Report of the 2nd Meeting of the Scientific Working Group on Neritic Tuna Stock Assessment in the Southeast Asian Waters
15 to 17 June 2015
Research Institute of Marine Fisheries (RIMF), Hai Phong, Viet Nam

I. BACKGROUND AND OPENING OF THE MEETING

1. The 2nd Meeting of the Scientific Working Group on Neritic Tuna Stock Assessment in the Southeast Asian Waters (SWG-Neritic Tunas) was convened at the Research Institute of Marine Fisheries (RIMF), Hai Phong, Viet Nam from 15 to 17 June 2015. The Meeting was attended by SWG-Neritic Tunas members from Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, the Philippines, Thailand, and Viet Nam, representatives from Directorate of Fisheries Viet Nam (D-Fish), RIMF, as well as resource person from National Research Institute of Far Seas Fisheries, Japan (NRIFSF). Researchers and Senior 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) also attended the Meeting. The list of participants appears as **Annex 1**.

2. The purpose of the Meeting was to follow up on discussions made during the 1st Meeting of the SWG-Neritic Tunas which was convened from 18 to 20 November 2014 in Malaysia. The objectives of the Meeting include updating on Council's decision pertaining to the Regional Plan of Action for Sustainable Neritic Tuna Fisheries and Management (RPOA-Neritic Tunas) and Terms of Reference (TOR) for SWG-Neritic Tunas, discussion on the work plan - for genetic study and stock assessment of *Thunnus tonggol* (Longtail tuna) and *Euthynnus affinis* (Kawakawa), as well as prioritization of capacity building programs for the implementation of the RPOA-Neritic Tunas.

3. On behalf of RIMF, *Mr. Nguyen Quang Hung*, Director of RIMF extended his warm welcome to the participants. He highlighted the importance of neritic tuna fisheries in the Southeast Asian region and the need to promote sustainable utilization of neritic tuna. While recalling the establishment of the SWG-neritic tunas during the 47th Meeting of the SEAFDEC Council, he emphasized that the work carried out under the said program is very important to the fisheries sector in the region. Lastly, he wished for a fruitful deliberation and pleasant stay in Hai Phong. His welcoming remark appears as **Annex 2**.

4. The Meeting continued with the delivery of keynote address by the Secretary-General of SEAFDEC, *Dr. Chumnarn* Pongsri. On behalf of SEAFDEC, he welcomed the participants and recalled that the purpose of establishment of the Working Group was to support the implementation of the RPOA-Neritic Tunas. He further highlighted the endorsement of RPOA-Neritic Tunas and TOR of the SWG-Neritic Tunas by the SEAFDEC Council, which had strengthened the platform to scrutinize the activities in relation to neritic tuna stock assessment in order to ensure sustainable utilization of the species. Towards the end, he encouraged everyone to actively participate throughout the deliberation and wished for a fruitful Meeting. His keynote address appears as **Annex 3**.

5. Lastly, the Deputy Director General of Directorate of Fisheries and SEAFDEC Council Director for Vietnam, *Mr. Pham Anh Tuan* delivered his opening remarks. He extended his warm welcome to the participants and mentioned that the meeting would be a good opportunity for the participants to share views and strengthen cooperation in relation to neritic tuna resource management. He also added that neritic tuna very important to the livelihood for coastal community, and that exploitation and management of tuna fisheries in a sustainable manner has been the priority of the Government of Viet Nam. In this connection, he expressed his sincere appreciation to SEAFDEC for establishing the RPOA-Neritic Tunas and officially opened the 2nd Meeting of the Scientific Working Group on Neritic Tuna Stock Assessment in the Southeast Asian Waters. His opening remark appears as **Annex 4**.

6. *Ms. Mahyam bt. Mohd Isa,* Chief of MFRDMD was appointed as the chairperson of the Meeting. The Meeting started with introduction of participants.

II. INTRODUCTION AND ADOPTION OF THE AGENDA

7. *Dr. Somboon Siriraksophon*, Policy and Program Coordinator of SEAFDEC Secretariat presented the Introduction of the 2nd Meeting of the SWG-neritic tuna. He provided brief background of the establishment of SWG-neritic tunas, its scope of work, as well as some important decisions made during the 1st Meeting of the SWG-Neritic Tunas. He further elaborated the objectives of the 2nd Meeting of the SWG-Neritic Tunas, expected outcome of the Meeting, and introduced the provisional agenda for adoption. His presentation appears as **Annex 5**.

8. The Meeting adopted the agenda unanimously.

III. OUTCOMES FROM THE 47TH MEETING OF THE SEAFDEC COUNCIL

- ***Terms of Reference (TOR) of the SWG-Neritic Tunas***

9. Assistant Policy and Program Coordinator of SEAFDEC Secretariat, *Dr. Worawit Wanchana*, presented the adopted TOR of SWG-Neritic Tunas **(Annex 6)**. He elaborated the sequence of events which resulted in establishment of the RPOA-Neritic Tunas. The Meeting took note of the work plan of the RPOA-Neritic Tuna which consist of three (3) main activities i.e. development of RPOA-Neritic Tunas, establishment of the Scientific Working Group, and activities to support the human resources development program. Furthermore, the Meeting was also enlightened on the objective, role, scope of work, composition of SWG-Neritic Tunas, details of activities and financial arrangements, as well as mechanism of providing scientific advice to the higher management up to ASEAN forum.

10. The Meeting took note of the TOR, in particular on the Para stipulating that the SWG-Neritic Tunas Meetings would be partially funded by SEAFDEC, and that the AMSs would bear the cost for their participation in the said meetings starting 2018. In this regard, the Meeting suggested that Member Countries should start planning on securing budget for the participation of its SWG-Neritic Tunas Members in the future. At the same time, SEAFDEC would also try obtaining support from other potential donors to manage the Secretariat of the SWG-neritic tunas after 2017.

