Report of the 4th Meeting of the Scientific Working Group on Neritic Tuna Stock Assessment in the Southeast Asian Waters

Kuala Lumpur, Malaysia

7-9 November 17

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Southeast Asian Fisheries of Development Center

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

Royale Chulan Hotel, Bukit Bintang, Kuala Lumpur, Malaysia
7-9 November 2017

I. Introduction

1. The 4th Meeting of the Scientific Working Group (SWG) on Neritic Tuna Stock Assessment in Southeast Asian Waters was convened at Royale Chulan Hotel, Bukit Bintang, Kuala Lumpur, Malaysia from 7 to 9 November 2017. The Meeting attended by the experts/scientist and researchers from seven (7) Member Countries namely: Brunei Darussalam, Cambodia, Indonesia, Malaysia, Philippines, Thailand and Viet Nam. Representatives and officers from SEAFDEC/Marine Fisheries Resources Development and Management Department (MFRDMD), SEAFDEC/Training Department (TD) and SEAFDEC/Secretariat (Sec) as well as resource persons from Japan had also attended this meeting. The list of participants appears as **Annex 1**.

II. Opening of the Meeting

2. The meeting was officially opened by the Chief of SEAFDEC/MFRDMD, *Mr. Raja Bidin Raja Hassan*. He welcomed the participants to the meeting and informed the Meeting will also be conducted with a special course by Resource Person, Dr. Nishida. He hoped that all the participants can get as much valuable input during these four (4) days meeting. His Opening Remarks appears as **Annex 2**.

III. Introduction and Adoption of the Agenda

3. *Ms. Noorul Azliana Jamaludin*, Research Officer from SEAFDEC/MFRDMD gave a brief background of the establishment of SWG-Neritic Tunas. The objectives of the Meeting were updated the activities recommended by the 3rd SWG on neritic tuna, updated the results of Longtail tuna (LOT) and Kawakawa (KAW) stock and risk assessment, review and discuss on the seer fish stock and risk assessment and workplan and update the genetic study for LOT and KAW. The Meeting also discuss on the management measures and capacity building requirement to improve stock assessment at country level and transfer risk assessment method to scientists who attend the training. Her presentation appears as **Annex 3**.

4. The meeting adopted the agenda unanimously. **(Annex 4)**.

IV. Review/progress on Stock Assessment of Neritic Tunas including Seer fishes by country and SEAFDEC

- **Country report**

i. Brunei Darussalam

5. *Mr. Muhammad Adam Ramlee* presented the updated status of Neritic Tunas of Brunei Darussalam, including fishing areas used, trend of purse seine fisheries, statistical data, issues and problems and way forward on Neritic Tunas stock

management at national and regional level **(Annex 5)**. He also highlighted the inadequacy of capacity building on fish stock assessment especially on the neritic tunas at national level.

6. During the discussion, *Mr. Adam* had informed the meeting that only purse seine had operated to catch the neritic tuna at zone 2 and 3. He also explained that the drop of landing for 21% starting from 2013 was due to decreasing of resource during data collection. According to the report presented also the representatives from Brunei Darussalam explained the possibility of the migration season of the neritic tuna could be a reason why there was no data available during January to February. The meeting was also informed that Brunei Darussalam also had the landing data information for seer fish from 2001 to 2010 but data it will be updated for stock assessment analysis.

7. The meeting commented that the changed catch tends could also be affected by seasonal and migratory pattern of fish as well.

ii. Cambodia

8. *Mr. Suy Serywath* presented the status of marine fisheries in Cambodia, seer fish production and some other additional information such as coral reef seagrass and mangroves. Catches of LOT and KAW had decreased by 30-50% compared to the last years. Most of the catches are by BECA gill net in the period from May to November with peak period from July to October and the proportion of catch for LOT was 60% and KAW was 40%. The data is only based on research data since adequate landing data is not available. The validity of the results is therefore uncertain. Catch statistics data for seer fish also previous to 2012 are also available but earlier data are not separated per species and are therefore less useful. His presentation appears as in **Annex 6**.

9. *Dr. Nishida* required the old statistical catch data series of seer fish (older than 2012) from Brunei Darussalam and Cambodia to observing the trend in long time series which both will be update later. In response, the data from Cambodia was not separated by species for seer fish which the data should be clarified later.

iii. Indonesia

10. *Mr. Achmad Zamroni* reported on the updated status and trends of neritic tunas in Indonesia **(Annex 7)**. The catch trends for neritic tunas landing by purse seine has been increasing starting from 2010. Most of the neritic tunas in Indonesia waters are caught by purse seine and for the small scale fishery in gillnets. KAW had contributed 18% and LOT 12% from the marine fish production in Pemangkat operated by both gears. Mackerel were also presented. Besides, additional information such as current stock of pelagic species and genetic study conducted in Indonesia were also reported in his presentation.

11. *Dr. Nishida* suggested that the king mackerel and seer fish statistics which should include all seer fish species. The national analysis of neritic tuna are interesting but since the stock structure extends outside Indonesian waters they should be viewed as snap shot assessment and are not appropriate for long time assessment as Maximum Sustainable Yield (MSY). The Total Allowable Catch (TAC) data processing which the

Electronic Length Frequency Analysis (ELEFAN) and FAO-ICLARM Stock Assessment tools (FiSAT) can be used for these analyses.

iv. Malaysia

12. *Mr. Sallehudin Jamon* presented the current and updated status of Neritic Tunas and seer fish in Malaysia **(Annex 8)**. There are landing data of neritic tuna from 1990 to 2016. The landnings show a decreasing trend from 2002 to 2005 after which there has been an increase until 2014. Neritic tunas in Malaysia are commonly caught by purse seine, trawl, hand line and driftnet as well as by using Fish Aggregating Device (FADs) and light luring techniques. In 2016, Neritic tuna and seer fish contribute to Malaysia's marine fish landings by 4.7% and 1.1% respectively. There are no landing data separated by species for seer fish.

13. However, neritic tunas had appeared to be stabilized from 2010 to 2014. Data for landings of neritic tunas are also available for different areas. The total landing of seer fish was also highlighted in this presentation besides the analysis of data on CPUE of LOT, KAW and seer fish for Malaysia. It was also indicated the need of strengthen the capacity and regularize research programs and at the same time research collaboration as a management strategies for tuna. However, the Statistical data system also needs to be strengthening to ensure the quality of data collection. The effective management measures also need to consider the ecosystem impact and also the governance and management roles need to be developed and implemented for effective tune fishery management.

14. The meeting commented that the data collection for seer fish should be improved. It was also proposed that the number of FADs in Malaysian water may need to be managed better to balance the catch of neritic tuna and seer fish. The need to specify species for neritic tuna and seer fish was also highlighted and SEAFDEC/TD offered to help in improving the data collection.

v. Philippines

15. *Ms. Grace V. Lopez* and *Ms. Sherryl Mesa* presented the current status of the Philippine Neritic Tunas and Seer Fish **(Annex 9 and 10)**. The trend in landings of neritic tuna and Bullet tuna were increased from 2012 to 2016 especially *Auxid rochei* and *Auxis thazard*. The data of neritic tuna and seer fish in the Philippines was gathered by National Stock Assessment Program (NSAP). For Seer fish data collection that included CPUE did not start until 2014 and data on trends are therefore not yet available.

vi. Thailand

16. *Ms. Praulai Nootmorn* presented the Status of Neritic Tunas Fisheries in Thailand. Based on landing data and CPUE data between 1980 and 2015, Long-tail Tuna and Kawakawa are overfished in the Gulf of Thailand. This was based on a Virtual Population Analyses (VPA) and length at age data. The likely reason for the overfishing is due to catches of small sized neritic tuna using FADs and Luring Purse Seine (LPS). However effort regulation measures are being implemented to improve the stock status. Her presentation as appears in **Annex 11**.

vii. Viet Nam

17. *Mr. Bach Van Hanh* presented on the Neritic Tunas Fisheries in Viet Nam Waters (**Annex 12**). frigate tuna, bullet tuna KAW and LOT was also reported in his presentation. There is presently no specific legal framework for neritic tunas fisheries management. However, the Fisheries Law and Decree could be used to develop management tools for neritic tuna fisheries. Nevertheless, the representative from Viet Nam then stated the technical matters happened to the particularly fishery in Viet Nam such as overfishing capacity besides data for stock assessment and the problems such as database is not well handling and frequently updated that need to be concern. Presently Viet Nam has problems with over capacity and there are also technical issues with databases on catch data. For seer fish there is no data collection.

18. A general discussion on the need to take the stock structure into account when the MSY and stock status is calculated as well as on the need for good input data was held. The result from the last SWG meeting showed that spawning stock biomass (SSB) for Kawakawa was in the green zone but close to MSY in Indian Ocean but much higher and in green zone in Pacific Ocean waters. Long-tail Tuna in the Indian Ocean are in the red zone and close to MSY while in Pacific Ocean this species was estimated to be in green zone and above MSY point.

19. Presently these species have been assumed to have two stocks, one in the Indian ocean and one on the South China sea/Pacific. Although this may change in the future any assessments of the MSY must be based on the stock structure even if national/regional assessments can be done to get a snapshot assessment of the regional situation.

20. Other than that, *Dr. Nishida* also informed that the stock assessment on seer fish also will be started in the next two years. Therefore all the member countries should be ready with the input data on the particular species from this time. He also suggested that the target reference point could be based on FISAT analysis while the indicator was based on management point as the starting tools for the analysis at this point.

21. At the moment the quality of the data is a very limiting factor for the possibilities to estimate stock status. The meeting agreed that improvements of catch data separated to species level and including both landing data and CPUE data should be prioritized. It was also proposed that the SWG could produce a document for the country administrations, listing the most immediate needs to improve data quality for stock assessments.

V. Review/progress of the Genetic Study and Improve Data Collection

22. *Ms. Wahidah Mohd Arshaad* from SEAFDEC/MFRDMD presented the Preliminary result of population study of LOT in Southeast Asia waters **(Annex 13)**. The aim of the study is to examine the stock structure of Long-tail Tuna (LOT) but samples for Kawakawa have also been collected from the same sites. The stock structure is important for how the species should be managed in the future. The preliminary result is based on 200 samples of LOT from four locations namely Kuala Perlis, Kuantan from Malaysia, Sihanouk Ville from Cambodia and Vung Tau from Viet Nam. The samples have been analyzed using mtDNA D-loop gene. The result

sofar indicates that LOT consists of one single stock in the whole area. Samples for both species from some locations are still pending. Samples from Kota Kinabalu represent South China Sea and Semporna Sulu Sea as an out-group are currently being collected within the available budget. The available result for the Gulf of Thailand and the Andaman Sea are though very consistent and likely to stand also after additional samples. The table below indicates the status for the remaining samples to be collected according to the original plan:

No.	Country	Number of samples	
		LOT	**KAW**
1.	Brunei Darussalam	30	40
2.	Indonesia	0	0
3.	Myanmar	0	0
4.	Philippines	0	50 (From SCS)* 50 (From SS)**

*SCS = South China Sea
**SS = Sulu Sea

23. *In* the discussion, it was recommended that some additional samples from the west coast of Thailand were collected and also that the results should be compared to the genetic result from Philippines if available. The meeting also agreed that the samples from Myanmar should be collected to get more data from the Andaman Sea.

24. IOTC are presently collecting samples on genetics of neritic tuna in the Indian Ocean and the program has funding that IOTC member countries can apply for. Collaboration with IOTC On analyses and possibly funding could be fruitful for all involved.

VI. Apply the Stock and Risk Assessment of LOT and KAW to sub-region Management measures

25. The Chairman for this session, *Mr. Abdul Razak Latun*, Special Departmental Coordinator from SEAFDEC/MFRDMD had given the introduction about the overview of regional framework for SA of neritic tuna in the region. In this discussion, *Mr. Isara C.* from SEAFDEC/TD stated that to the important for the Working Group to know the global situation on same stock structure. He suggested using Risk Assessment method instead of Stock Assessment method. However, the global picture for each country need to be determined since each country has its own measure for example the established country such as Philippines that using indicator based as a tool for fishery management.

26. The representative from Thailand agreed that on method which proposed by *Dr. Nishida* to be used the neritic tunas stock in this region for assessment. While Chief of SEAFDEC/MFRDMD also added to asses this stock as globally since it was a common shared stock in this region.

27. *Dr. Nishida* reported so far only bot sub-regional for Thailand had the CPUE data and he encouraged the other country to give the input data for the assessment purpose. He also suggested for the SWG to come out with Standard Operating Procedure (SOP) for the establishment of stock assessment. And he also suggested

adding the accumulation for biology data in future beside ASPIC analysis result. The Chief of SEAFDEC/MFRDMD recommended doing a major assessment by using comprehensive data. He suggested the age structure analysis also could be analyzed besides length structure input data. Perhaps if the result was same, the management strategy could be started and can be proposed for ASEAN meeting for management on neritic tuna in the region.

28. However, SWG need to be standardized and finalized to use the best method for stock assessment of neritic tunas in the region as been suggested by *Dr. Jacob Hagberg*. Currently, as mentioned by *Dr. Nishida* the used of CPUE as the data input for Thailand has been applied. However, the other tools such as ASPIC method also need to be considered. The SWG need to consider of each country situation before decide the method will be used for assessment such as Viet Nam had reported that in their country, the catch of neritic tunas was not a target species therefore, the use of CPUE analysis was difficult to applied therefore Viet Nam preferred the use of ASPIC and Risk Assessment method to use for the neritic tunas assessment. The representative from Philippines also reported their time series of data was not consistent if the effort was applied as needed in the analysis. Therefore, the quality of input data by each country need to be reviewed so that the idea of neritic tunas management at ASEAN level can be conclusive and comprehensive as stated by Malaysia's representative. The Malaysia's representative also suggested that the updated analysis should be done in every two years. Therefore, recognizing the situation faced by most of the country regarding the non-targeted species of neritic tunas, *Dr. Jacob Hagberg* suggested optimizing the method so that the assessment of neritic tunas in the region can be fully used.

