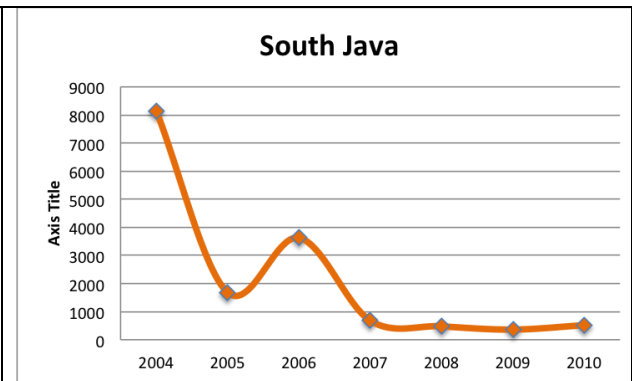
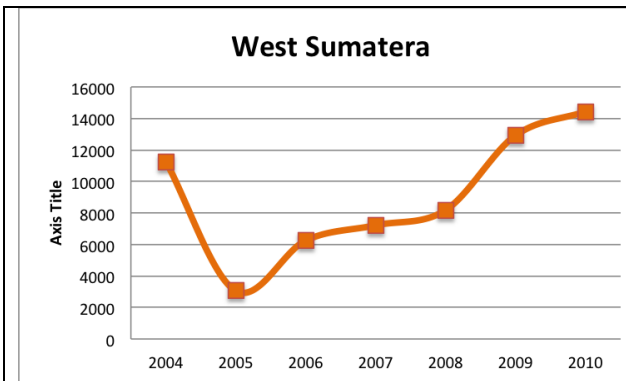
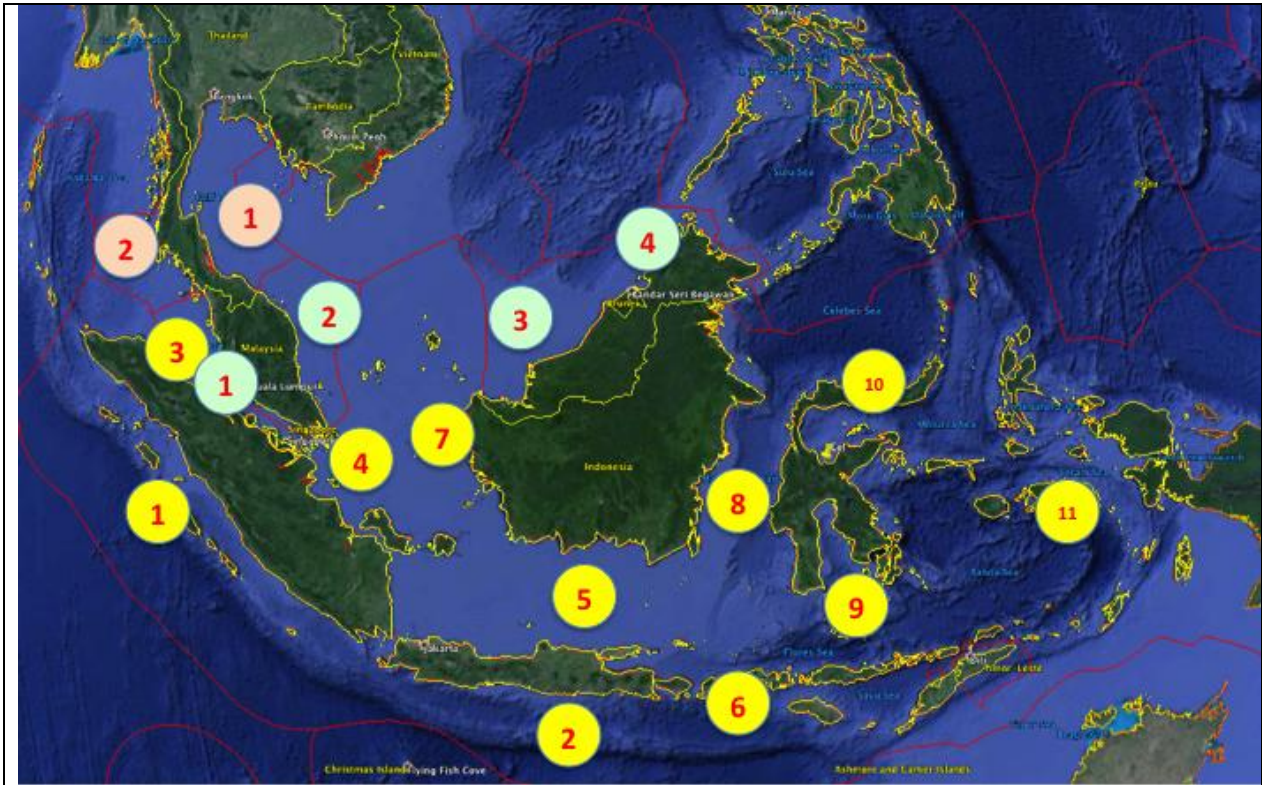