11. In addition, the Chairperson also emphasized that the same person, as per list of SWG-Neritic Tunas members, should be attending the SWG Meetings every time in order to ensure consistent and continuous input.

12. While noting the role of SWG-Neritic Tunas, the Meeting supported the suggestion on the need for potential scientist who could lead the stock assessment activity according to neritic tuna species. In this regard, the Meeting agreed that there should be one (1) scientist working on one (1) species, and a chief scientist and alternate chief scientist nominated in each countries, who would be responsible for the coordination of neritic tuna stock assessment study as a whole. The nomination of the chief scientist and alternate chief scientist should be subjected to the countries' decision.

13. On the other hand, the Meeting also noted that the stock assessment activity is a regional project and therefore, data sharing should be made available to all potential scientists who would lead the regional stock assessment project.

- ***RPOA-Neritic Tunas***

14. The Meeting continued with the presentation on RPOA-Neritic Tunas by *Dr. Worawit Wanchana* **(Annex 7)**. The Meeting noted that the RPOA-Neritic Tunas was developed by taking into account the major issues prioritized during the technical meeting in 2013, and six (6) main objectives were endorsed. Under each objective, several key issues were identified and respective action plans were formulated.

15. The Meeting took note of the objectives in the RPOA-Neritic Tunas and decided focussing on Objective I (Determining available data and information, improving data collection and developing key indicators), as the TOR had clearly stipulated the role and mandate of the SWG-Neritic Tunas, that is to conduct stock assessment of neritic tuna resources.

16. While congratulating SEAFDEC for the development of the RPOA-Neritic Tunas, the representative from the Philippines, *Mr. Noel C. Barut* supported the decision to concentrate on Objective I. In addition, he also suggested collecting information regarding the utilization of neritic tunas in each country, in order to obtain more information with respect to the economic perspective.

17. With regards to Objective II, Issue 2.4 (Negative impact of the climate change to the changes of neritic tuna stock), the Meeting suggested conducting a study on the impact of temperature to the neritic tunas stock. Neritic tuna is a highly migratory species and very much affected by environmental factors, and that such study could be useful in determining the migration pattern and abundance of neritic tunas. In this regard, the Meeting supported the suggestion and would discuss further with MFRDMD on the proposal for future study.

IV. REVIEW/PROGRESS OF THE GENETIC STUDY AND IMPROVED DATA COLLECTION, DETAILS OF BUDGET AND WORK PLAN IN 2015

18. The Meeting continued with the presentation on Population Study of *Thunnus tonggol* (Longtail tuna) in the Southeast Asian Region by *Ms. Wahidah bt. Mohd Arshaad*, researcher from MFRDMD **(Annex 8)**. The objective of the study is to identify the genetic structure of *Longtail tuna* in the Gulf of Thailand, South China Sea and Andaman Sea waters by using

cytochrome b, mitochondrial DNA (mtDNA) marker. She elucidated the significance for choosing mitochondrial DNA (mtDNA) as marker of choice and provided some other reviews on neritic tuna genetic studies that were conducted in the past. Details such as materials and methods, sampling sites, sampling schedule, and estimated budget for the study were also explained to the Meeting. The study is envisaged to identify the stock structure of Longtail tuna in the region and determine to what extent, if any, the population of the said species from the region is connected to the population elsewhere in the world.

19. The Meeting was invited to finalize the sampling sites and consider the expansion of the sampling site beyond the sub-regions (beyond the proposed Gulf of Thailand, Andaman Sea and South China Sea) for the purpose of result comparison. In addition, the Meeting was also invited to consider the inclusion of other neritic tuna species besides Longtail tuna, as well as determine the availability of samples/peak season in each sampling sites to facilitate the sample collection activity.

20. As for the expansion of the scope of study, the Meeting agreed to include another neritic tuna species, which is Kawakawa (*Euthynnus affinis*) in the abovementioned genetic study.

21. In addition to the collection of samples for genetic study, the Meeting also suggested on getting other additional information such as fishing gears used, fishing period, peak season, and fishing grounds in order to support the planning and analysis for genetic study.

22. The Meeting noted that peak season for neritic tuna landing in Pemangkat, Indonesia is from September to October.

23. The Meeting was informed that European Union (EU) provided a total amount of USD 1.2 million to the Indian Ocean Tuna Commission (IOTC) for conducting genetic analysis of neritic tunas in IOTC areas. On the other hand, the Meeting also noted that Western and Central Pacific Fisheries Commission (WCPFC) had been conducting similar genetic study on Tunas. As such, the Meeting was of the view that cooperation with the abovementioned organizations in conducting the genetic study would be complicated and out of the current geographical area. Nevertheless, sharing of information on results of the study would be helpful to the neritic tunas stock assessment project in the region.

24. With regards to the suggestion on expansion of sampling sites beyond the sub-region, the Meeting agreed to include other two (2) sampling sites as reference points in Pekalongan, Indonesia (Central Java) and General Santos, the Philippines.