29. *Mr. Isara C.* from SEAFDEC/TD suggested on the regional management for neritic tuna in Gulf of Thailand (GoT) Sub-region should be focused on the social economic aspect in order to apply the environmental management in the in the region as well. While Chief of SEAFDEC/MFRDMD suggested on the study of economy also could be included and this also agreed by Malaysia's representative.

30. In addition, the representative from Malaysia also suggested that fishing gear development could also be applied in future. This also been supported by Brunei Darussalam to starts with the implementation of mesh size could be done. SEAFDEC/TD had reported that the survey of fishing gears has been done in 2014 that focused on neritic tunas and purse seine net mesh size. However, this suggestion could be least priority as stated by Chief of MFRDMD as he advised to focus on up-dated data to be analyses therefore can be used for management strategy (*e.g.* to reduce the fishing effort). The compilation of data and with latest information from SEAFDEC could be a major exercise to pre-determine the neritic tunas stock in the region.

31. *Dr. Nishida* inform the meeting that there are the "Data massage process" and standardize of CPUE using generalize linear model which the uncertainties could be got rid of a lot. The assessment time every 2 years was too fast, the current level of region cannot obtain this rapid assessment. The period of monitoring should be depended on situations, the red stock should have monitored as often as possible but the yellow or green can take longer time.

32. The Meeting was informed that the FADs management issue was raised in order to manage the tuna and other pelagic resource and Malaysia request SEAFDEC to study on this.

33. The representative from the Philippines required the clarifications on the type of effort used for calculation in the entire process. In response, *Dr. Nishida* clarified that the exact unit of effort cannot answer yet depends on the detail and trend of effort which was different in each countries and area, this issue should be discussed later.

34. The representative from Thailand *Mr. Amnuay Kongprom* provided the concept on *"The effort reducing management measure simulating data by Thai DoF*" this concept is to using the percentage of overfishing for separate to each country by that percentage that can be converted to catch. That catch could be referred to each country by ratio of regional catch by country, which each country could be calculate back to the national effort using their own standard CPUE. The effort they can be separated by gear by their own national data which the management measure will be decided by country themselves.

35. *Dr. Jacob Hagberg* provided that another possible way is to control the catch by country by using the CPUE trend. The management measure of catch reduction or other necessary options can be implemented when trend of CPUE is declining as precautionary approach. This choice seems to be appropriated for both socio-economic based management and biological based management as well.

VII. Reviews on preparatory work on Stock and Risk Assessment of Seer Fish in the Southeast Asia by Dr Tom Nishida

36. *Dr. Nishida* presented a Review on Stock and Risk Assessment of Seer fish and work plan **(Annex 14)**. In this session, he showed the progress work that has been done for LOT and KAW under this program. He also informed that currently the IOTC also had been working under same species therefore he pointed that the need of collaboration with IOTC and the extra budget was needed under this purpose. Again he also informed the meeting that the assessment for neritic tunas in the region will be continued in addition with seer fishes. During the discussion, representative from Philippines reminds the countries that the data collection of seer fish have to be collected according to the species before the stock assessment of the seer fish could be done.

VIII. Reviews other activities and work plan for Research, Capacity Building and Priorities for 2018 and onward

- **Role of SWG**

37. The meeting discussed how the Terms of Reference for SWG, which had been endorsed by the SEAFDEC Council Meeting should be followed up. Recognizing the important of landing control logbook system, *Dr. Jacob Hagberg* suggested for SEAFDEC to develop Monitoring, Control and Surveillance (MCS) system for monitoring and control as been applied to Gulf of Thailand. He also suggested suggest on the data requirement step for more clarification and gathering as much data as we can, including the fishery, monitoring and managing and biological data. The logbook

data was also required to be included for more precise information and The data gathering should be included the data of other species that have possibility to do the assessment in the future as a good process for future work.

38. *Dr. Nishida* had emphasized all the SWG members the important of input data for CPUE for stock assessment using ASPIC analysis. Besides the biological data also could be added in the analysis. Perhaps this also could be a good exercise for preparation on stock assessment for seer fishes in next two year. Therefore, a follow up action on data compilation and mining according to country requirement was needed. A few of suggestions had been raised in order to upgrading the data collection such as:

i) Some collaboration with statistics working group for data compilation and data mining.
ii) A specific program for more detail information on data collection.
iii) A development of Working Group for data collection.
iv) A technical support for country with poor data collection.

39. The representative from Malaysia, *Mr. Samsudin Basir* suggested should be set a timing for the result of stock assessment to be forwarded to the higher level at the same year so that the advice could be taken.

- **Work plan for research and capacity building**

40. The representative from Cambodia expressed the interest on capacity building and will try their best to contribute in stock assessment for neritic tunas and also seer fishes in future. Therefore, the meeting understand the need of capacity building especially on species identification and data analysis for country such as Cambodia, therefore further discussion on budget was needed especially when involve with high value species like seer fishes. The meeting was also agreed that a special workshop for data standardization was needed for data collection. Therefore, it was suggested that this workshop schedule in third week of April 2018.

- **Next SWG-Neritic Tunas Meeting**

41. The meeting had agreed that the next SWG meeting will be hosted by Indonesia and the meeting was proposed at first week of October or November 2018.

IX. Introduction: Risk Assessments for Neritic Tunas in Southeast Asia

42. *Dr. Nishida* was presented the Introduction for Risk Assessments for Neritic Tunas in Southeast Asia as in **Annex 15**. He had reviewed the last course conducted in 2016 and his plan for the course that been conducted back to back with this SWG meeting. He also reported the information or result from stock assessment conducted for LOT and KAW in Indian Ocean waters under IOTC program.

43. During the discussion, the representative from Thailand requested some information paper for reference due to 30% reduce of total landing was proposed in Indian Ocean based from the risk assessment analysis done.

44. The representative from Malaysia suggested the SWG secretariat to consider the framework on the activity for SWG to insert the matter of emergency to re-analyse the

stock assessment on LOT in 2018. He also added this issue also as one of the major concern during IOTC meeting.

45. The Chief of SEAFDEC/MFRDMD had emphasized the important of learning the software analysis for stock and risk assessment so that all the countries can work on their own data analysis for their own assessment in future.

46. Some participants of the meeting wished to perform a reassessment of LOT in 2018. However the general opinion was that the current estimate was still valid and there were no plans or resources to update the data and reassess during 2018 which instead will be dedicated to Seer fish (King Mackerel).

X. Risk Assessments for Neritic Tunas in Southeast Asia

47. During the last day of the meeting *Dr. Nishida* held a training course on risk assessments of Neritic tuna. This Training was the second phase of the training conducted as proposed by the hosted by SEAFDEC/MFRDMD. One person from each participating country was invited to attend the course which was considered a "Training the Trainer course". The participants were required to make a report on risk assessment after the course.

XI. Closing of the Meeting

48. The Chief of SEAFDEC/MFRDMD, *Mr. Raja Bidin Raja Hassan* had expressed his sincere gratitude to all the participants who had spent four days to discuss stock assessment of neritic tunas in Southeast Asian waters. He was pleased that meeting had been able to obtain valuable outputs for management measures. He conveyed his thanks to all the participants, resource person and secretariat of the meeting for their hard work and contribution during the meeting. With that note, he declared 4th Meeting of the SWG on Neritic Tuna Stock Assessment in the Southeast Asian Waters closed. His closing remarks appeared in **Annex 16**.

Annex 1

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Annex 2

Opening Remarks

By Chief of SEAFDEC/MFRDMD
Mr. Raja Bidin Raja Hassan

Assalamualaikum WBT and very good morning,
Dr Tom Nishida, Our resource person from Japan,
Dr Kenji Taki, Deputy Chief of SEAFDEC/MFRDMD,
Members of Scientific Working Group on Neritic Tuna
Senior Officers from Secretariat, TD and MFRDMD
Observers,

Ladies and Gentlemen:

Welcome to our Scientific Working Group Meeting on neritic tuna stock assessment and advance training course on risk assessment of longtail tuna and kawakawa in the Southeast Asian waters.

It is indeed a great pleasure for me to welcome all of you to our meeting and special training program on Longtail Tuna and Kawakawa in Southeast Asia jointly organized by SEAFDEC/MFRDMD in collaboration with SEAFDEC/Sec.

This is the fourth series of SWG meetings organized by SEAFDEC since 2014. The first meeting was held in Malaysia, the second meeting in Thailand, the third meeting in Vietnam and the fourth meeting back to Kuala Lumpur. According to our original plan, this meeting should be in Manila, however due to unforeseen circumstances, this meeting is back to Malaysia.

I hope during 2 days meeting here, we could compile the latest information from member countries about your follow-up activities related to data collection and your data analyses based on our previous training program. I hope we could introduce more interesting findings that useful for management of neritic tuna species in the South China Sea and Andaman Sea waters.

We are going to spend two days for SWG meeting and another one more day for our special training. Today, I am very happy that Dr Tom Nishida, our resource person from Japan, could be with us after was advised to rest following an operation early this year.

Therefore I am really hope that our participants will participate actively during the meeting and training program, so that you are able to benefit most from Dr Tom present.

Ladies and gentlemen

Neritic tuna is not only a good local commodity, however increasingly important for international markets, especially in Europe and US. Therefore regional cooperation is required to promote the sustainable utilization of neritic tuna in Southeast Asia.

It is anticipated that the participants will enhance their knowledge on risk assessment which also important for management of these species. This training has been designed to be practical with lectures, examples and exercises to provide skills, encourage participation and exchange information among participants. Therefore, these meeting and training program will provide us not only essential knowledge but also a great opportunity to share experiences both technical and regulatory issues on Risk Assessments and Fisheries Management Framework/Measures of our targeted species.

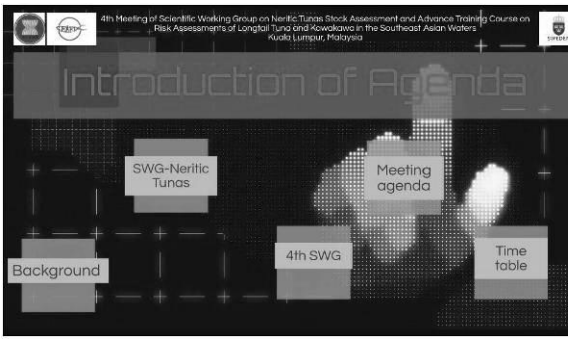
Lastly, I would like to take this opportunity to express our sincere thanks to the organizing committee and in particular our honorable resource person Dr Tom Nishida. I wish this meeting and training program are useful, interesting and beneficial for our future works and hope you have a pleasant stay in Kuala Lumpur.

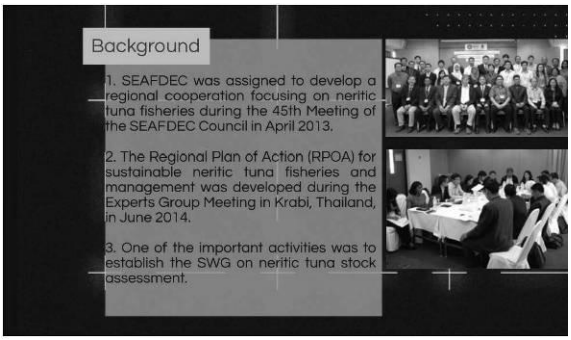
Finally, in the name of Allah, the most Gracious and Merciful, I would like to declare our SWG Meeting and **Training on Longtail Tuna and Kawakawa in Southeast Asia"** officially open.

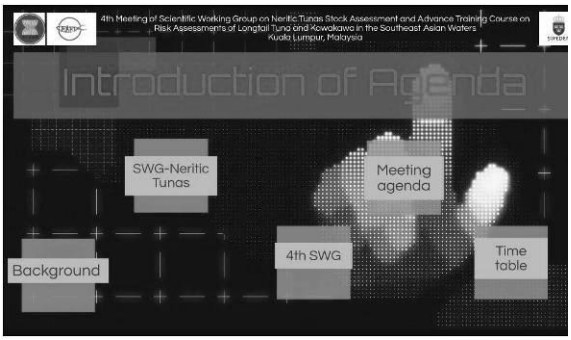
Thank you.