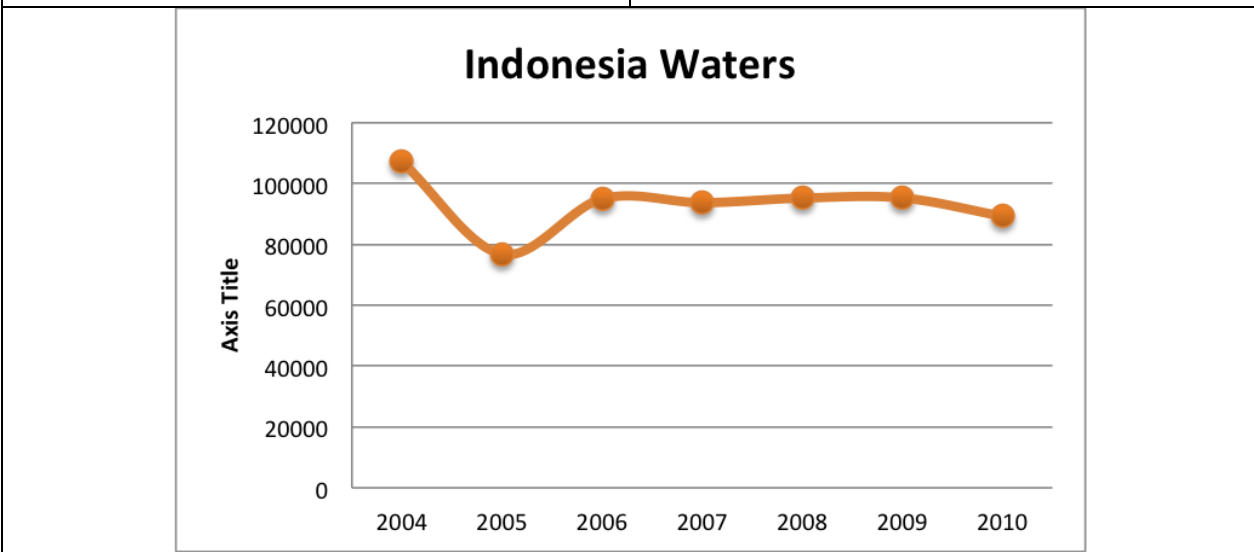
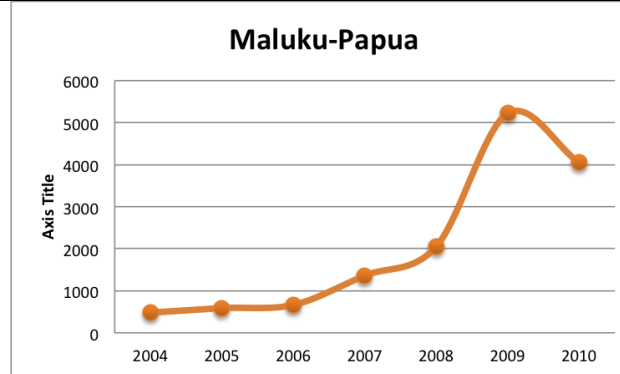
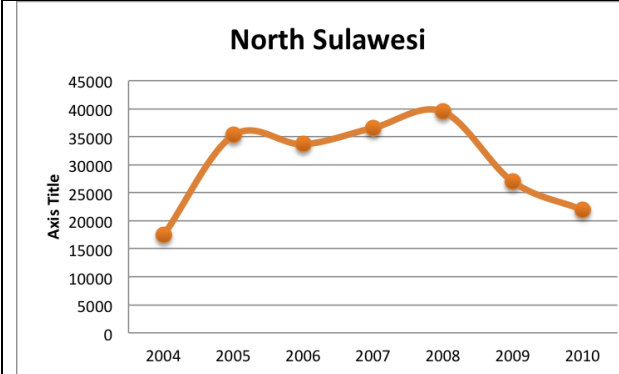
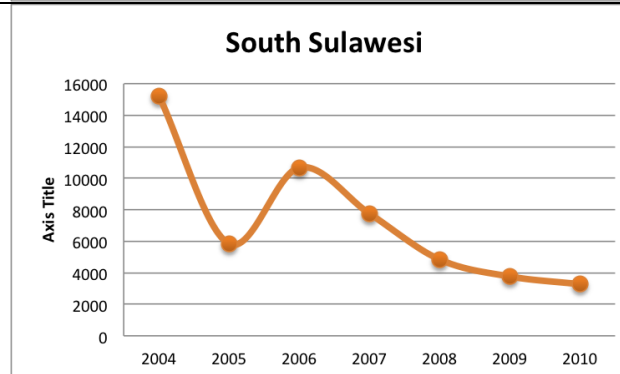