25. The Meeting agreed that sampling sites in each sub-region should not be not located close to each other, as to prevent obtaining samples from the same fishing ground. After thorough deliberation, the Meeting finalized the following sampling sites for the genetic study of Longtail tuna and Kawakawa from 2015-2017:

Country	**Sub-regions**		**Reference Point**
	Andaman Sea	**Gulf of Thailand & South China Sea**	
Brunei Darussalam		❖ Muara port	
Cambodia		❖ Sihanoukville	

Country	Sub-regions		Reference Point
	Andaman Sea	**Gulf of Thailand & South China Sea**	
Indonesia	❖ Banda Aceh ❖ Belawan	❖ Pemangkat	❖ Pekalongan (Central Java)
Malaysia	❖ Kuala Perlis	❖ Tok Bali ❖ Kuantan ❖ Miri ❖ Kota Kinabalu ❖ Tawau	
Myanmar	❖ Yangon		
The Philippines		❖ Masinloc (Zambales) ❖ PuertoPrincesa (Palawan) ❖ Zamboanga	❖ General Santos
Thailand	❖ Ranong	❖ Trat ❖ Songkhla	
Viet Nam		❖ Nghe An ❖ Danang ❖ Vung Tau ❖ Kien Giang	

V. SOPs FOR GENETIC STUDY ON NERITIC TUNAS, AND NERITIC TUNA DATA COLLECTION

- ***Standard Operating Procedure for Collection and Preservation of DNA Tissue Samples***

26. Under Agenda V, *Ms. Wahidah bt. Mohd Arshaad* continued her presentation on Standard Operating Procedure (SOP) for Collection and Preservation of DNA Tissue Samples. The objective of the SOP is to ensure all collected tissues are prepared and preserved according to the standard methods and procedures. High quality DNA is required to produce reliable and comparable data for stock/population identification of neritic tunas in the Southeast Asian Region. The SOP contained description of the target species; list of sampling sites; materials, tools, and procedures for sampling at the sites; material, tools, and procedures for tissue sample collection and preservation; and related sampling forms. Besides that, she also described the five-point maturity scale/stage for partial spawner (refer to the SOP for Data Collection), in order to identify the sex and gonad stage of the sampled fish through visual censes.

27. In response to the inquiry on the need for gonad examination in genetic study, the Meeting was clarified that since the sampling for genetic studies would be conducted on one-time basis, the fish samples should not be wasted and that other information such as gonad maturity, length-weight data, etc should be extracted as well, in support to the routine data collection activity which was also planned as part of the stock assessment study. Moreover, the Meeting also noted that budget for procurement of fish samples would be allocated for the genetic study after finalization of selected sampling sites from the Meeting.

28. Regarding the discussion on transportation/exportation of samples to MFRDMD for analysis, the delegate from Indonesia informed the meeting that an agreement between SEAFDEC and Ministry of Marine Affairs and Fisheries, Indonesia would be needed to approve the transport of tissues samples out of the country. As for the Philippines, the Meeting was also informed that a Memorandum of Agreement (MoA) would be necessary for transportation of any research materials out of the country. In addition, other countries also have certain regulations pertaining to the transport of tissue samples to another country.

29. In this connection, the Meeting requested SEAFDEC to prepare an official letter to the participating Member Countries, citing the Council's endorsement on the establishment of SWG-Neritic Tunas and explaining about the study, in order to obtain permission for the transportation of tissue samples to MFRDMD for genetic analysis. The meeting noted that letter would be prepared by SEAFDEC Secretariat and sent to the Council Directors by 4th week of June.

30. As for the scope of SOP, the Meeting suggested removing the species name from the SOP so that it would be applicable for all neritic tunas.

31. The Meeting also decided to collect information on peak season of the concerned neritic tuna species during the data collection activity.

32. In order to start the sample collection, the Meeting agreed to provide vials and containers for the tissue sample storage to the participating Member Countries.

- ***Standard Operating Procedure for Data Collection and Analysis of the Neritic Tunas***

33. *Mr. Raja Bidin Raja Hassan*, Senior Researcher from MFRDMD presented the SOP for Data Collection and Analysis of the Neritic Tunas. The study would provide information on fishing operation and status of neritic tuna fishery, together with the biological information of neritic tunas caught by several type of fishing gears in the Southeast Asian region. The SOP consisted description of neritic tuna species, procedures for data collection and analysis for fishing operation, catch and biological data. The biological data collection includes length-frequency, length-weight relationship, gonad maturity, and stomach content.

34. While congratulating MFRDMD for development of the SOP, *Dr. Tsutomu Nishida* shared that historical data for at least 10 years period, especially catch and CPUE data would be very useful for producing age structure model, in support to the stock assessment study.

35. *Dr. Somboon Siriraksophon* explained to the Meeting that the SOP prepared by MFRDMD would serve as a guideline for the Member Countries in conducting routine data collection for the stock assessment study. He further invited the Meeting to consider and finalize the SOP.

36. Referring to Para 4.8, the delegate from Indonesia expressed his reservation on the inclusion of gonad maturity analysis under the duty of enumerators. He explained that based on experience, the enumerators only measured length, weight, and gathered necessary catch data, but do not conduct gonad maturity analysis.

37. Meanwhile, the representative from Viet Nam pointed out the difficulty in fulfilling minimum sampling of at least 10% of total number of boats by gear type as indicated in Para (5.2.1.a) on port sampling procedure, due to the large number of boats. Instead of minimum percentage, he suggested the Meeting to specify minimum number of samples to facilitate the sampling activity.

38. On the other hand, *Mr. Noel C. Barut* informed the Meeting that the Philippines already has data collection system in place and that daily sampling may not be applicable since the samples has to be collected from artisanal and commercial fishing zones. Furthermore, sampling days for each category was also fixed. He added that BFAR is now in process of reviewing the sampling methodology to determine the real number of samples to be collected, distance of sampling sites, types of data needed, etc. In addition, he supported the comment by Indonesia mentioning that catch and effort data should be collected by enumerators while biological data should be collected by other technical staff.

39. *Dr. Osamu Abe*, Deputy Chief of MFRDMD commented that the SOP for data collection is very comprehensive and suggested prioritizing the type of data needed for stock assessment study. Besides, he also pointed out that some information such as fishing ground would be difficult to be obtained because such information is confidential to the fishers. Therefore, alternative data should be considered to overcome such cases.