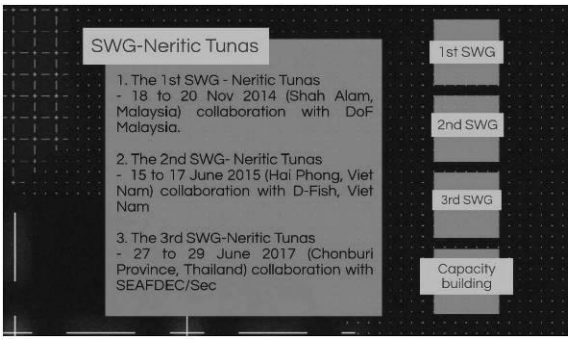
Annex 3

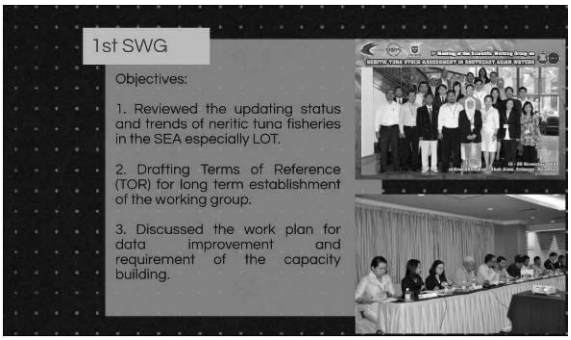
Introduction of the Meeting by *Ms. Noorul Azliana Jamaludin*

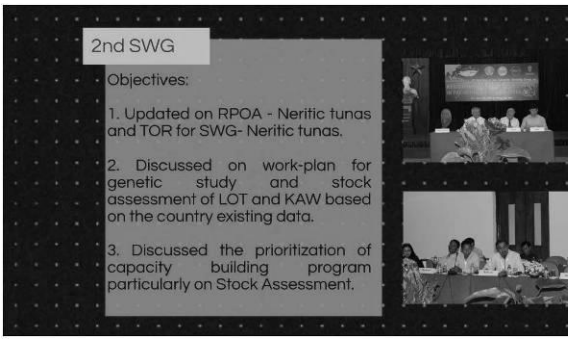


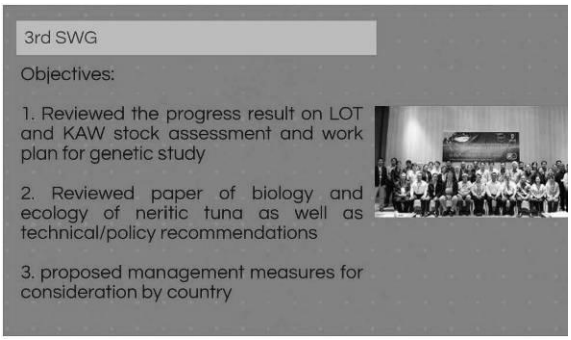


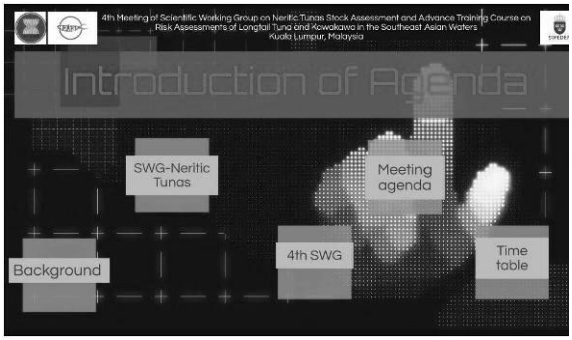


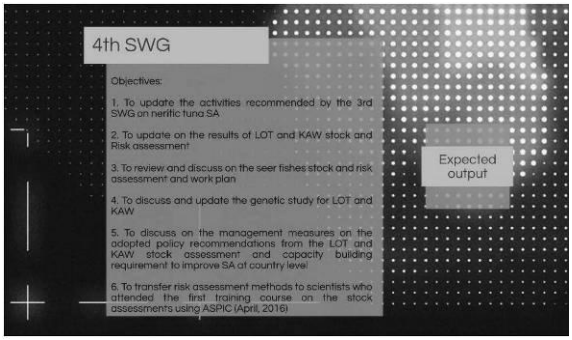


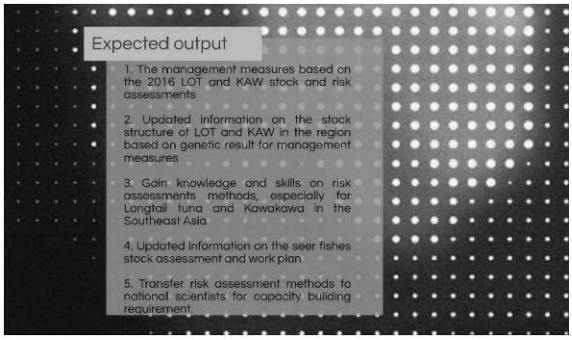


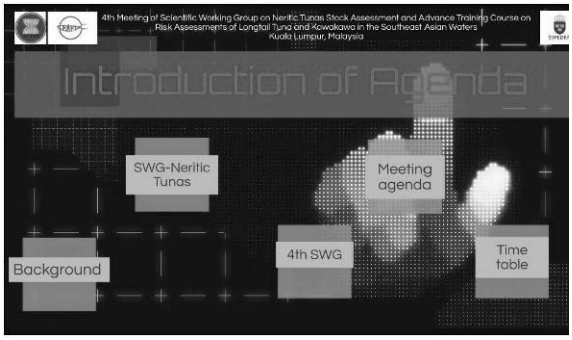


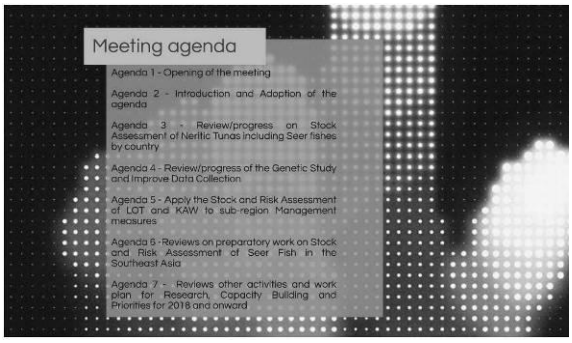


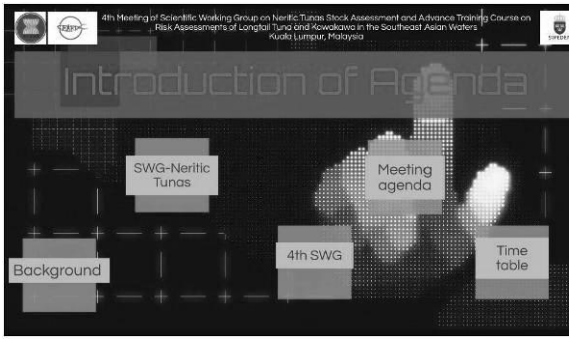


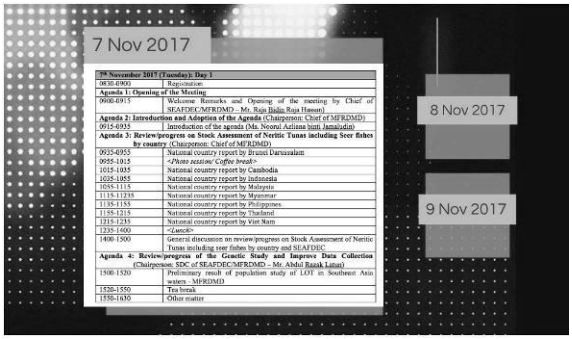






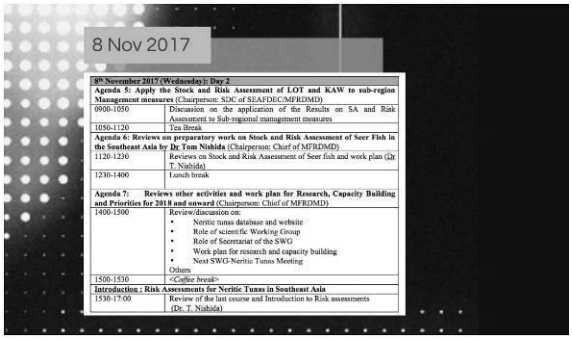






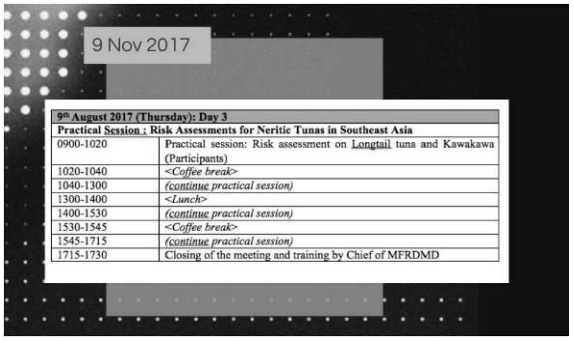
7th November 2017 (Tuesday): Day 1

0830-0900	Registration
Agenda 1: Opening of the Meeting	
0900-0915	Welcome Remarks and Opening of the meeting by Chief of SEAFDEC/MFRDMD – Mr. Raja Bidin Raja Hassan)
Agenda 2: Introduction and Adoption of the Agenda (Chairperson: Chief of MFRDMD)	
0915-0935	Introduction of the agenda (Ms. Nesrul Azlina binti Jamaludin)
Agenda 3: Review/progress on Stock Assessment of Neritic Tunas including Seer fishes by country (Chairperson: Chief of MFRDMD)	
0935-0955	National country report by Brunei Darussalam
0955-1015	*<Photo session/ Coffee break>*
1015-1035	National country report by Cambodia
1035-1055	National country report by Indonesia
1055-1115	National country report by Malaysia
1115-1135	National country report by Myanmar
1135-1155	National country report by Philippines
1155-1215	National country report by Thailand
1215-1235	National country report by Viet Nam
1235-1400	*<Lunch>*
1400-1500	General discussion on review/progress on Stock Assessment of Neritic Tunas including seer fishes by country and SEAFDEC
Agenda 4: Review/progress of the Genetic Study and Improve Data Collection (Chairperson: SDC of SEAFDEC/MFRDMD – Mr. Abdul Razak Latun)	
1500-1520	Preliminary result of population study of LOT in Southeast Asia waters - MFRDMD
1520-1550	Tea break
1550-1630	Other matter

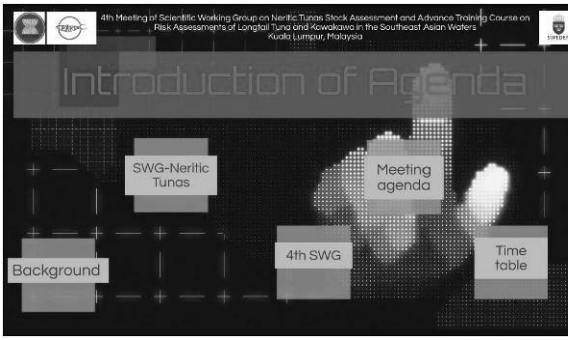


8th November 2017 (Wednesday): Day 2

Agenda 5: Apply the Stock and Risk Assessment of LOT and KAW to sub-region Management measures (Chairperson: SDC of SEAFDEC/MFRDMD)	
0900-1050	Discussion on the application of the Results on SA and Risk Assessment to Sub-regional management measures
1050-1120	Tea Break
Agenda 6: Reviews on preparatory work on Stock and Risk Assessment of Seer Fish in the Southeast Asia by Dr Tom Nishida (Chairperson: Chief of MFRDMD)	
1120-1230	Reviews on Stock and Risk Assessment of Seer fish and work plan (Dr T. Nishida)
1230-1400	Lunch break
Agenda 7: Reviews other activities and work plan for Research, Capacity Building and Priorities for 2018 and onward (Chairperson: Chief of MFRDMD)	
1400-1500	Review/discussion on: • Neritic tunas database and website • Role of scientific Working Group • Role of Secretariat of the SWG • Work plan for research and capacity building • Next SWG-Neritic Tunas Meeting Others
1500-1530	*<Coffee break>*
Introduction : Risk Assessments for Neritic Tunas in Southeast Asia	
1530-17:00	Review of the last course and Introduction to Risk assessments (Dr. T. Nishida)



9th August 2017 (Thursday): Day 3	
Practical Session : Risk Assessments for Neritic Tunas in Southeast Asia	
0900-1020	Practical session: Risk assessment on Longtail tuna and Kawakawa (Participants)
1020-1040	*<Coffee break>*
1040-1300	*(continue practical session)*
1300-1400	*<Lunch>*
1400-1530	*(continue practical session)*
1530-1545	*<Coffee break>*
1545-1715	*(continue practical session)*
1715-1730	Closing of the meeting and training by Chief of MFRDMD



Annex 4

Agenda

Agenda 1: Opening of the Meeting

Agenda 2: Introduction and Adoption of the Agenda

Agenda 3: Review/progress on Stock Assessment of Neritic Tunas including Seer fishes by country and SEAFDEC

- National country report
  i. Cambodia
  ii. Indonesia
  iii. Malaysia
  iv. Myanmar
  v. Philippines
  vi. Thailand
  vii. Viet Nam

- General discussion on review/progress on Stock Assessment of Neritic Tunas including seer fishes by country and SEAFDEC

Agenda 4: Review/progress of the Genetic Study and Improve Data Collection

Agenda 5: Apply the Stock and Risk Assessment of LOT and KAW to sub-region Management measures

Agenda 6: Reviews on preparatory work on Stock and Risk Assessment of Seer Fish in the Southeast Asia by Dr Tom Nishida

Agenda 7: Reviews other activities and work plan for Research, Capacity Building and Priorities for 2018 and onward

- Neritic tunas database and website
- Role of scientific Working Group
- Role of Secretariat of the SWG
- Work plan for research and capacity building
- Next SWG-Neritic Tunas Meeting

Agenda 8: Introduction: Risk Assessments for Neritic Tunas in Southeast Asia

Agenda 9: Practical Session: Risk Assessments for Neritic Tunas in Southeast Asia

Agenda 10: Closing of the Meeting

Annex 5

Country Profile: Brunei Darussalam by *Mr. Muhammad Adam Ramlee*

NERITIC TUNAS FISHERIES

BRUNEI DARUSSALAM

COUNTRY REPORT BY:
MATZAINI HAJI JUNA
MUHAMMAD ADAM RAMLEE

Introduction

- Brunei Darussalam is located in the northwestern part of Borneo with an area of 5,765km^2 and 161 km long coastline fronting South China Sea.
- The total marine territorial area is estimated about 41,188 km^2 covering the Brunei Fisheries Limits with the potential yield of about 21,300 metric tons.

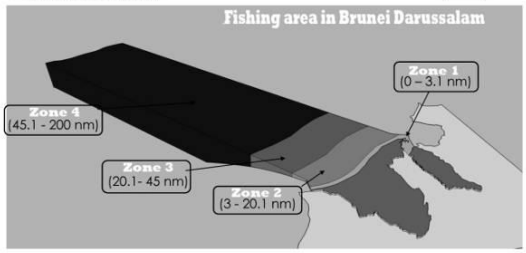
Introduction…

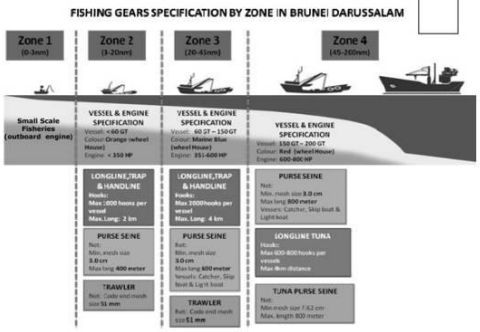
- Neritic tunas (also called coastal tuna) are very important species group for commercial coastal fishing and / or the small-scale fisheries of most nations including Brunei Darussalam.
- The neritic tunas in Brunei Darussalam is very much affected by its neighboring countries since neritic or coastal tunas are highly and moderated migratory species.
- Stock assessment of neritic tunas is not as easy as demersal resources because of the wider area of coverage of this migratory species.
- Therefore it is highly recommended that Brunei actively participate in the RPOA neritic tuna which will involve capacity building and stock assessment in the region.