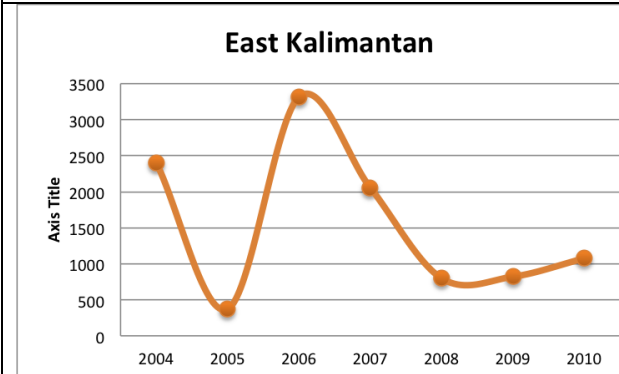
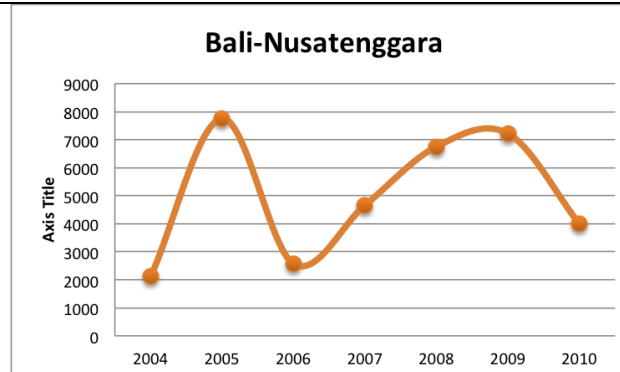
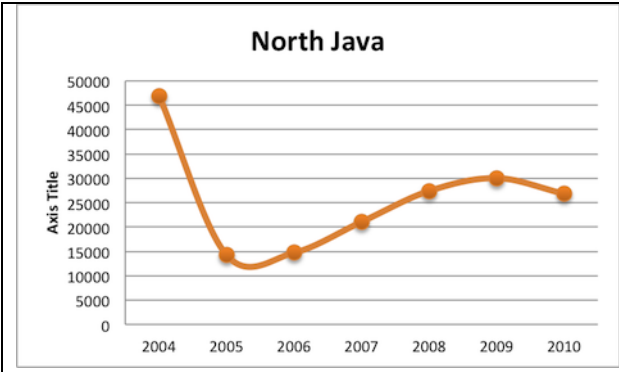
PROBLEMS / ISSUES