40. The Meeting suggested removing gonad maturity analysis from the SOP for genetic study because the said procedure had been included in the SOP for Data Collection, under biological data collection. Towards the end, the Meeting agreed revising the SOPs as per comments by Member Countries. The revised SOP for Genetic Study and SOP for Data collection appear as **Annex 9**. And **Annex 10**, respectively.

- ***Presentation by the Resource Person***

41. *Dr. Tsutomu Nishida*, Resource Person from FRA Japan shared his knowledge on stock assessment study as well as experiences in stock assessment project conducted by IOTC and Neritic Tuna Management Project in Oman. He provided suggestions on how to start with stock assessment study, developing hypothesis, type of stock assessment methods, and other relevant information. He also shared some results from IOTC Longtail stock assessment Project and Oman Neritic Tuna Management Project. In summary, the Meeting noted that A Stock-Production Model Incorporating Covariates (ASPIC) could be used as first step in stock assessment study, using global catch and CPUE data. Some other aspects for consideration are CPUE standardization and hypothesis formulation. His presentation appears as **Annex 11**.

42. At this juncture, the Meeting agreed to concentrate on stock assessment study within Southeast Asian region. However, experiences from IOTC and Oman projects could be useful for conducting the stock assessment study in this region.

VI. REVIEW OF INFORMATION ON STOCK STATUS FOR LONGTAIL TUNA, KAWAKAWA, FRIGATE TUNA, BULLET TUNA AND SEERFISH

- ***Brunei Darussalam***

43. Representative from Brunei Darussalam, *Mr. Matzaini Haji Juna* presented on Neritic Tuna Fisheries in Brunei Darussalam. His presentation included general information of Brunei Darussalam waters such as the length of coastline and marine territorial area. Besides that, he also provided information on the production of marine capture fisheries in 2012/2013, neritic tuna species found in Brunei Darussalam waters, fishing areas, zoning system, types of gears used in neritic tuna fisheries, as well as fishing and FAD areas of purse seiners. Some important statistical data related to neritic tuna fisheries such as catch data from 2001 to 2014, production trend by gears, and CPUE for purse seine were also presented to the Meeting. His presentation is as per **Annex 12**.

44. The Meeting noted some of the issues in relation to reliability of neritic tuna data in Brunei Darussalam i.e. poor data collection, insufficient capacity on species identification, and lack of updated fish stock assessment.

45. On the inquiry regarding CPUE data, the presenter clarified that CPUE data was computed based on catch by operation. In this regard, the Meeting highlighted that CPUE data should be represented according to its appropriate effort unit, and diagrams used to describe the CPUE trend should present accurate information in order to avoid misleading information.

46. Noting that Brunei Darussalam does not have many fishing vessels operating in their waters, the Meeting encouraged the country to target for 100% data coverage.

47. The fishing operation from past to present has been changing due to improvement of fishing technology, environmental change, and other factors. Considering that, the Meeting reminded that stock assessment involving such kind of fishing activities should be conducted carefully, taking into account the possible changing factors.

- ***Indonesia***

48. Representative from Indonesia, *Mr. Thomas Hidayat* enlightened the Meeting with his presentation on Country Profile of Neritic Tuna Fisheries. He provided information on neritic tuna species found in Indonesian waters, fishing gears associated with neritic tuna fisheries, physical characteristic of coastal and offshore area, existing management arrangements, national statistics on production, status of trade, as well as issues and challenges in neritic tuna fishery management. In addition to the basic information, he also shared a neritic tuna case study conducted in Pemangkat, located at South China Sea waters around the Natuna Islands. Some of the important information among others is annual catch of neritic tuna in South China Sea, catch composition of neritic tuna by purse seine and gill net, fishing ground, and CPUE data by trip per month. His presentation appears as **Annex 13**.

49. Referring to the presentation, *Dr. Tsutomu Nishida* provided some comments for improvement of existing data. Considering that purse seine had mesh size limits and only certain sizes could be caught, CPUE computation should take into account age and size of the fish. He also added that at least five (5) years historical data is needed for CPUE analysis, and that it could be obtained from national statistic archive.

50. While noting the comprehensive data available in Pemangkat, the Meeting was informed that several other landing sites in Indonesia also have such records. The Meeting also noted that vessels operating in other areas such as Java Sea and Natuna Islands

sometimes landed the catches in Pemangkat, and that record on total number of vessels landing in Pemangkat is also available.

51. Regarding the inquiry on data collection by species for national statistics, *Mr. Thomas Hidayat* responded that designated staff would carry out data collection once fish were landed. Different ports have different arrangements but Pemangkat in particular has four (4) staff stationed and working only on data collection.

52. Meanwhile, *Mr. Isara Chanrachkij* shared that mesh size of purse seine for tunas varies from 1 to 4 inches while the length of purse seine is from 500m to 1000m.

53. The Meeting was informed that purse seine used in Indonesia targets not only neritic tunas but also other small pelagic fish.

- ***Malaysia***

54. *Mr. Samsudin bin Basir*, representative from Malaysia presented the country's profile of neritic tuna fisheries. He elaborated that tuna catch represents less than 5% of total marine landings, and are mostly caught using purse seines. Neritic tunas are not targeted species, but mostly caught together with other small pelagic fishes. Other information such as Malaysian EEZ areas and management of neritic tuna was also provided to the Meeting. As for data and statistics, he presented figures and charts on annual landings of neritic tunas, catch by sub-areas and species, catch by species from different fishing gears, import and export data, as well as analysis of CPUE by gear for East Coast and West Coast of Peninsular Malaysia. He highlighted that species segregated data was only recorded since 2008. His presentation is as per **Annex 14**.

55. While appreciating Malaysia's effort in conducting CPUE analysis, *Dr. Tsutomu Nishida* provided some comments and guidance on improving the data. Noting that catch data since 1980 up to 2007 was not species segregated, he suggested cross checking the existing data with results of studies on species composition by gears and seasons, if available. He also mentioned that CPUE analysis for neritic tunas caught incidentally might not be reliable and accurate. In order to improve the analysis, gears which targets neritic tuna should be used for CPUE computation. In addition, long term catch data would be needed to produce reliable production curve.