Neritic Tunas Species Found in Brunei Darussalam Waters

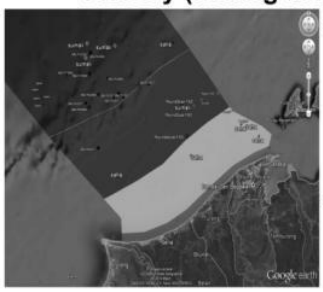
English Name	Scientific Name
Longtail Tuna	*Thunnus tonggol*
Frigate Tuna	*Auxis thazard*
Bullet Tuna	*Auxis rochei*
Kawakawa	*Euthynnus affinis*
Narrow-barred Spanish mackerel	*Scomberomorus commerson*
Indo-pacific king mackerel	*Scomberomorus guttatus*

Fishing areas in Brunei Darussalam





Fishing Area of Purse Seine Fishery (fishing area)



- The picture shows the fishing area of commercial purse seiners according respective companies registered in Brunei Darussalam where their FADs are being deployed.
- Mostly zone 2, 3 and 4 are areas of purse seiner in Brunei Darussalam.

FADs areas for purse seiners

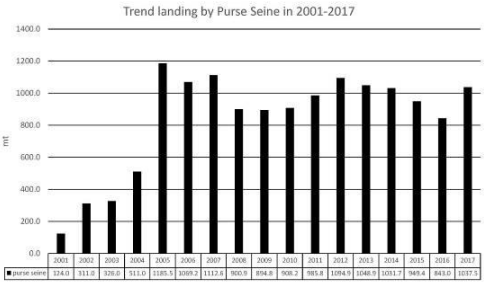
FADs areas

- FADs deployed by purse seiners are located at zone 1,2 and 3.
- Traditional FADs for small scale fishermen are deployed near the shore in zone 1 and 2

Utilization of Neritic Tunas

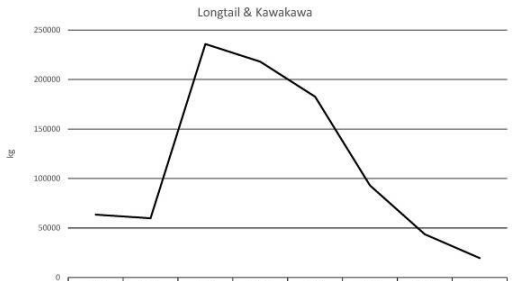
- Important to Brunei Darussalam as it is the main source of protein provider to the people of Brunei Darussalam.
- Most fish is consumed as fresh.
- Processed to tuna loin, smoked fish, fish burger and other processing products.

TREND OF PURSE SEINE FISHERIES BRUNEI DARUSSALAM (mt)



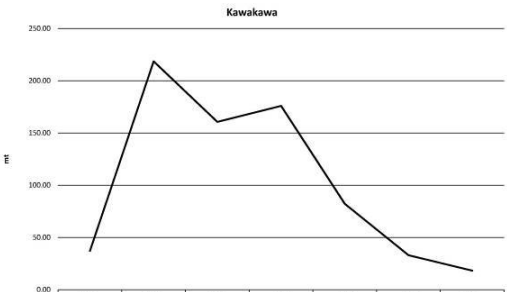
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
purse seine	124.0	311.0	326.2	511.0	1185.5	1069.2	1112.6	900.9	894.8	908.2	985.8	1094.9	1048.9	1031.7	949.4	843.0	1037.5

TREND OF LONGTAIL TUNA AND KAWAKAWA 2010-2017



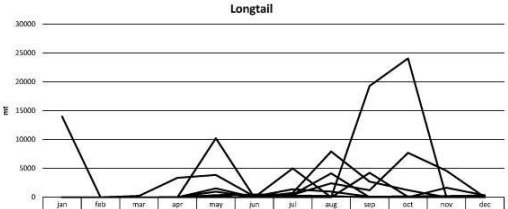
	2010	2011	2012	2013	2014	2015	2016	2017
Neritic tuna	63568	59890	235900	218059	182703	93043	43738	19683

TREND OF KAWAKAWA 2011-2017



	2011	2012	2013	2014	2015	2016	2017
Kawakawa	37.03	218.61	160.65	175.95	82.15	32.93	18.18

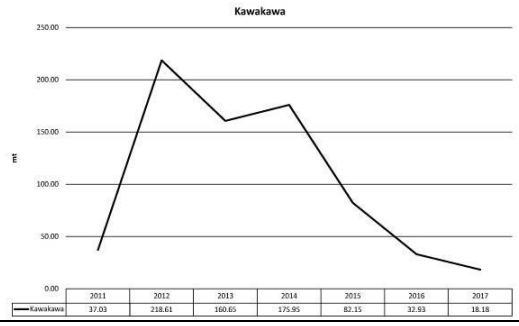
MONTHLY TREND OF LONGTAIL TUNA 2011-2017



	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
2011	0	0	0	0	10225	0	759	7932	2711	1233	3	0
2012	0	0	0	0	374	486	466	2429	1221	7715	4597	0
2013	14000	0	0	0	0	35	0	0	19300	24075	0	0
2014	0	0	0	37	100	0	472	4146	0	0	1658	336
2015	0	0	0	0	1539	0	5011	0	4241	83	22	0
2016	0	0	239	3373	3872	147	1400	992	107	164	209	308
2017	0	0	0	0	981	0	312	214	0	0	0	0

2011 2012 2013 2014 2015 2016 2017

TREND OF KAWAKAWA 2011-2017



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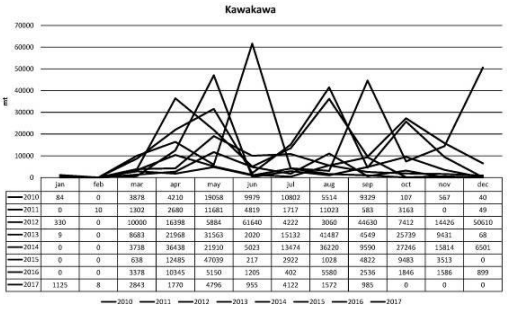
MONTHLY TREND OF KAWAKAWA 2010-2017



	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
2010	84	0	3878	4210	19058	9979	10802	5514	9329	107	567	40
2011	0	10	1302	2680	11681	4819	1717	11023	583	3163	0	49
2012	330	0	10000	16398	5884	61640	4222	3060	44630	7412	14426	50610
2013	9	0	8681	21968	31563	2020	15132	41487	4549	25739	9431	68
2014	0	0	3738	36438	21930	5023	13474	36220	9590	27246	15814	6501
2015	0	0	638	12485	47039	217	2922	1028	4822	9483	3513	0
2016	0	0	3378	10345	5150	1205	402	5580	2536	1846	1586	899
2017	1125	8	2843	1770	4796	955	4122	1572	985	0	0	0

2010 2011 2012 2013 2014 2015 2016 2017

NERITIC TUNA STATISTIC DATA (KG)

Brunei Darussalam's Coastal Area

Up to 200 nautical miles from shore of Brunei Darussalam: Zone 1 - 4

Fish Species	2010	2011	2012	2013	2014	2015	2016	GRAND TOTAL
GUT	3656	6778	6586	9373	11465	10067	3261	51186
KAW	64833	37763	218973	160415	176377	82147	1614	742122
LOT	23671	69820	98694	90541	21769	10896	10811	326202
COM	11614	13348	23189	51970	22527	24344	46981	193973
TOTAL	105784	129720	349454	314312	234152	129469	64683	1313483

ISSUES AND PROBLEMS

- The main issue that needs to be addressed is the overfishing and over capacity problem causing the decline in neritic tuna resources.
- Lack of updated fish stock assessment among others that will be tackled in the RPOA process.
- Need more capacity building on the neritic tuna / tuna stock assessment analysis.

Way Forward

- Joint partner with the operator on identification of the pelagic species, reducing the error on the data.
- Work with them on research work on length weight relationship, and Gonad Somatic Index (GSI) will be start NEXT YEAR FOR TWO YEARS PROJECT
- Working on NPOA pelagic fisheries that included neritic tunas.
- Limiting numbers of licenses, based on MSY of the gears.
- Regulation of mesh size for purse seines, by zoning.
- Transfer knowledge to other officers and staffs of Department of Fisheries on the analysis of neritic tuna.

THANK YOU

Annex 6

Country Profile: Cambodia by *Mr. Suy Serywath*

4th Meeting of Scientific Working Group on Neritic Tunas Stock Assessment and Advance Training Course on Risk Assessment of Longtail Tuna And Kawa Kawa in the Southeast Asian Waters
7–9 November 2017
Kula Lumpur, Malaysia

Marine Fisheries In Cambodia

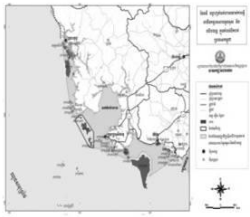
The Marine Fisheries Research and Development Institute/Administration, Cambodia
November 2017
Prepared by: Suy Serywath

Outline

- The general information
- Marine capture fisheries
- Seer fish production
- Coral reef seagrass and mangroves
- Observation on longtail tuna and Kawa

General information

- There are 435 km coast line covered 4 provinces (Koh Kong, Preah Sihanouk and Kep)
- The Exclusive Economic Zone (EEZ) covers approximately 55 600 km2 and
- An average depth of about 50 metres.



Marine Capture production

Year	Total catch (tons)	Marine fish (tons)	%
2012	608,000	99,000	16.28
2013	638,000	110,000	17.24
2014	625,255	120,250	19.23
2015	608,405	120,500	19.81
2016	629,950	120,600	19.14

Source: FiA (21012–2016)

Seer fish production

Year	Marine fish (tons)	Seer fish (tons)	%
2012	99,000	1,234	1.25
2013	110,000	1,286	1.17
2014	120,250	1,485	1.23
2015	120,500	1,506	1.25
2016	120,600	1,539	1.28

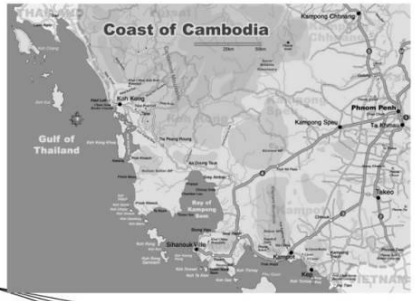
Source: FiA (2012–2016)

Coral reef, sea grass and mangroves

Provinces	Coral Reef (ha)	Seagrass (ha)	Mangroves (ha)
Koh Kong	602	3,993	
Preah Sihanouk	1,198	164	13.50
Kampot	953	25,000	
Kept	52	2,790	1,005
Total	2,805	31,947	1,005

Observation/information on longtail tuna and Kawa kawa

- Catch period of long tail tuna and kawa kawa was conducted from May to November and fishing gears is BECA gill net
- The peak period of catching longtail tuna and Kawa kawa is July to October, and more fish capture production when there are strong wind or storm occured at off shore
- An area of capture these two species at 30 miles is from coastal and around islands
- The recoding on longtail tuna and kawa kawa during DNA sampling (50 heads of each species)
  - Longtail tuna: Length (305mm–440mm) and average length is 381mm
    Weight (370g–1,180g) and average weight is 774g
  - Kawa Kawa: Length (285mm–428mm) and average length is 381mm
    Weight (340g–1200g) and average weight is 742g



Remark from fisherman on longtail tuna and kawa kawa

- The proportion of production
  - Longtail tona is around 60%
  - Kawa Kaw is around 40%
- The production is decrease around 30–50% comparing with last few years
- There are strong wind and storm occurred several time in this year, however, fisherman could not catch these species
- The number of fisherman is decreasing year by year.

Thank you very much

Annex 7

Country Profile: Indonesia by *Mr. Achmad Zamroni*

Neritic Tuna Fishery in Indonesia

Agency for Marine and Fisheries Research and Human Resources Development
Center for Fisheries Research

Ignatius Trihargiyatno[1)]
Achmad Zamroni[2)]

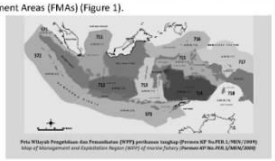
[1)]Center for Fisheries Research, Jakarta
[2)]Research Institute for Marine Fisheries, Bogor

Indonesia FMAs

Indonesia is an archipelagic nation located between the continents of Asia and Australia surrounded by two oceans, Pacific Ocean in the northern part and Indian Ocean in southern part. It consist of approximately 17,508 islands and coast line of 81,000 km.

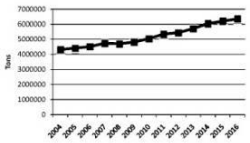
Totally, Indonesia has 5.8 million km2 of marine waters consisting of 3.1 million km2 of territorial waters (<12 miles) and 2.7 million km2 of EEZ (12-200 miles).

For fisheries management purpose Indonesia waters is divided into eleven Fisheries Management Areas (FMAs) (Figure 1).



Marine Production

Total marine production in 2016 → 6.351.480 tons, in 2015 total→ 6.200.468 tons



Indonesia Fisheries production dominated by small pelagic (32 %), large pelagic (23%), and demersal fish group (24 %).