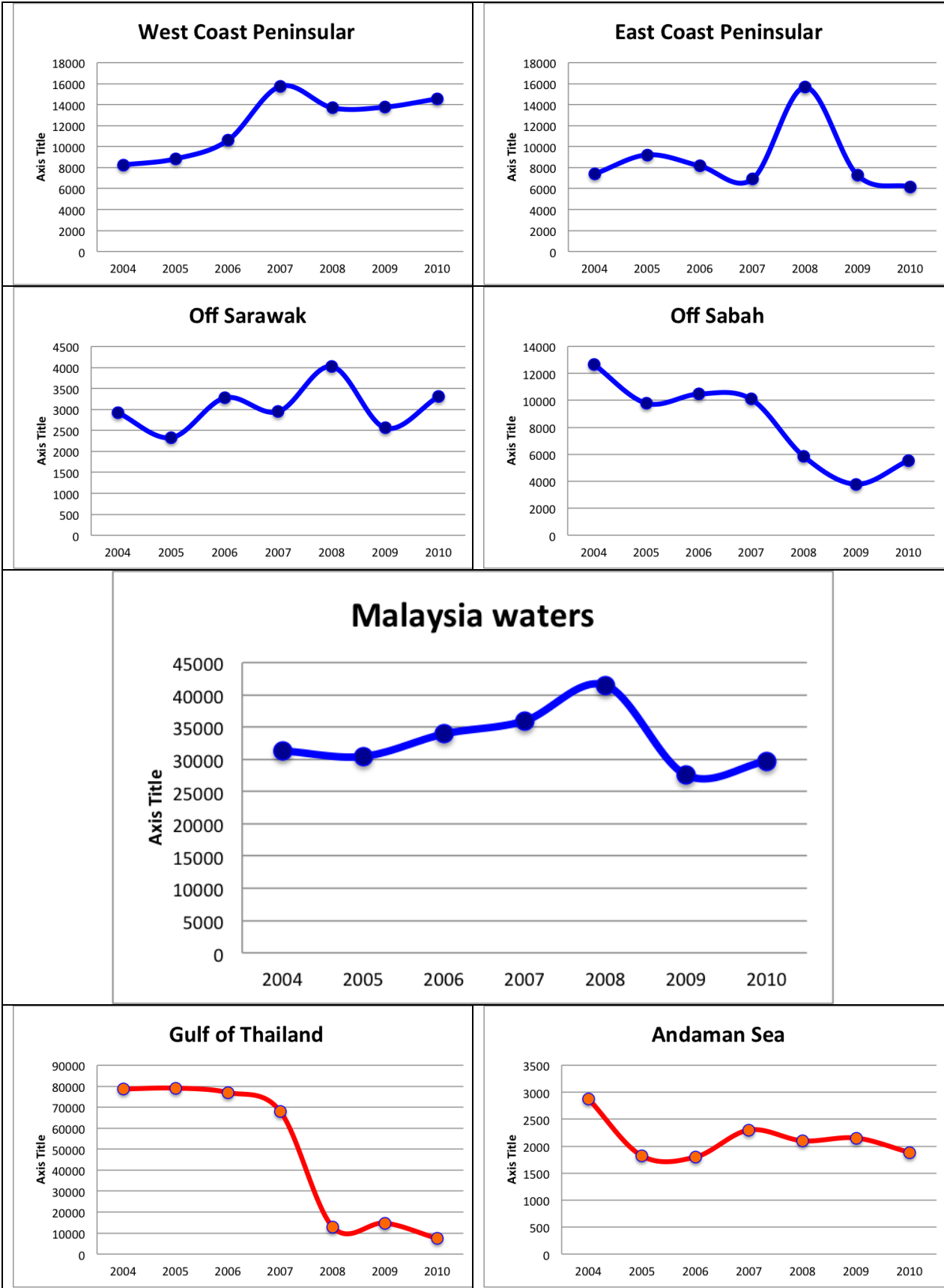
- ✓ SPECIES IDENTIFICATION
- ✓ STOCK ASSESSMENT AT NATIONAL & REGIONAL
- ✓

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Trends of Tonggol Tuna in the Southeast Asian Waters
(based on the National Statistic from 2004-2010)







Joint Tuna Research in Sulu and Sulawesi Seas

Presented at the Scientific Working Group Meeting on Neritic Tuna Stock Assessment in the Southeast Asian Waters, 19-20 November 2014

Worawit Wanchana
SEAFDEC, TD

Introduction

- Sulu and Sulawesi Seas cover the area of 90,000 km² of bio-diverse marine area
- Important fishing grounds of large and pelagic fishes including oceanic and neritic tunas
- Spawning and nursery ground, migratory route for big-eye, skipjack, and yellow-fin tuna
- In 2006, 370,000 MT of estimated tuna in SSS – lacking of collaborative research program
- Impacts of thousands of FADs deployed in the areas