56. As for neritic tuna stock assessment for East Coast of Malaysia, in particular Sabah and Sarawak waters, the Meeting noted that such assessment was conducted, and that it could be carried out based on available historical data.

57. With regards to the interpretation of by-catch, The Meeting was clarified that the purse seine used by fishers mostly targets all small pelagic fish, regardless of neritic tunas. Therefore, The Meeting pointed out that such catch should not be regarded as by-catch, because the gear does not targets any specific species.

- ***the Philippines***

58. *Ms. Grace V. Lopez*, representative from the Philippines provided a presentation on Philippine Fisheries Data Collection. She listed the agencies responsible for collecting fishery information that includes Bureau of Fisheries and Aquatic Resources (BFAR), and elaborated

several tuna data collection initiatives by BFAR. One of the initiatives is the National Stock Assessment Program (NSAP) and it had been a regular activity of BFAR in 16 regions. The Meeting further enlightened on the details of NSAP program such as coverage of NSAP, objectives of the program, survey methods, types of data collected, sampling frequency, data analysis, and types of information that can be generated. Besides that, she also shared some information regarding neritic tunas and seerfishes including its distribution, relative abundance, annual catch data, size ranges of Kawakawa and Longtail tuna caught by gear, as well as annual production of Eastern Little tuna by political region. The detail of her presentation appears as **Annex 15**.

59. With regards to the sampling schedule, the meeting noted that sampling was also conducted on Saturdays and Sundays, in order to obtain wider data coverage. As a whole, the Meeting congratulated the Philippines for having good data system.

60. In response to an inquiry on the abundance of Frigate and Bullet tuna, the Meeting noted that bigger tunas were mostly caught in the Pacific waters while the abundance of smaller tunas are higher in Celebes and Sulu Seas. Most of the Frigate and Bullet tunas caught were not from spawning population.

61. Meanwhile, *Mr. Thomas Hidayat* agreed that species composition differs by geographical areas. He mentioned that the abundance of Frigate and Bullet tunas are higher in the Indian Ocean, West Coast Sumatera and South West Java.

62. The Meeting was clarified that the list of fishing gears which appeared in the table on size ranges of neritic tuna caught by gear included all types of fishing gears in all regions. However, not all of the gears operated in all landing sites.

63. In addition, the Meeting also noted that there are 10 different training modules developed for enumerators and there are about 500 trained enumerators in the Philippines.

- ***Thailand***

64. The Representative from Thailand, *Ms. Pakjuta Khemakorn* presented the Information Review of Neritic Tunas Stock Status in Thailand. Her presentation included fishing areas and landing sites along Gulf of Thailand and Andaman Sea, neritic tuna species found in Thailand waters, main fishing gears for neritic tunas, legislations for tuna fisheries, and catch of neritic tunas by species from 2000 to 2011. She also provided review of stock for Longtail tuna, Kawakawa, and Frigate tuna. Data on CPUE (kg/day) for purse seines, length distribution from purse seines, fecundity, spawning period, etc, for each species separated by sub-regions (Gulf of Thailand and Andaman Sea) were also presented to the Meeting. The detail of her presentation appears as **Annex 16**.

65. *Dr. Tsutomu Nishida* congratulated Thailand for comprehensive presentation and pointed out that mapping technique to visualize data is very important and useful in terms of data presentation. With regards to CPUE data, he suggested focussing on gears that targets neritic tunas such as tuna purse seine and king mackerel gill net in order to obtain reliable CPUE data.

66. The Meeting was informed that tuna purse seine fishing uses sonar to hunt schools of neritic tuna, particularly Longtail tuna. The CPUE data for tuna purse seiners were based on sampling, and that no data was available for some of the months because tuna purse seiners

were not found in those months when the sampling took place. As such, it should not be concluded that tuna purse seiners were not in operation during those months.

67. As for the length frequency data, *Ms Mahyam Bt. Mohd Isa* highlighted that length frequency against total landing for each gear type should be analysed prior to combining all gear types to prevent misleading information.

68. On the other hand, the Meeting noted that Indo-Pacific Tuna Development and Management Program (IPTP) had conducted comprehensive data collection on tuna catch by species, and suggested referring to that information for better understanding on species composition.

69. Noting that Thailand has comprehensive data on length measurement series, the Meeting suggested using FiSAT program to determine population parameters and mortality rates. When the population parameters are available, exploitation rate could be computed. In addition, the Meeting also recommended conducting further analysis on spawning period to determine the recruitment period, as it could be useful in developing proper management plan for neritic tunas.

- ***Viet Nam***

70. The representative from Viet Nam, *Mr. Nguyen Viet Nghia* enlightened the Meeting with his presentation on Neritic Tuna Fisheries in Viet Nam. He started with the overview of tuna fisheries, maritime management areas and fishing zones, as well as type of fishing gears and fishing efforts. He continued his presentation with data focussing on purse seine and gill net fisheries, including annual catch, species composition, and catch rate. Other information such as CPUE and length frequency for each neritic tuna species and fishing grounds were also presented during the Meeting. Before ending his presentation, he raised some issues on data collection faced by Viet Nam. His presentation appears as **Annex 17**.

71. The Meeting noted that there was a project on fisheries resources assessment in Vietnam waters and the results revealed skipjack tuna fisheries' potential. Since then, the Government of Viet Nam has been promoting oceanic tuna fisheries, mainly for Skip Jack species.