Group Species	tons	%
Small Pelagic	2,015,002.00	32.48
Large Pelagic	1,476,872.00	23.80
Demersal	1,534,404.00	24.73
Coral fish	289,892.00	4.67
Crustacean	405,934.00	6.54
Others	482,564.00	7.78
Total	6,204,668.00	

Fleet Structure and Fishing Gear

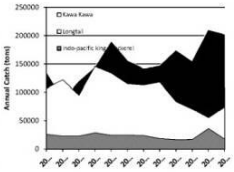
- Total vessel in 2014 → 625.633 units, dominated by small scale fisheries with < 10 GT vessel size
- Total fishing gear in 2014 → 1.141.809 units with the hooks and line (37%), gillnets (27.5%), traps (12 %) seine nets (11,3 %) → purse seine only 2,3 %

Category		units	Units		
Non Powered Boat		165,066			
Powered Boat	Out board Motor	238,010	597,943	95.6 % Small Scale	
	<5 GT	153,493			
	5-10 GT	41,374			
	10-20 GT	14,301	27,690	4.4 % Industry	
	20-30 GT	9,578			
	30-50 GT	1,029			
	50-100 GT	1,766			
	100-200 GT	840			
	>200 GT	176			
	Total	625,633			

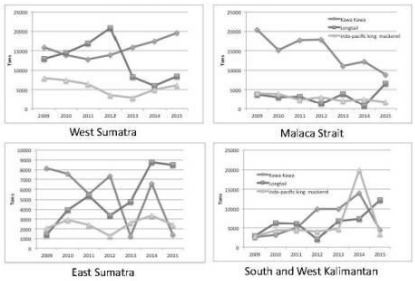
Fishing gear group	units	%
Surrounding nets (include PS)	23,225	2.03
Seine nets	127,091	11.13
trawl	18,993	1.66
lift nest	34,307	3.00
Gillnets and Entangling Nets	314,500	27.54
Traps	139,274	12.20
hooks and lines	423,925	37.13
others	60,494	5.30
Total	1,141,809	

Indonesian Tuna Neritic

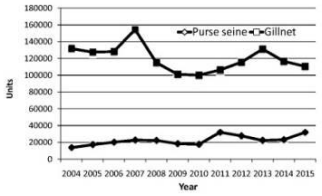
- There are 6 species of neritic tuna and seer fishes in Indonesia waters. The six species are kawakawa (*Euthynnus affinis*), longtail tuna (*Thunnus tonggol*), frigate tuna (*Auxis thazard*), bullet tuna (*Auxis rochei*), narrow-barred Spanish mackerel (*Scomberomorus commerson*) and Indo-Pacific king mackerel (*Scomberomorus guttatus*).
- Kawa-kawa (*Euthynnus affinis*) and Longtail tuna (*Thunnus tonggol)* are pelagic fish that have economic value in Indonesian fisheries.
- Indo-Pacific king mackerel (*Scomberomorus guttatus*), Kawa-kawa (*Euthynnus affinis*) and Longtail tuna (*Thunnus tonggol)* contribute 293,643 tons (4,6 % national marine prod.)



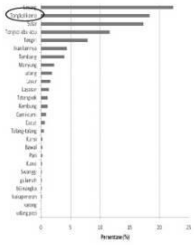
Annual Catch



Trend of National PS and Gillnet Units



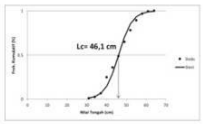
Kawa kawa

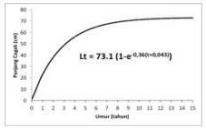


Kawa kawa contribute 18 % marine fish production in Pemangkat Oceanic Fishing Port caught by Mini Purse Seine and Gillnet

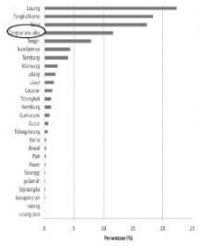
Growth Parameter Kawa kawa

Size	30-65 cm
Lc	46,1 cm
Lm	39,4 cm
L inf	73,1 cm
K	0,36 / year
M	0,58/ year
F	0,61/ year
Z	1,19/ year
E	0,46
Methode	ELEFAN
Fishing Gear	Gillnet
Location	Pemangkat Fishing Port
Source	RIMF, 2016





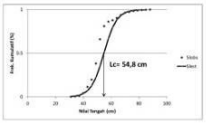
Longtail

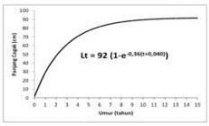


Longtail contribute 12 % marine fish production in Pemangkat Oceanic Fishing Port caught by Mini Purse Seine and Gillnet

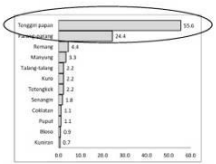
Growth Parameter Longtail

Size	30-90 cm
Lc	54,8 cm
Lm	48,5 cm
L inf	92 cm
K	0.36/ year
M	0,54/ year
F	0,39/ year
Z	0,93/ year
E	0,36/ year
Methode	ELEFAN
Fishing Gear	Gillnet
Location	Pemangkat Fishing Port
Source	RIMF, 2016





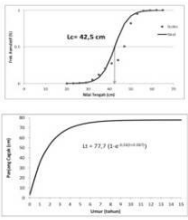
Indo- Pacific Mackerel



Catch Composition Gillnet < 5 GT in Moro Island , Riau Arc Prov (RIMF, 2016) → Main target → 55,6 %

Growth Parameter Indo-Pacific Mackerel

Size	19-66 cm.
Lc	42,5 cm
Lm	48,5 cm
L inf	77.7 cm
K	0,56/year
M	0,76/ year
F	2,52/ year
Z	3,28/ year
E	0,73/ year
Methode	ELEFAN
Fishing Gear	Gillnet
Location	P Moro
Source	RIMF, 2016



Stock Status In Indonesia

- Based on Ministerial Decree NOMOR 47/KEPMEN-KP/2016

Location		Large Pelagic (Exc: Tuna and Skipjack)	
Malaca Strait	Potential (ton)	101,969	
	TAC (ton)	81,575	
	Exploitation Rate	0.89	Fully Exploited
West Sumatra	Potential (ton)	364,830	
	TAC (ton)	291,864	
	Exploitation Rate	1.29	Over Exploited
South China Sea	Potential (ton)	198,994	
	TAC (ton)	159,195	
	Exploitation Rate	0.42	Moderate Exploited

Stock Status In Indonesia

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South China Sea	Potential (ton)	198,994	
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Thank you

Annex 8

Country Profile: Malaysia by *Mr. Sallehudin Jamon*

Neritic Tuna Fishery in Malaysia

Tuna Stock Assessment and Advance Training
Course on Risk Assessments of Longtail Tuna
Kawakawa in the Southeast Asian Waters
Kuala Lumpur Malaysia

Sallehudin Jamon
Fisheries Research Institute- Kampung Acheh
32000 Sitiawan Perak

INTRODUCTION

Malaysia is a maritime nation, surrounded by five seas;

i Straits of Malacca,
ii Andaman Sea
iii South China Sea, and
iv Sulu Sea and
v Celebes Sea

Marine fishing areas in Malaysia

- Peninsular Malaysia,
  - West coast (Malacca Straits) and Andaman Sea
  - East coast (South China Sea)
- Sarawak
  - South China Sea
- Sabah waters
  - South China Sea on the west coast
  - Sulu and Celebes Seas in the east coast.

The Malacca Straits is part of the IOTC area of competence, and The Malaysian EEZ in the Malacca Straits is adjacent to Indonesia in the west and to Thailand in the north

Marine fish productions

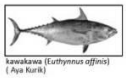
- Total catch of marine fish from Malaysian waters in 2016 were 1.57 million mt, a slide increased 6% compared to 1.48 million in 2015
- The total landing in 2016 were attributed to the catch from 56,111 registered vessels with trawlers, purse seines, drift nets contributed large percentage of the catches
- In 2016, marine fish production from the west coast of Peninsular Malaysia (Malacca Straits) contribute 813,758 mt (51.8%) out of the total catch. The remaining catches were from the South China Sea and Sulu Celebes Seas, east coast of Sabah
- Coastal fisheries produced 76% (1,195,359 mt) and 24% (377,481 mt) from offshore fisheries
- The government develop tuna fisheries not only in coastal waters, but also in offshore waters within the Exclusive Economic Zone (EEZ).
- Tuna fisheries, which include both oceanic and neritic tuna,
- The second strategic development plan for tuna fisheries was launched at the end of 2013.

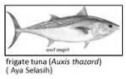
- In Malaysia, neritic tunas and seer were exploited by variety of fishing gears –
  purse seine, trawl, hand line and drift net.
- In 1987, when purse seiner were introduced to catching the neritic tunas and start from that the landing of neritic tuna were increased.
- At present fishing gears and techniques to catch were developed by using Fish Aggregating Device (FADs) and light luring techniques

- In 2016, Neritic tuna and seer fish contribute more 4.7% and 1.1% of Malaysia's marine fish landings respectively
- Purse sienes are the most important fishing gear in neritic tuna fisheries, especially the 40-69.9 GRT and >70 GRT vessel size. It contributed more than 82% of the annual catches of neritic tuna in Malaysia.
- In WCPM, Drift net is the most important fishing gear to catch seer fish, followed by trawl net.
- ECPM- handline, Labuan – Drift net, Sabah – Pure seine and Sawarak – Trawl net

Exploitation of Neritic Tuna

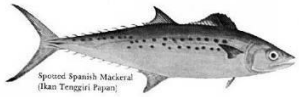
longtail Tuna (*thunnus tonggol*)
(Aya Hitam)


kawakawa (*Euthynnus affinis*)
(Aya Kurik)


frigate tuna (*Auxis thazard*)
(Aya Selasih)

- Neritic tuna consists of
  - longtail tuna *(Thunnus tonggol)*,
  - kawakawa *(Euthynnus affinis)* and
  - frigate tuna *(Auxis thazard and Auxis rochei)*.
- In 2016 , Neritic tuna contributed 4.7% (69,780.31 mt of the total marine landings with the value more than USD4.8 billion

Seer Fish


Spotted Spanish Mackeral
(Ikan Tenggiri Papan)

Scomberomorus guttatus

S.gutatus
- Trawl net/DN/HL/PS
- Dirft Net
- Handline

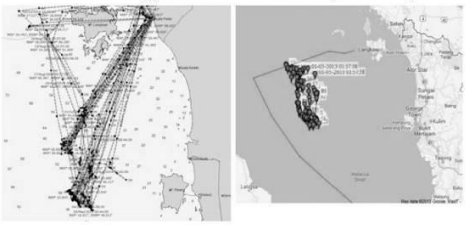
Barred Spanish Mackeral
(Ikan Tenggiri Batang)

Scomberomorus commerson

S.commercon
- Coastal area
- WCPM
- Drift Net/DN/HL/PS
- Handline

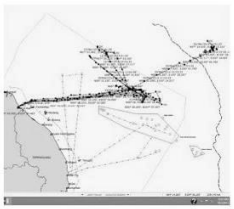
No breakdown by species in annual fisheries statistic

Fishing Area WCPM (Perlis)

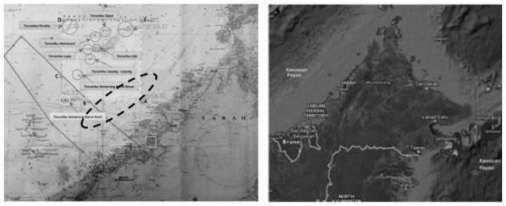


- The neritic tuna catches by purse seine with capacity >70 GRT usually operates on more than 30 bn from the beach
- Most areas with sufficient depth is located in the northern part of west Peninsular Malaysia.

Fishing area ECPM (Kelantan)

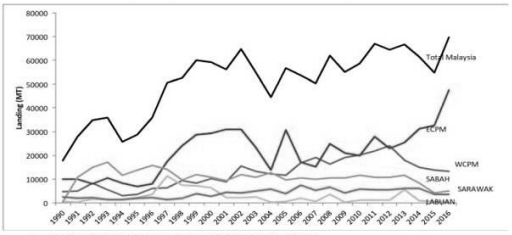


Fishing area Sabah



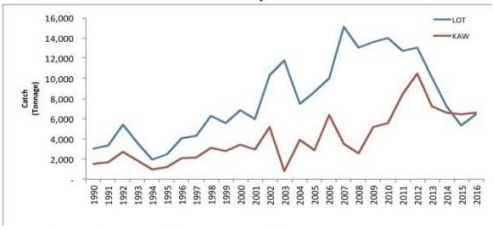
- Potential area in west Sabah
- FADs – depth areas for fishing

Total landings of neritic tuna in Malaysia -Annual Fisheries statistic DoFM



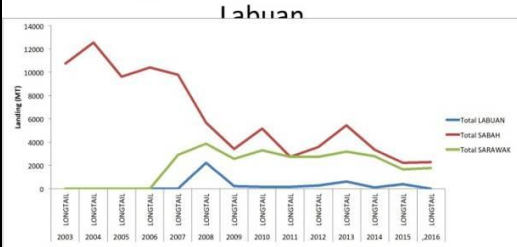
- Landings in Malaysia ranged from 40,000 mt to 65,000 mt.
- The highest catch - 2013 and 2002 (68,000 mt and 62,000 mt)
- Decreasing trend - 2002 to 2005 before an increasing trend until 2014
- Landings of neritic tune in Malaysia appear to have stabilized from 2010 to 2014.
- Total annual production in Sarawak, Sabah & Labuan 26,839 Mt (1997) and 3172 Mt (1990)
- ECPM & WCPM annual production 50,000 Mt (2011) and 11,000 (1995)

Total landings of LOT & KAW in Pen Malaysia



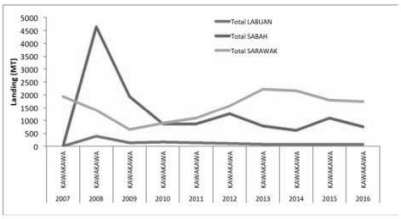
- Parallel trend – total landing in ECPM & WCPM
- The highest catch LOT in 2007 (15,000 mt)
- Increasing trend from 1990 -2012 and decreasing in 2012 untill 2014
- The highest catch KAW 2012 (10,000 mt) and than start to decreasing untill 2016