Introduction

- In 2012 Council Meeting, agreed conduct joint research on tunas in SSS to understand the status of tuna stock in SSS areas
- Information and data to be collected:
 - Tuna fishery profile in SSS: total no. of tuna catchers, total no. of fishing gears, major landing sites, etc.
 - Catch and landing: monthly total weight by species and gears
 - Length frequency: monthly length distribution by species and gears
 - Weight frequency: monthly average weight distribution by species and gears
 - Growth pattern: monthly length frequency by species
 - Gonad: monthly stage of maturity by species
 - Stomach contents (optional): stomach contents by species
 - Genetics (optional): tissue samples

Introduction

- Area coverage: Sulu and Sulawesi Seas
- Participating countries: Indonesia, Malaysia, Philippines
- Fisheries resources: 3 oceanic tunas namely, Big-eye tuna (*Thunnus obesus*), Skipjack tuna (*Katsuwonus pelamis*), and Yellow-fin tuna (*T. albares*).
- Financial support: Participating countries cost-sharing and Japanese Trust Fund through SEAFDEC
- Period: 2013~



Objectives

- Strengthen collaborative research among SSS surrounding countries
- Assess status of tuna stock and MSY in SSS
- Identify spawning and nursery grounds of tuna resources in SSS
- Investigating the impact of FADs on tuna population
- Increase awareness of stakeholders on sustainable exploitation of tuna



Meeting in KL, Aug 2013

Activities

- Review catch and efforts, biological data and information on tuna harvested in SSS
- Data collection
 - Tuna fisheries data collection from identified landing sites
 - Catch and effort data and biological data using agreed SOPs
 - Fishing ground profile using M.V. SEAFDEC2
- Tuna stock assessment in SSS
- Determination of tuna spawning grounds in SSS
- Assessment of the use of FADs for tuna fisheries in SSS

Landing Sites for Data Collection

- **Indonesia:** Bitung, Sangihe, Kwandang, and Tarakan
- **Malaysia:** Samporna, Sandakan, and Kudat
- **Philippines:** Palawan and Zamboanga

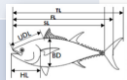
Sub-regional Working Groups and Lead Countries

Working Group	Lead Countries and Chief Scientist	Members
1) Stock Assessment		
Big-eye tuna	Philippines, Mr. Noel Barut	I-1, M-1, P-3
Yellow-fin tuna	Indonesia, Dr. Fayakun	I-1, M-1, P-3
Skipjack tuna	Malaysia, Mr. Samsudin Basir	I-1, M-1, P-3
2) Tuna spawning ground study	Malaysia, Mr. Zulkifli Tabli	I-1, M-1, P-4
3) FADs for tuna fisheries	Philippines, Dr. Jonathan O. Dickson	I-1, M-2, P-3
4) Others		
Genetic study	Philippines, BFAR	Dr. M. Santos
Oceanographic Data	SEAFDEC/TD	Mr. Sukchai, A.
Hydro-acoustic data	SEAFDEC/MFRDMD	Mr. Raja Bidin Raja Hassan

SOPs

- Tuna stock assessment
- Spawning ground
- FADs
- Genetics

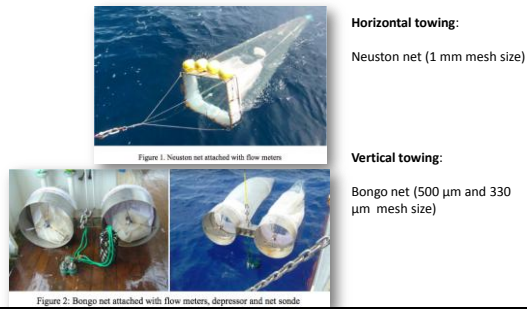
SOP – Tuna Stock Assessment

Topics	Data to be collected	Remarks
1. Tuna fisheries profile	Total no. of boats, total no. of gears catching tuna, major landing sites	Historical data
1.1 Catch landing	Monthly total weight by species and gear	Historical data
1.2 CPUE	Nominal catch and effort by species and by fishing gear	Historical data
1.3 Length frequency	Monthly length distribution by species and gear	1 to 2 years data
1.4 Weight frequency	Monthly average weight by species and gear	