72. Meanwhile, *Mr. Raja Bidin Raja Hassan* shared his views on the possibility of neritic tuna migration from south to north. Based on the abundance pattern, the abundance of neritic tuna in Malaysia, Thailand, and Viet Nam was observed during September to November, January to March, and April respectively. He added that such pattern could be due to the movement of surface water current from Viet Nam to South China Sea during that period.

73. As for the inquiry on monsoon seasons in Viet Nam, the Meeting noted that Northeast monsoon season occurs from October to April, and that the neritic tunas caught during Northeast monsoon were smaller in size compared to neritic tunas caught during Southwest monsoon. The meeting suggested that such data could be useful in determining other information such as spawning season.

74. *Dr. Tsutomu Nishida* shared his observation on neritic tuna landing trend and pointed out that neritic tuna catch has been increasing in most of the Southeast Asian countries. However, the CPUE trend was observed to be declining in some countries. As for the

presentation of Viet Nam, he suggested that information on catch and log book data could be applied on the historical data to cross check the species composition by area and year, in order to generate data with species breakdown.

- ***Summary of Available Data from Past Meetings***

75. The Meeting continued with a presentation by *Dr. Somboon Siriraksophon* on compilation and summary of existing data from all participating Member Countries which was gathered from the past meetings. The data summary was compiled by country and presented in Excel form. He shared the available data such as annual catch of neritic tuna, species composition, fishing ground, and other important information. Based on the summary, the Meeting was able to take note of data available and lacking for each country.

76. The Meeting was informed that the source of data was obtained from the 1st Meeting of SWG-Neritic Tunas and other past meetings related to neritic tunas. The data was mostly extracted from the countries' presentations.

77. While recognizing the importance of being alert on IOTCs resolutions and neritic tuna stock status, the Meeting urged Member Countries to cooperate among each other in conducting stock assessment for the region. Such exercise would not only assist in producing reliable data but also Member Countries could make use of those data for submission to international organizations i.e. IOTC and WCPFC.

- ***Prospect and Recommendations for Neritic Tuna Stock Assessment***

78. After completion of countries' presentations, *Dr. Tsutomu Nishida* provided a presentation on Prospect and Recommendations on how to proceed with neritic tuna stock assessment. While congratulating all participants for sharing country information, he pointed out that catch of neritic tunas was reported to be increasing but the CPUE in most of the countries showed declining trend. In order to start with the stock assessment exercise, few important decisions shall be made such as selecting the species of concern, setting the hypothesis on stock structure, and choosing a suitable stock assessment method. Based on the available data from each country, he recommended using A Stock-Production Model Incorporating Covariates (ASPIC) for the first phase of Stock Assessment work plan. His presentation appears as **Annex 18**.

79. The Meeting agreed to select two (2) neritic tunas namely 1) Longtail tuna and 2) Kawakawa for stock assessment in the Andaman Sea and the South China Sea including Gulf of Thailand.

80. Regarding hypothesis setting, the Meeting discussed thoroughly on the number of stock structure to be assumed for the stock assessment study. Some delegates suggested separating the stock structure into two (2) sub-regions namely Andaman Sea and South China Sea which also includes Gulf of Thailand. There was also suggestion to separate the areas into three (3) sub-regions.

81. *Dr. Tsutomu Nishida* explained that as a preliminary step, the existing data should be checked for accuracy and filtered to ensure reliability of the data before it could be applied in the stock assessment study. Some of the historical catch data are species aggregated and certain cross checking exercises should be carried out in order to separate the data into catch

by species. Moreover, CPUE standardization is also required to be conducted before using ASPIC to perform the stock assessment analysis. In this regard, he suggested that capacity building on data quality control exercise, CPUE standardization, and application of ASPIC should be provided to the Member Countries.

82. Noting the abovementioned suggestions, the Meeting agreed on not concluding the stock structure hypothesis at this juncture. Meanwhile, the Meeting urged the participating countries to review their existing data before performing data quality control exercise.

83. On the other hand, the delegate from Viet Nam proposed conducting a case study on morphology of neritic tuna species to get some idea on the stock identification, considering genetic study would take longer period. It could also be a preliminary and fast track case study, in support to the genetic study of neritic tunas. As such, the Meeting supported the proposal and suggested Brunei Darussalam conducting the case study in order to address the species identification issue.

84. Regarding data quality control, the Meeting suggested that the resource person(s) should visit each participating country and assist in performing data quality control exercise. In response to that suggestion, *Dr. Tsutomu Nishida* proposed the countries to provide historical data inputs in a data template before performing the data quality control. Nevertheless, he mentioned that data quality control exercise should be conducted together with the member countries to ensure better understanding of the techniques.

85. Taking into consideration the suggestions by participants, the Meeting decided that a data template for stock assessment using ASPIC would be sent to the participating Member Countries through SWG members for historical data inputs and gathered for compilation via email. Once the data are gathered, further analysis and data quality control could be carried out by resource persons.

86. As to ensure the success of the project, the Meeting urged the Member Countries to provide full cooperation and encourage young potential scientist to be involved in the project, so that there would be a group of stock assessment experts in each Member Country in future. The Meeting also suggested MFRDMD to work closely with the Resource Person and SWG members on this matter.

VII. RESEARCH, CAPACITY BUILDING, AND PRIORITIES

- ***Information of Research Activities in relation to Tunas***

87. *Mr. Isara Chanrachkij*, representative from SEAFDEC Training Department (SEAFDEC/TD) presented the Research Activities related to tuna species. He shared some information regarding research programs related to tuna. There were three (3) programs related to tuna that was coordinated by SEAFDEC i.e. 1) Joint Program on Tuna research in Sulu and Sulawesi Seas; 2) Joint Research and Training Cruise in the Area under Jurisdiction of Cambodia; and 3) Training Workshop on Monitoring Tuna Catch Data: at Tuna Cannery. He explained the detail of each program including the background, objectives, participating countries, activity framework, as well as output of the programs. He further highlighted that the Joint Tuna research program was not only focussed on stock assessment alone, but also getting other scientific information such as oceanographic and hydroacoustic data. The detail of his presentation appears as **Annex 19**.