Landings of LOT Sarawak, Sabah & Labuan



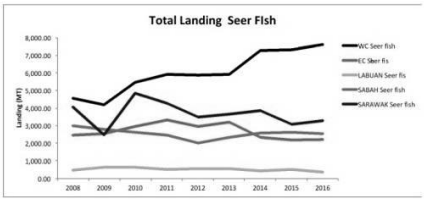
- Sarawak- Landing stable 2003- 2016 (2,900 -1,600 MT)
- Labuan – The highest landing in 2008 (2200 MT)

Total landings of KAW Sarawak, Sabah & Labuan

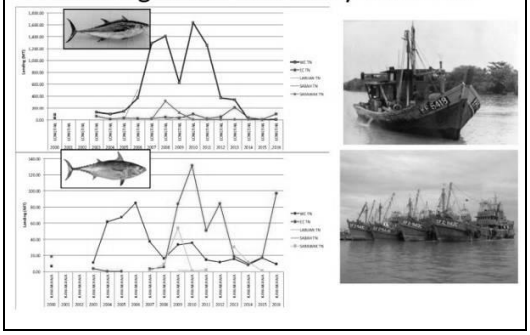


- Sabah – Decreasing trend 2008- 2016 (4,600 – 615 MT)
- Sarawak –Increasing trend 2009-2016 (646 – 2,200 MT)
- Labuan – Decreasing trend 2008 -2016 (400- 64 MT)

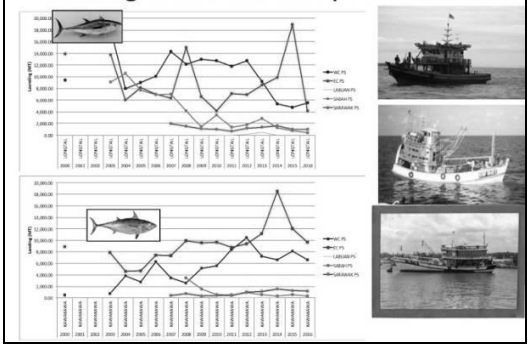
Total Landing of seer fish in Malaysia



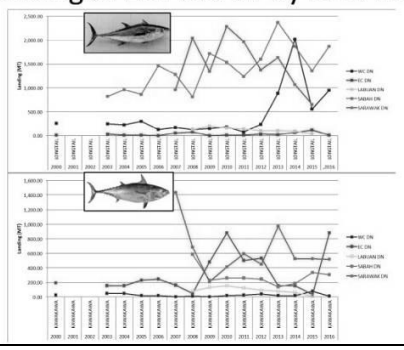
Landing of LOT & KAW by Trawl net



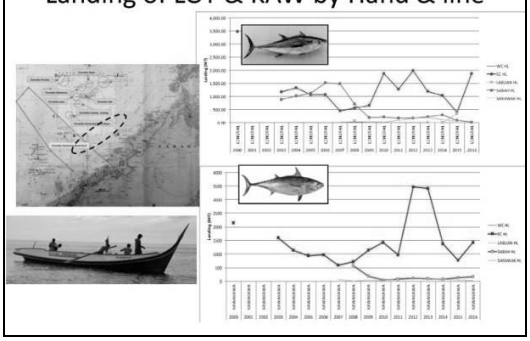
Landing of LOT & KAW by Purse seine



Landing of LOT &KAW by Drift net



Landing of LOT & KAW by Hand & line

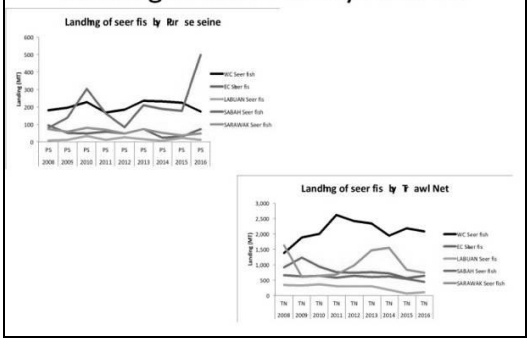


GROWTH PARAMETERS & EXPLOITATION RATE

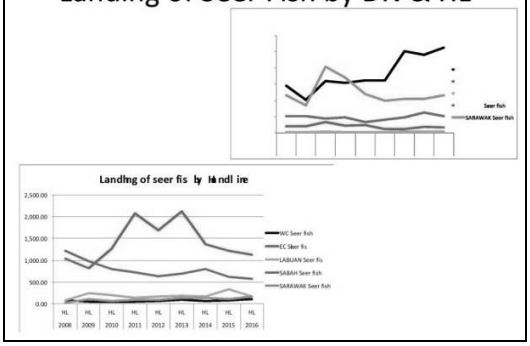
Table 3 :Growth parameters of kawakawa, longtail tuna and frigate tuna in Kuala Perlis and Tok Bali

Spesies	Common name	Location	L_∞ (mm)	K	Ø	Z	M	F	E
Euthynnus affinis	Kawakawa	Kuala Perlis	604.28	0.26	4.98	0.80	0.33	0.47	0.59
		Tok Bali	530.78	0.19	4.73	0.49	0.28	0.21	0.43
Auxis thazard	Frigate tuna	Kuala Perlis	436.28	0.33	4.80	1.24	0.42	0.82	0.66
		Tok Bali	457.28	0.34	4.85	0.92	0.43	0.49	0.54
Thunnus tonggol	Longtail tuna	Kuala Perlis	520.28	0.93	5.40	2.49	0.79	2.15	0.73
		Tok Bali	541.28	0.33	4.99	1.22	0.40	0.82	0.67

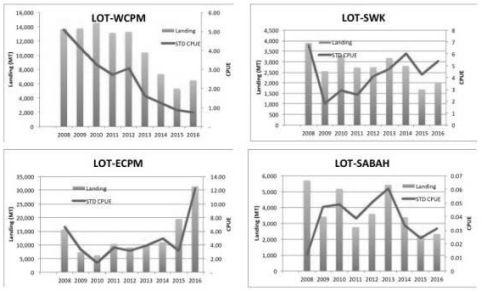
Landing of Seer Fish by PS & TN



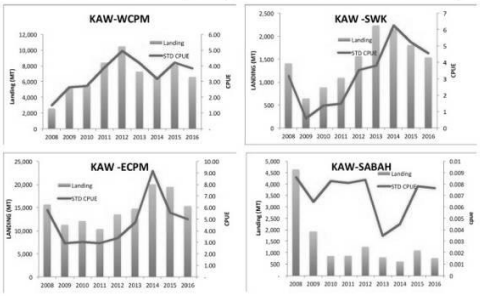
Landing of Seer Fish by DN & HL



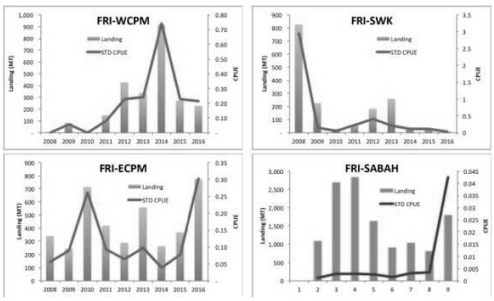
LOT- CPUE (MT/Cum.No of Vessels)



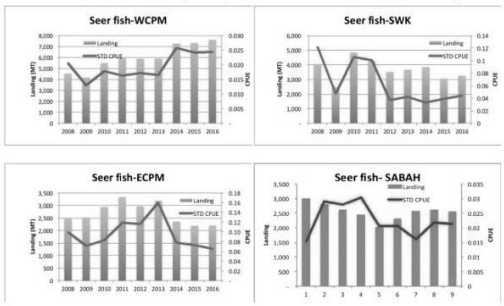
KAW- CPUE (MT/Cum.No of Vessels)



FRI- CPUE (MT/Cum.No of Vessels)



Seer- CPUE (MT/Cum.No of Vessels)



Management strategies for tuna (Recommendations)

1. **Stock Status**
   - A precautionary approach is recommended to avoid the stocks from reaching over-fished levels based on the following:
     - Strengthen capacity and regularize research programs for stock assessment, biology and population structure of each tuna species within Malaysia waters.
     - Research collaboration with foreign research institutions and regional tRFMO.
     - Strengthening of tuna fishery statistical data collection system by:
       - » Adequate and well trained staff to ensure quality data collection.
       - » Deployment of observers onboard fishing vessels for quality catch data by species and fishing effort data.
   - Implementing logbook system for all purse seine operators to provide catch and fishing information which is mandatory to merit the renewal of their annual vessels and fishing gears license Specify what capacity.

2. Ecosystem Impacts
- There is a need to introduce effective management measures to protect retained species and ETP animals. This is to address the impact related to the use of light and FADs in the purse seine fishery on retained species (juvenile fish) and ETP animals (marine mammals).

3. Governance and Management
- Develop and implement neritic tuna fisheries management plan.
- Develop guidelines and regulations on installation of FADs in Malaysian waters.
- Establish gear specifications for tuna purse seine
- Strenghten enforcement to combat IUU fishing - transhipment at sea and illegal catch landing in foreign port.

CONCLUSIONS

- The neritic tuna fishery is very much related to the purse seine fishing gears. There is a question of harvesting small pelagic fish including neritic tuna in the South China Sea and Sulu & Celebes Sea, to what level of the fishing efforts that the present neritic tuna can sustain the exploitation rate.
- There should be a level of exploitation rate set the by the fisheries manager as to ensure that the present resources are exploited at a sustainable level and with a responsible manner.
- The shared stock need shared management among the bordering countries. To implement an effective shared stock management, it needs systematic cooperation and coordination between the ASEAN countries. With the ASEAN Member, SEAFDEC can play the role as a platform to coordinate and assist the member countries in research program, managing and streamline data collection format and conducting relevant capacity buildings
- For Malaysia, there is still room to improve the quality of catch and efforts data. With a good data quality, it will provide a good input for scientist to estimate the status of small pelagic fish stocks and at the end it will also assist the fisheries manager in planning and sustainable development of the purse seine fishery.

TERIMA KASIH

Annex 9

Country Profile: Philippines Part I by *Ms. Grace V. Lopez*

Current Status of the Philippine Neritic Tunas and Seer Fishes

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Bureau of Fisheries and Aquatic Resources/
National Fisheries Research and Development Institute

SHERRYL V. MESA
Bureau of Fisheries and Aquatic Resources
Regional Field Office VI

4th SWG Meeting on Neritic Tunas Stock Assessment and Advance Training Course on Risk Assessment of LOT and KAW in the SEA Waters
7 – 9 November 2017
Kuala Lumpur, Malaysia

OUTLINE:

I. INTRODUCTION
- Overview of marine capture fisheries
- Updated landing data of neritic tunas and seer fishes
- Other information (i.e. biology, ecology, stock structure, fisheries & environmental data)

II. STOCK ASSESSMENT STATUS OF NERITIC TUNAS AND SEER FISHES
- Catch and effort
- Catch at size
- Growth curves and age-length
- Catch at age
- CPUE indices and standardized data CPUE indices
- Tagging data

III. STOCK ASSESSMENT UPDATES OF NERITIC TUNAS AND SEER FISHES

IV. OTHER INFORMATION (i. e. ,management strategies, technical advice on the status of neritic tunas and seer fishes)

V. CONCLUSION

Overview

The Philippines

- situated in the western Pacific Ocean,
- categorized into 3 main geographical divisions: Luzon, Visayas, and Mindanao
- consist of more than 7,100 islands and islets
- **Total territorial water area (+EEZ)**: 2.2 million km²
  - coastal area: 266,000 km²
  - oceanic area: 1,934,000 km²

Philippine Marine Capture Fisheries

Divided into:

- ❑ Municipal fishing sector (use fishing boats of 3 GT or less, fish within the municipal waters or 15 km from shoreline)
- ❑ Commercial fishing sector (use fishing boats of >3 GT, fish outside the municipal waters beyond 15 km from shoreline)

3 sub-sectors:

- small scale commercial fishing – use passive or active gear utilizing fishing vessels of 3.1 GT up to 20 GT.
- medium scale commercial fishing - use active gear and vessels of 20.1 GT up to 150 GT.
- large scale commercial - use active gear and vessels of >150 GT.

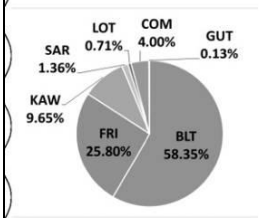
WHERE can we find the activities of NSAP?