SOP – Tuna Stock Assessment

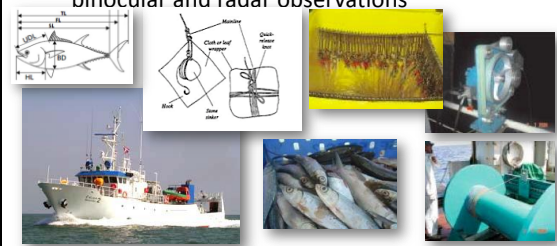
Topics	Data to be collected	Remarks
2. Growth pattern	Monthly length frequency by species	
3. Gonad	Monthly stage of maturity by species	On land and at sea sampling by MV SEAFDEC2
4. Stomach contents	Stomach content analysis by species	
5. Genetic		

SOP – Tuna Spawning Ground Study

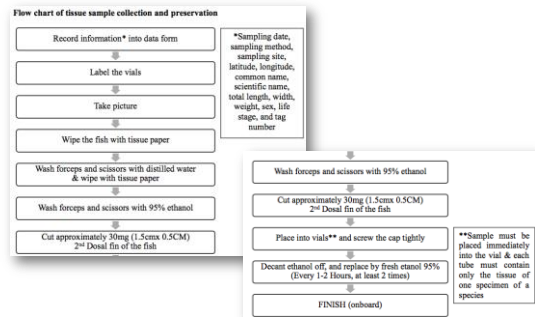


SOPs – FADs

- FADs – MV SEAFDEC2 survey using binocular and radar observations



SOP – Genetics



Strategic Work Plan

1. Data Collection:

- Catch and effort data
 - Cambodia, Myanmar and Viet Nam needs on the job training on data collection
 - submit 1 month raise data as proposed by *Mr. Barut*
- Biological data
- Species identification
- Classification of fishing gear (by-catch, juvenile)
- Data handling/processing (excel format/spread sheet in pivot table)
- Others

2. Stock assessment:

- Length base stock assessment
- Surplus production
 - Time series data (10 yrs) Determine and estimate MSY
 - Trend analysis
- Data poor stock assessment (by invited experts)
- Age structure production model
- Kobe plot (more)
- Biological analysis
 - Measurement analysis
 - Length measurement (population structure)
 - Gonad analysis (GSI)
 - Stomach content

3. Genetic Study: (subjects will be identify later)

- Need special training to all country

Additional Issues/Problem

1. Fish handling practice training
2. Reduction of manpower onboard purse seiner
3. Bycatch and tuna-juvenile from fishing gears

**Terms of Reference for the Scientific Working Groups
For Stock Assessment on Neritic Tunas in the Southeast Asian Region**
(Final Draft, as of 20 Nov 2014)

I. Background

Refers to the Expert Group Meeting on Regional Plan of Action on Sustainable Utilization of Neritic Tuna Resources in the Southeast Asia Waters conducted last 18-20 June 2014 in Krabi Province, Thailand, that, during the workshop one of the important outputs was the need to establish Scientific Working Group on Stock Assessment for neritic tuna in the Southeast Asian waters herein after called “SWG-neritic tuna”. In this connection, SEAFDEC Member Countries namely Cambodia, Indonesia, Malaysia, Myanmar, the Philippines, Thailand and Viet Nam nominated their delegate to work as members of the scientific working group since October 2014. To facilitate the work of Scientific Working Group, SEAFDEC formulates the Term of Reference (ToR) to be considered and finalized by all members of the SWG at the 1st Meeting of the Scientific Working Group on Neritic Tuna Stock Assessment in the Southeast Asian Waters, 18-20 November 2014 in Malaysia.

II. Role of SWG-Neritic tuna

The role of SWG is to provide technical/scientific advice particular on the current status of neritic tuna fisheries resources and policy consideration needs to the SEAFDEC Council for the improvement of fisheries management in Southeast Asia.

III. Scope of Work

SWG will cover data collection, genetic study and other relevant activities to support stock assessment on neritic tuna and mackerel species (seerfish) for the management of neritic tuna in Southeast Asian waters.