88. Meanwhile, *Mr. Nguyen Viet Nghia* shared Viet Nam's experiences during the hydroacoustic survey using M.V. SEAFDEC 2. He advised using the fixed hydroacoustic device instead of portable device, as portable device is not stable when the vessel moves at high speed. In addition, he supported SEAFDEC's initiative in conducting the joint research program and looked forward towards collaborating with other countries on such kind of research particularly for neritic tunas.

89. While noting SEAFDEC/TD's experiences on tuna research activities, *Dr. Somboon Siriraksophon* invited the Meeting to consider utilizing the available data and results from previous surveys. For instance, the data from fish larvae sampling could be related to neritic tuna spawning ground. Since the previous survey did not focus on any species, the Meeting was encouraged to review the existing information, including the oceanographic data and relate it with neritic tunas.

90. Besides that, the Meeting also pointed out that some kind of research cooperation among Member Countries focussing on neritic tunas may be required to facilitate the stock assessment study, *e.g.* Joint Tuna Research Survey in Sulu and Sulawesi Seas. However, further details should be discussed in terms of using research vessels such as M.V. SEAFDEC 2 or even T.S. Koyo Maru which belongs to National Fisheries University (NFU), Japan.

91. On the other hand, *Mr. Nguyen Viet Nghia* mentioned that application of hydroacoustic method for oceanic tunas may not be appropriate due to fast swimming behaviour of the said species. However, it could be suitable for small pelagic such as mackerels and neritic tunas.

92. In following up with the Joint Tuna Research Survey in Sulu and Sulawesi Seas, *Ms. Samsudin bin Basir* kindly informed the Meeting that progress status of larvae analysis and DNA samples are yet to be received from Indonesia and the Philippines. He also hoped to obtain the report of oceanographic data analysis during the Oceanic Tuna Meeting which would be convened in Davao, the Philippines.

93. In response to the comments from the Meeting, *Mr. Isara Chanrachkij* informed the Meeting that SEAFDEC conducted a training workshop for the Regional Group on Fish Larvae Identification, and that the resource person had provided a useful textbook on fish larvae identification during that workshop. In this regard, he suggested strengthening the existing working group for information sharing. As for the matter on hydroacoustic survey, the Meeting noted that there would be a Conference on hydroacoustic research in November 2015, which would serve as a platform for sharing knowledge and expanding hydroacoustic research.

94. *Dr. Osamu Abe* shared his experiences working on larvae identification, and pointed out that there could be high possibility of misidentification and suggested cross checking the data with DNA analysis to ensure accurate results.

95. Considering the comments and suggestions, the Meeting advised the researchers to conduct in depth analysis with the existing data, such as investigating the correlation between oceanographic data and abundance of fish. Furthermore, *Dr. Tsutomu Nishida* commented to

take note of FAO's initiative on Ecosystem Approach to Fisheries Management (EAFM) and start utilizing available data in consideration for management of neritic tuna resources.

- ***Capacity building Priorities***

96. Under Capacity Building Priorities, *Dr. Somboon Siriraksophon* explained the capacity building needs that were concluded during the Regional Technical Consultation on Development of the RPOA-Neritic Tunas **(Annex 20)**. Referring to the earlier decision, he reiterated that only Objective I of the RPOA-Neritic Tunas which is related to stock assessment study would be focussed for further discussion in the Meeting.

97. Considering insufficient data on neritic tunas in Myanmar, the Meeting suggested working closely with Myanmar scientists who are working on the said species in order to obtain more information on type neritic tunas found in their waters and its production.

98. The Meeting was also clarified that the capacity building needs were aimed for SWG-Neritic Tunas, which is also related to the countries' needs. In this regard, the Meeting proposed concentrating on SWG-Neritic Tunas first before considering capacity building for the countries.

99. In conclusion, most of the countries requested capacity building on statistics and data collection (including standardizing the stock assessment methodology and data collection) (bullet 3) and assessment of CPUE and stock status based on catch data and fishing effort (bullet 4). In addition to that, some countries also requested capacity building on neritic tuna species identification and biology information (bullet 1) and neritic tuna data collection (bullet 2).

- ***Development of Database for Neritic Tunas***

100. In the effort to compile information of neritic tunas for the benefit of Member Countries, SEAFDEC had started developing a website which includes important information such as statistical database, description of each neritic tuna species, related projects, and others. *Dr. Somboon Siriraksophon* presented the first draft of the Website for Neritic Tunas in Southeast Asia that was developed by *Ms. Namfon Imsamrarn*, Database Developer of SAFDEC Training Department, who is also the Secretariat of the Meeting. He described the structure, components, and information that would be included in the website. The Meeting noted that the website is still under construction and not available for access.

101. While congratulating SEAFDEC's initiative on data sharing, the Meeting requested explanation on security setting for the database. The Meeting was clarified that the database is confidential, and that username and password would be required to access the information in the database.

102. The Meeting highlighted that SEAFDEC could only develop the skeleton for the website and database, while all SWG members were requested to provide some inputs to complete the system.

103. Besides that, the Meeting recommended to improve the website by making it look more attractive and catchy. The Meeting also noted the suggestion to include an addition tab for 'Report' to share the results and documents related to neritic tuna studies.

104. With regards to the view on inclusion of oceanic tuna information in the website, the Meeting emphasized that the objective of the project is to address the importance of neritic tunas, and that inclusion of oceanic tuna would shadow the whole purpose of the activity. Therefore, the Meeting agreed that information related to oceanic tunas would be linked under other tab *e.g.* 'Other Regional Initiative'.