Data source of neritic tunas and seer fishes:

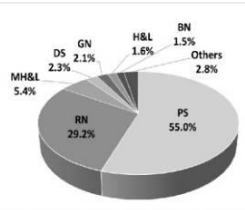
- ***National Stock Assessment Program (NSAP)*** *– gather data i.e. landed Catch and effort, length measurements of selected species, reproductive biology of selected species*

Philippine map showing the distribution of the fish landing sites being monitored by NSAP

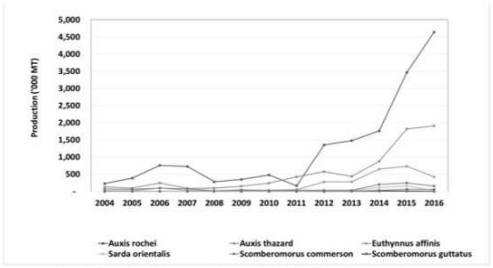
Updated landing data of neritic tunas and seer fishes



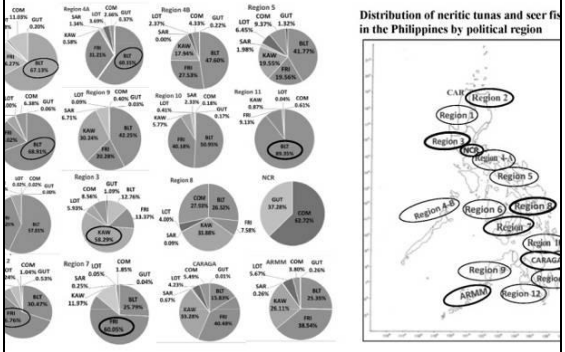
Relative Abundance of Neritic Tunas and Seer Fishes in the Philippines (NSAP data, 2004-2016)



Relative Abundance of Fishing Gea Catching Neritic Tunas and Seer Fishes in the Philippines (NSAP dat 2004-2016)



Annual Production of Neritic Tunas and Seer Fishes in the Philippines in metric tons (NSAP, 2004-2016)



Exploitation Rates of Dominant Neritic Tunas by Fishing Ground Based on National Stock Assessment Program Length Frequency Data in 2015

REGION	FISHING GROUND	SPECIES	Actual E-value
3	Aurora Waters	*Auxis rochei*	0.42
	West Philippine Sea	*Auxis rochei*	0.79
		Euthynnus affinis	0.80
5	Albay Gulf	*Auxis rochei*	0.78
	Lagonoy Gulf	*Auxis rochei*	0.86
		Auxis thazard	0.86
	Lamon Bay	*Euthynnus affinis*	0.59
		Scomberomorus commerson	0.33
	Ragay Gulf	*Auxis rochei*	0.38
		Euthynnus affinis	0.67
	San Miguel Bay	*Euthynnus affinis*	0.69
		Scomberomorus commerson	0.59
6	Cuyo East Pass	*Auxis rochei rochei*	0.63
7	Cebu Strait	*Auxis rochei*	0.62
8	Samar Sea	*Euthynnus affinis*	0.84
10	Camiguin Waters	*Auxis rochei*	0.59
		Auxis thazard	0.58
11	Davao Gulf	*Auxis rochei*	0.56
12	Moro Gulf	*Auxis rochei*	0.72
		Auxis thazard	0.76
		Euthynnus affinis	0.52
		Average	0.63

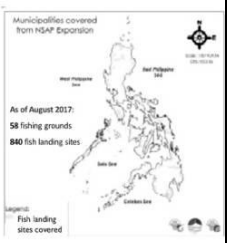
Limit Reference Point for Exploitation Rate set at E = 0.5

Status of Philippine neritic tunas b fishing ground based on Exploitation values using 2015 length frequency d

Stock Assessment Update:

NSAP expansion coverage supported!

- **NSAP Coverage in 1997**
  Fishing Grounds Monitored: 15
- **NSAP Coverage in all regions started in 2015**
  Landing Centers monitored by NSAP: 782
- **NSAP Coverage in 2016**
  Landing Centers monitored by NSAP: 840
  Fishing Grounds monitored: 58



Philippine map showing the distributio of the fish landing sites being monitor by NSAP (As of August 2017)

Stock Assessment Update:

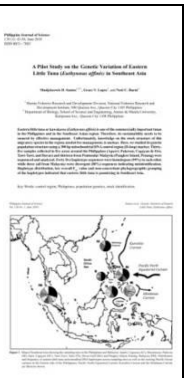
NSAP started reproductive biology study of selected species

- **NSAP in BFAR Region I started reproductive study in 2016 of selected species** incuding the two neritic tunas (*Auxis rochei* and *Auxis thazard*).
- Fishing grounds facing the West Philippine Sea **(Ilocos Coast, Lingayen Gulf, and Bangui Bay)**

Other Information

A Pilot Study on the Genetic Variation of Eastern Little Tuna (*Euthynnus affinis*) in Southeast Asia (Santos et al., 2010)

- A first report on the analysis of the genetic variation of *Euthynnus affinis* (Eastern Little Tuna) population in the Philippines and Southeast Asia using mitochondrial DNA control region (D-loop).
- Samples were collected from 1997-1999 in selected landing areas or markets, 35 from the Philippines and 14 from West Coast Malaysia (Penang, Malaysia).
- Initial result showed no genetic heterogeneity detected on the samples collected which showed that this species from the Philippines and in Southeast Asia is near "panmixia" or "mixing".
- further studies in the future using a larger sample size and additional sampling sites in the area e.g. Sulawesi and Papua New Guinea were suggested



Management strategies

- The management of the Philippine tuna fisheries is primarily governed by the national government through the Department of Agriculture/Bureau of Fisheries and Aquatic Resources (DA/BFAR). It is responsible in the management, conservation, development, protection, utilization, and disposal of all fisheries and aquatic resources **beyond the municipal waters.**
- **Municipal waters is under the jurisdiction of the Local Government Units (LGUs)** composed of the municipal and city government.
- Various management efforts by the **national and local government, private sector and the Non-Government Organizations (NGOs)** help in the management of our fishery resources.

Fisheries Management

3 legal framework of Philippine fisheries sector:

1) **Republic Act (RA) 8550 – "The Philippine Fisheries Code of 1998" as amended by RA 10654 – "An Act to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing".**
   - the governing law in Philippine fisheries
   - highlights conservation, protection and sustained management of fishery an aquatic resources
2) **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 Governme Units** (LGUs).
3) **RA 8435 -The Fisheries Modernization Act of 1997 (AFMA)**
   - – is geared towards modernization and industrialization of the fisheries sect by transforming it into a technology-based industry in accordance with the principles of sustainable development.

National Fishing Regulations (Fishery Administrative Order/FAO)

- FAO 144, s 1983 – Rules and regulations on commercial fishing
- FAO 188, s 1993 - Regulations governing the operation of commercial fishing boats in Philippine waters using tuna purse seine nets
- FAO 198, s 2000 – Rules and regulations on commercial fishing
- FAO 199, s 2000 – Guidelines on fish transshipment
- FAO 201, s 2000 - Ban of fishing with active gear
- FAO 204, s 2000 - Restricting the use of superlights in fishing
- FAO 217, s. 2001 – Obstruction to Defined Migration Paths.
- FAO 223, s 2003 – Moratorium on the issuance of new Commercial Fishing Vessel and Gear License (CFVGL) as part of precautionary approach to fisheries management
- FAO 223-1, s 2003 – Amending Sec. 1 and 2 of FAO 223, s. 2003, re: Moratorium on the issuance of new Commercial Fishing Vessel and Gear License (CFVGL) as part of precautionary approach to fisheries management
- FAO 226, s 2008 – Regulations on the mesh size of tuna purse seine nets and trading of small tunas.

National Fishing Regulations (Fishery Administrative Order/FAO)

- FAO 236, s 2010 - Rules and regulations on the Operation of Purse Seine and Ring Net Vessels Using FADs locally known as Payaos during the FAD Closure Period as Compatible Measures to WCPFC CMM 2008-01
- FAO 236-1, s 2012 – Extension of FAO 236, s. 2010: Rules and regulations on the Operations of Purse Seine and Ring Net Vessels Using FADs locally known as Payaos during the FAD Closure Period as Compatible Measures to WCPFC CMM 2008-01
- FAO 238, s 2012 - Rules and Regulations Governing the Implementation of Council Regulation (EC) No. 1005/2008 on the Catch Certification Scheme
- FAO 240, s 2012 - Rules and Regulations in the Implementation of Fisheries Observers Program in the High Seas
- FAO 241, s 2012 - Regulations and Implementation of the Vessel Monitoring System (VMS) in the High Seas
- FAO 244 s.2012 - National Tuna Fish Aggregating Device (FAD) Management Policy
- 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

Other Management Measures in Relation to Neritic Tunas and Seer Fishes

- National Tuna Management Plan (cover all forms of municipal and commercial tuna fishing up to the limit of its Exclusive Economic Zone (EEZ)
- 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).
- Demarcation of Fishery Management Areas (FMA)

CONCLUSION

The problem of managing the fishery resources that are shared by two or more countries or just within the country like in the Philippines is very complicated especially with the problem of resource depletion or over harvesting being experienced now by the majority of our marine resources. In this case, there is a need for cooperation and collaboration among the member countries for the resources like the neritic tunas and seer fishes to be sustained. Cooperative type of research, management and conservation among the concerned countries should be encouraged. For the Philippines, the data collection including the neritic tunas and seer fishes under the National Stock Assessment Program should be continued annually. Expansion to cover all fishing grounds should be encouraged, if the budget from the Philippine government is possible. Studies to include the reproductive biology, stock structure etc. of these species should be started for a deeper understanding of the biology, structure, migration, etc. of these species.

Annex 10

Country Profile: Philippines Part II by *Ms. Sherryl Mesa*

Current Status of the Philippine Neritic Tunas and Seer Fishes

II. STOCK ASSESSMENT STATUS OF NERITIC TUNAS AND SEER FISHES

Stock Status of *Auxis rochei rochei* (Bullet Tuna)

FISHE: Framework for Integrated Stock & Habitat Evaluation

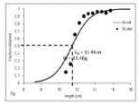
- Management regulations based on science even in resource and data limited conditions
- Uses various methods and inputs from stakeholders
- Adaptive process

NSAP Assessment Methodologies:

CPUE = Catch / Effort

FISAT II

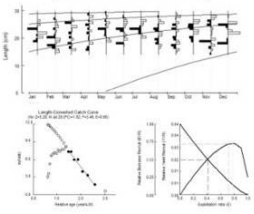
FishBase



Growth and Age-Length Keys

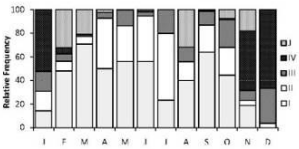
L∞ (cm)	30.7
K (year^{-1})	1.04
M (year^{-1})	1.82
F (year^{-1})	3.46
E (year^{-1})	0.66
Age (years)	3
E_{10}	0.72
M/k	1.75
Recruitment	Bimodal

FISAT II

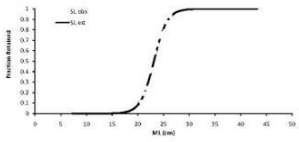


Reproductive Biology

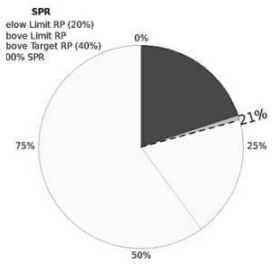
Spawning Season: November to January **(FIV Stage)**



Selection Ogive: Length at First Maturity Lm= 23.12cm

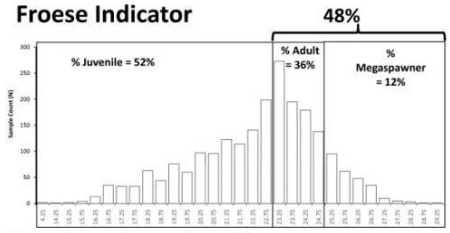


Spawning Potential Ratio



20% threshold

Froese Indicator

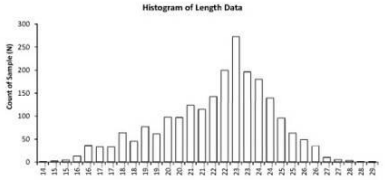


Input	Value	Source	Area
Lmax	31.5	NSAP6 Data	Northern Sulu Sea
Lm	23.1	NSAP6 ReproBio	Northern Sulu Sea
Megaspawner	12.0	Calculated	

Juvenile Proportion	52
Adult Proportion	36
Megaspawner proportion	12

80% Adult Stocks

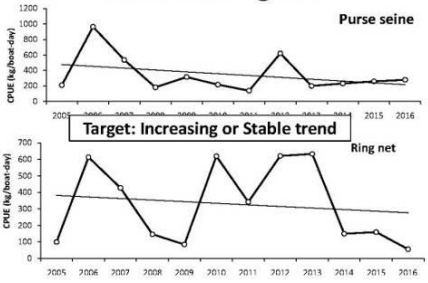
LBAR



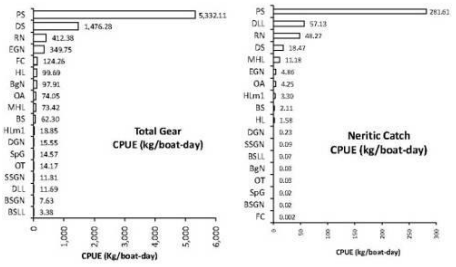
Linf	30.7
k	1.04
M	1.82
Lc	24
Lbar	25.13
Z	5.11
F	3.29

REFERENCE POINT			
Indicator	Target	Limit	Result
F Results	F = M	F = 2M	1.8M
F/M	< 1	≤ 1	F>M @1.8

Annual CPUE (kg/boat-day) of Purse Seine and Ring Net



Catch and Effort



CPUE Standardization (Sparre & Venema, 1992)

Fishing Gear	Total Gear CPUE index kg/day	PS	RN
BSLL	3.38	0.0006	0.0082
BSGN	7.63	0.0014	0.0185
DLL	11.69	0.0022	0.0283
SSGN	11.81	0.0022	0.0286
OT	14.17	0.0027	0.0344
SpG	14.57	0.0027	0.0353
DGN	15.55	0.0029	0.0377
HLm1	18.85	0.0035	0.0457
BS	62.30	0.0117	0.1511
MHL	73.42	0.0138	0.1780
OA	74.05	0.0139	0.1796
BgN	97.91	0.0184	0.2374
HL	99.69	0.0187	0.2417
FC	124.26	0.0233	0.3013
EGN	349.75	0.0656	0.8481
RN	412.38	0.0773	1.0000
DS	1,476.28	0.2769	3.5799
PS	5,332.11	1.0000	12.9302

Fishing Gear	Neritic Catch CPUE index kg/day	PS	RN
FC	0.00	0.00001	0.00003
BSGN	0.02	0.00006	0.00037
SpG	0.02	0.00007	0.00041
OT	0.03	0.00011	0.00067
BgN	0.03	0.00012	0.00071
BSLL	0.07	0.00023	0.00136
SSGN	0.09	0.00033	0.00194
DGN	0.23	0.00083	0.00483
HL	1.58	0.00562	0.03278
BS	2.11	0.00751	0.04378
HLm1	3.30	0.01172	0.06836
OA	4.25	0.01510	0.08807
EGN	4.86	0.01725	0.10064
MHL	11.18	0.03971	0.23167
DS	18.47	0.06560	0.38270
RN	48.27	0.17142	1.00000
DLL	57.13	0.20286	1.18342
PS	281.61	1.00000	5.83369

Sparre, P. and C. Venema. 1992. *Introduction to tropical fish stock assessment*. Part I- Manual. FAO-Fisheries technical paper. No. 306.1,Rev.1, FAO.1992. 376 p.