IV. Terms of Reference of the SWG-Neritic tuna

- To review and assess the current status of the neritic tuna resources in the region;
- To provide scientific based recommendations on priority fisheries management issues which may include policy consideration, and coordinated fisheries management actions for sustainable utilization of neritic tuna;
- To share the national catch and effort data/information including the biological data (if available) for regional stock assessment of the neritic tuna;
- To identify the needs for human capacity requirements in member countries;
- To coordinate with international/regional organizations, programs or projects concerned with fisheries management and sustainable use of fisheries resources in formulating advice.

V. Composition of the SWG-Neritic tuna

The composition of the SWG-Neritic tuna is identified as follows:

a. SWG-Neritic tuna:

The SWG comprises at least two standing members representing the SEAFDEC Member Country by nomination with Four-year fixed tenure of members and possibility for reappointment.

b. Chief Scientist(s):

An interim Chief Scientist for stock assessment of neritic tuna shall be an stock assessment expert from MFRDMD. A work period of the Chief Scientist is depended upon the tenure of the study period as decided by the SWG.

c. Chairperson:

SWG-Neritic tuna shall be chaired by Chief MFRDMD and co-chaired by a representative of its member countries on an annual rotational basis following the alphabet in order.

d. Resources persons/ Experts:

SWG-neritic tuna may identify and invite resource persons/experts from the Member Countries, ASEAN and other international/regional organizations to participate in SWG Meeting on an ad-hoc basis.

e. Secretariat:

MFRDMD in collaboration with the SEAFDEC Secretariat shall serve as a secretariat of the SWG meeting, as well as coordinate with the SWG members on the propose period and date of the meeting.

f. Rapporteur:

Secretariat of the meeting shall perform a Rapporteur of the SWG meeting in collaboration with the host country.

VI. Nature of SWG Activities and Financial Arrangements

1. SWG is scheduled to meet at least once a year. The timing of the meeting(s) should be set in accordance with SEAFDEC annual working cycle before the SEAFDEC Program Committee Meeting.
2. Inter-sessional activities may be conducted as the need arises and subject to availability of funds.
3. The SWG meetings will be partially funded by SEAFDEC-Sweden Project managing by the secretariat of the working group. Under this condition, annually a certain amount of the money would be used for the meeting cost and participation of members from SEAFDEC MFRDMD and Secretariat to the SWG meetings; while the Member Countries would bear the cost for their participation to the SWG meetings starting from 2018.
4. The cost for attendance of the resource persons during SWG meeting (s) or during the inter-sessional activities should be from SEAFDEC-Sweden project and extra budgetary sources under the responsible from the Secretariat, while the cost for the experts/representatives from international/regional organizations will be shouldered by their respective organizations.

5. The cost for the inter-sessional activities will be funded from SEAFDEC-Sweden project and extra-budgetary sources.
6. SEAFDEC Secretariat in collaboration with the Member Countries and the MFRDMD is responsible for sourcing extra-budgetary funds for SWG.
7. Based on SWG's advice, the SEAFDEC Council will decide on how such advice should be considered and followed-up for the next session including imparting the recommendations to the ASEAN through ASEAN Sectoral Working Group on Fisheries.

VII. Mechanism to Convey the Technical/Scientific Advice/Recommendation to High-level

Mechanism – flow chart will be updated later.

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Timetable of activities for SWG

	ACTIVITIES	DEADLINE	RESPONSIBLE PERSON
1	Finalization of Term of Reference (ToR)	End of Nov.	Secretariat
2	Submission of ToRs to the 17 th FCG and 47 th Council Meeting	Dec. 3, 2014 and April 2015	Dr. Somboon Siriraksophon
3	Budget proposal for data collection of MC for consideration submitted to Secretariat (template of budget and co-finance)	Mid of January, 2015	Secretariat template of budget and co-finance
4	Genetic Analysis	End of February, 2015	Dr. Wahidah SEAFDEC-MFRDMD
5	SOP for data collection	30 January 2015	Secretariat
6	Onsite Capacity building on data collection	March, 2015	SEAFDEC-MFRDMD
7	2 nd SWG for finalization of the 2 years work plan in Da Nang, Viet Nam	Last week of April, 2015	Secretariat and Hosted by Viet Nam
8	Data collection program	June, 2015 to May, 2017	Member Countries
9	3 rd SWG meeting for half year progress	January, 2016	Secretariat
10	4 th SWG stock assessment meeting	October, 2017	Secretariat