105. *Mr. Samsudin bin Basir* proposed adding information on marketing and trade in the website. Taking note of all comments and suggestions, the Meeting agreed to discuss on construction and confidentiality of the website from time to time. The website would be kept confidential until completion.

- ***Conclusions, Recommendations and Way Forward***

106. Towards the end of the agenda, *Dr. Somboon Siriraksophon* presented the Conclusions, Recommendations and Way Forward **(Annex 21)**.

107. As for the first phase of the genetic study of neritic tunas, the Meeting agreed focussing on two (2) species namely Longtail tuna and Kawakawa, and finalized 24 sampling sites covering South China Sea which includes Gulf of Thailand, and Andaman Sea. Two (2) of the sampling sites would be regarded as reference points for the said study *i.e.* General Santos , the Philippines and Pekalongan, Indonesia (Central Java).

108. In order to facilitate exportation of tissue samples from participating Member Countries to MFRDMD for DNA analysis, official letter requesting for countries' permission would be prepared and sent out by SEAFDEC Secretariat.

109. The SOP for Genetic Study of Neritic Tunas and SOP for Data Collection and Analysis of Neritic Tunas would be revised according to comments by the Meeting and finalized prior to publication.

110. On other recommendations, the Meeting noted and supported the proposal from MFRDMD to conduct a study on the impact of rising temperature to the stock and migratory patterns of neritic tunas, considering that the result of the study may support the stock assessment in near future. However, the Meeting agreed concentrating on the stock assessment study at this juncture.

111. In addition, the Meeting also supported the suggestion for SEAFDEC conducting a study on "Utilization of Neritic Tunas" to attain more information on neritic tuna from economic perspective.

112. The Meeting recommended Brunei Darussalam to carry out morphology study on neritic tunas to address the problem on species identification.

113. Moving on to the recommendations pertaining to stock assessment study, the Meeting concluded that A Stock-Production Model Incorporating Covariates (ASPIC) would be used as per first phase of the neritic tuna stock assessment study. Similar to the genetic study, Longtail tuna and Kawakawa was selected as target species for the stock assessment study. In this regard, the participating Member Countries were requested to review all available historical data and information on to Longtail tuna and Kawakawa and submit to

SEAFDEC/MFRDMD (via *Dr. Osamu Abe*) using the data template which would be provided later. The data would be used for quality control exercise.

114. Further communication among MFRDMD, Resource Person and respective SWG-Neritic Tunas members was encouraged to coordinate neritic tuna data compilation and submission. As such, the Meeting agreed appointing a contact person in each country to facilitate the communication with the Resource Person. The following contact persons were nominated during the Meeting. Meanwhile, the delegate from Thailand promised to revert on the nomination of contact person as soon as possible.

Country	**Contact person**
Brunei	Mr. Matzaini Hj. Juna
Indonesia	Mr. Thomas Hidayat
Malaysia	Mr. Sallehudin bin Jamon (copy to Mr. Samsudin bin Basir)
The Philippines	Ms. Grace V. Lopez (copy to Mr. Noel C. Barut)
Thailand	To revert soon
Viet Nam	Mr. NGUYEN Viet Nghia

115. The timeline for activities under way forward was decided as follows:

Activity	**Schedule**
➢ Permission letter to countries for tissue sample transhipment	By 24 June 2015
➢ Genetic study: sampling and analysis	Aug 2015 – Aug 2017
➢ Stock Assessment for Longtail tuna and Kawakawa	July 2015 – Aug 2016
• Compilation of historical data in the template	July – Dec 2015
• Data quality control and validation by *Dr. Tsutomu Nishida* and *Dr. Osamu Abe* (subject to available resources)	Jan – Mar 2016
• Training of Trainers (TOT) on CPUE standardization and stock assessment analysis (one potential researcher from Member Country would be selected)	April – Aug 2016

116. The Meeting noted that once historical data compilation has been completed, data quality control and validation would be performed, coordinated by *Dr. Tsutomu Nishida* and *Dr. Osamu Abe* (MFRDMD). As for the capacity building on CPUE standardization and stock assessment analysis using ASPIC or other relevant program, participation of scientists who possess IT skills would be preferable.

117. The Meeting was clarified that first stage of stock assessment using ASPIC would be the preliminary exercise to assess the stock of Longtail tuna and Kawakawa using existing data. The results would be used for future improvement of data collection and stock assessment study using a more advanced model.

118. In addition, the Meeting suggested clearly specifying and explaining on the TOT for CPUE standardization and stock assessment analysis in the invitation letter to the countries, so that the candidate would be aware of his/her responsibility on conducting training at national level upon completion of the training.

119. As for the benefit of the Meeting, *Mr. Noel C. Barut* encouraged each country to develop IT experts on stock assessment to facilitate data manipulation and analysis using computer programs.

VIII. OTHER MATTERS

120. The Meeting agreed that the 3rd Meeting of the SWG-NeriticTunas would be convened in 2016. The venue would be discussed internally with the Member Countries.

IX. CLOSING OF THE MEETING

121. *Dr. Osamu Abe* was invited to deliver his closing remark. He pointed out that deliberation for the past three (3) days had led to a clear plan and way forward. Last but not least, he thanked the participants for active participation and the Government of Viet Nam for hosting the meeting. Finally, he declared the Meeting closed.

122. On behalf of D-Fish, *Ms. Nguyen Thi Trang Nhung* expressed her gratitude to SEAFDEC-Sweden Collaborative Program and SEAFDEC for supporting the Meeting. She also thanked the participants for their enthusiasm in providing comments and suggestions throughout the Meeting, and wished them a safe journey home.

123. On behalf of RIMF, *Mr. Ngyuen Viet Nghia* also thanked everyone for attending the Meeting and hoped for good cooperation among the countries in near future.