Summary of Results

Performance Indicator	Process/ Method	Results from Assessment	Reference Point		√ Or X
			Target	Limit	
Proportion of: Juvenile Adult Megaspawner	Froese Indicator	 52% 48%	 < 20% ≤80%	 20% 80%	 X
Fishing Mortality	LBAR	3.46 1.8	F/M ≤ 1	F= 2M	√ X
Egg Production/ Fecundity	SPR	21%	> 20%	20%	√
Catch Rate Trend	CPUE Trend	Decreasing	Increasing	Stable	X

HCRs Implementation and Adaptation

Questions	Answer
What are the actual Harvest Control Measures put in place to achieve HCRs	- No specific policies for the management of Neritic Tuna in the country - Indirect policies implemented that targets small pelagic fishes but are implemented on Fishing Gear approach *(eg. Fishing Closures and FAD Regulations)*

HCRs Implementation and Adaptation

Questions	Answer
Based on the results from Assessment Steps 2, 4 and 9 is there anything about the fishery that we need to keep in mind that might be impacting our results?	Fishing resource is not an infinite resource Assessment process should always involve the participation of all the stake holders to acquire their knowledge of the resource, as well as their commitment to meet the goal of the sector.

HCRs Implementation and Adaptation

Questions	Answer
What other things need to be done to help facilitate management?	- Establish detailed Scientific Basis on stock status - Temporal and spatial research studies (*eg. Simultaneous Reproductive Biology Studies*) - Thorough assessment on the status of major neritic tuna in the country

Annex 11

Country Profile: Thailand by *Ms. Praulai Nootmorn*

Country Report :Status of Neritic Tunas and Fisheries in Thailand

Praulai Nootmorn and Amnuay Krongprom

Department of Fisheries, Thailand

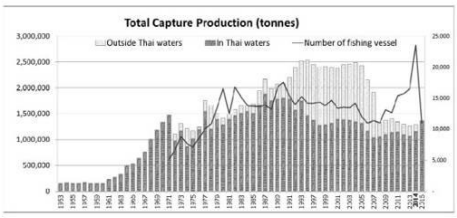
4th Meeting of Scientific Working Group on Neritic Tunas Stock Assessment and Advance Training Course on Risk Assessments of Longtail Tuna and Kawakawa in the Southeast Asian Waters
7th -9th November 2017 Kuala Lumpur, Malaysia

Introduction

Description of Thailand

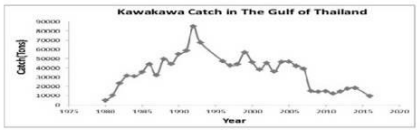
- **Location**: Southeast Asia
- **Area**: 513,120 km^2
- **Population**: 65 million
- **Seasons:**
  - -Summer
  - -Rain
  - -Winter
- **Coastline**: 2,615 km
  - -Andaman sea (955)
  - -Gulf of Thailand (1,660)

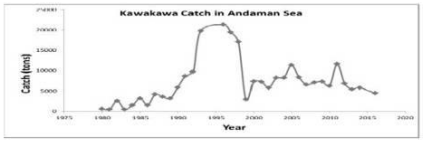
General Overviews



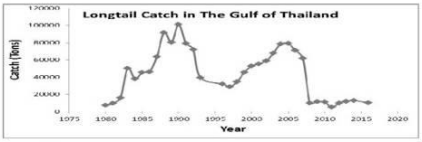
Remark : No. of fishing vessel based on licensed with DOF

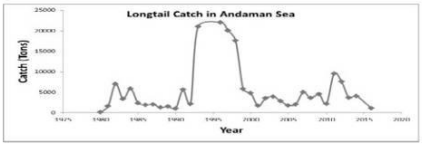
Updated landing data for neritic tunas including seer fishes



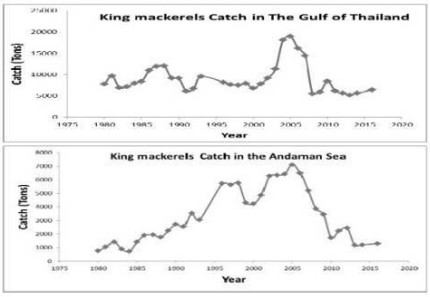


Updated landing data for neritic tunas including seer fishes



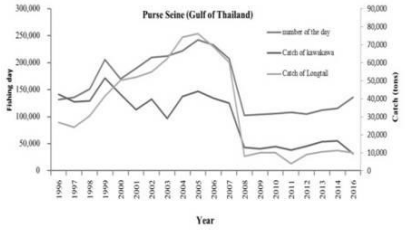


Updated landing data for neritic tunas including seer fishes

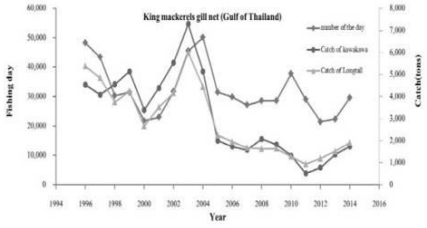


Data for input into stock assessments for neritic tunas including seer fishes

Catch of neritic tuna and seer fish and fishing effort in Gulf of Thailand



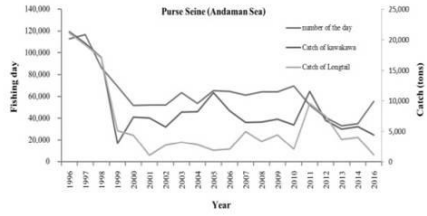
Catch of neritic tuna and seer fish and fishing effort in Gulf of Thailand



Catch of neritic tuna and seer fish and fishing effort in Gulf of Thailand

Year	Purse Seine				King Mackerels gill net			
	day	Kawakawa	Longtail	Seer fish	day	Kawakawa	Longtail	Seer fish
1996	131,465	42,516	26,854	876	48,296	4,539	5,379	3,706
1997	136,070	38,410	24,172	792	43,470	4,084	4,842	3,343
1998	151,417	38,816	30,390	1,259	30,273	4,551	3,752	3,070
1999	205,482	51,548	41,429	697	31,494	5,133	4,249	2,936
2000	169,848	42,585	50,269	493	21,824	3,403	2,664	1,636
2001	189,467	33,817	51,950	878	23,039	4,396	3,522	1,747
2002	209,653	39,806	54,874	395	31,699	5,536	4,163	2,465
2003	212,281	28,951	62,130	265	45,572	7,297	6,006	4,060
2004	222,486	41,313	74,179	268	50,181	5,133	4,441	3,107
2005	242,531	44,249	76,213	1,626	31,548	2,014	2,262	1,831
2006	232,562	40,255	68,765	316	29,855	1,736	1,956	1,637
2007	207,807	37,491	60,217	293	27,179	1,585	1,676	1,762
2008	102,299	12,966	8,119	346	28,597	2,092	1,631	1,930
2009	104,127	12,284	10,106	317	28,560	1,832	1,642	2,091
2010	106,018	13,426	9,959	341	37,772	1,326	1,276	3,905
2011	107,947	11,397	3,912	356	29,002	517	932	3,444
2012	104,825	13,611	8,974	1,081	21,503	778	1,192	1,965
2013	112,639	15,987	10,611	1,151	22,360	1,372	1,514	1,618
2014	115,700	16,639	11,126	1,199	29,631	1,745	1,920	2,062
2016	136,144	9,396	10,025	3,028	-	-	-	-

Catch of neritic tuna and seer fish and fishing effort in Andaman Sea



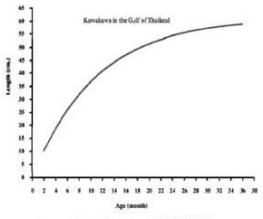
Catch of neritic tuna and seer fish and fishing effort in Andaman Sea

Year	Purse Seine				King Mackerels gill net			
	day	Kawakawa	Longtail	Seerfish	day	Kawakawa	Longtail	Seerfish
1996	112,873	21,320	21,095	1,485	20,634	5	941	3,377
1997	116,830	19,418	19,140	1,401	18,574	5	895	3,379
1998	86,677	17,115	17,057	863	15,773	5	542	3,677
1999	69,155	2,982	5,132	829	10,951	3	667	2,048
2000	51,839	7,351	4,373	653	9,605	23	465	2,098
2001	52,121	7,212	1,012	276	15,009	38	714	3,060
2002	52,293	5,746	2,741	760	18,927	52	795	3,886
2003	63,568	8,169	3,175	861	27,877	80	741	4,358
2004	53,820	8,194	2,827	538	10,269	62	47	5,220
2005	65,380	11,318	1,819	445	7,197	39	0	6,176
2006	64,830	8,348	2,047	482	5,244	37	6	5,402
2007	61,357	6,468	4,948	368	7,767	56	26	4,520
2008	64,353	6,532	3,313	414	8,637	497	188	2,985
2009	64,315	6,993	4,412	400	9,890	315	126	2,724
2010	69,641	6,073	2,084	24	9,018	181	77	1,595
2011	52,288	11,544	9,568	907	12,846	86	0	1,235
2012	40,648	6,771	7,450	758	10,361	72	134	1,529
2013	33,177	5,401	3,679	811	9,237	39	2	291
2014	35,089	5,763	4,054	794	9,080	41	2	335
2016	55,705	4,397	1,094	478	-	-	-	-

Growth curves and age-length key

Kawakawa in the Gulf of Thailand

Age (month)	Length (cm.)
2	10.25
4	18.78
6	25.89
8	31.8
10	36.72
12	40.82
14	44.23
16	47.07
18	49.44
20	51.41
22	53.05
24	54.41
26	55.55
28	56.49
30	57.28
32	57.93
34	58.48
36	58.93

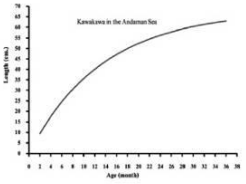


$Lt = 61.19\ (1\text{-}e^{-1.10(t\text{-}0.00)})$

Growth curves and age-length key

Kawakawa in the Andaman Sea

Age (month)	Length (cm.)
2	9.4
4	17.49
6	24.45
8	30.45
10	35.6
12	40.04
14	43.87
16	47.16
18	49.99
20	52.42
22	54.52
24	56.33
26	57.88
28	59.22
30	60.37
32	61.36
34	62.21
36	62.94

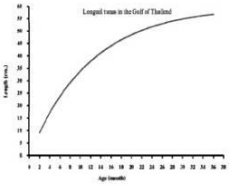


$Lt = 67.48\ (1\text{-}e^{-0.90(t\text{-}0.00)})$

Growth curves and age-length key

Longtail tuna in the Gulf of Thailand

Age (month)	Length (cm.)
2	9.18
4	16.95
6	23.53
8	29.1
10	33.82
12	37.81
14	41.18
16	44.04
18	46.46
20	48.51
22	50.25
24	51.72
26	52.96
28	54.01
30	54.9
32	55.65
34	56.29
36	56.83

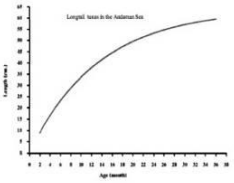


$Lt = 59.81\ (1\text{-}e^{-1.00(t\text{-}0.00)})$

Growth curves and age-length key

Longtail tuna in the Andaman Sea

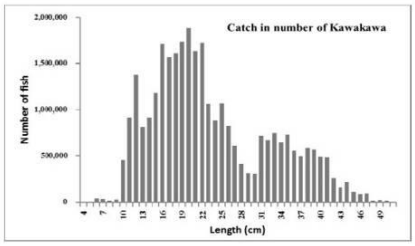
Age (month)	Length (cm.)
2	8.89
4	16.54
6	23.13
8	28.8
10	33.68
12	37.88
14	41.49
16	44.6
18	47.28
20	49.59
22	51.57
24	53.28
26	54.75
28	56.01
30	57.1
32	58.04
34	58.85
36	59.54



$Lt = 67.48\ (1\text{-}e^{-0.90(t\text{-}0.00)})$

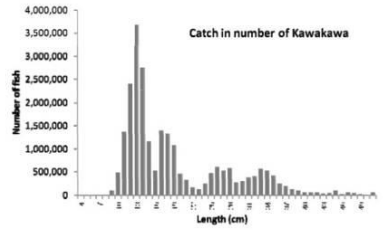
Catch at size

Catch in number by size of kawakawa in Gulf of Thailand, 2016



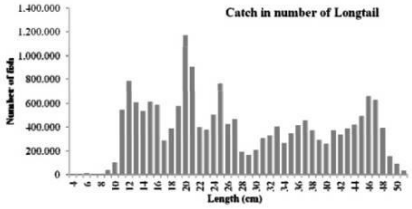
Catch at size

Catch in number by size of kawakawain Andaman Sea, 2016



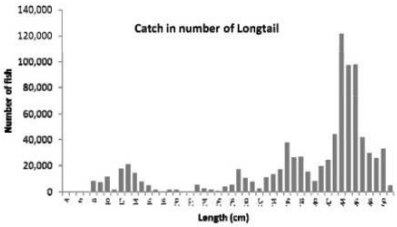
Catch at size

Catch in number by size of longtail tuna in Gulf of Thailand, 2016



Catch at size

Catch in number by size of longtail tuna in Andaman Sea, 2016



Stock assessment updates for neritic tunas including seer fishes

Dof of Thailand have studied on the status of neritic tuna in 2012 by applied biological parameters, such as asymptotic length (Loo), growth parameter coefficient (K), total mortality coefficient (Z), natural mortality coefficient (M), fishing mortality coefficient (F) and exploitation ratio (E).

We have also applied the age at size data by length structure virtual population analysis, VPA) followed the methodology of Jones' Length-based Cohort Analyze and length based Thompson and Bell Analysis.

The result found overfishing of kawakawa and longtail tuna in the Gulf of Thailand and Andaman Sea. The cause of overfishing that may be from catch small size of neretic tuna by FADs, LPS during the neritic tuna resources have migration in Thai Waters.

Others information (e.g. existing management strategies, technical advice on the status of neritic tunas including seer fishes by country)

Thailand has "the Marine Fisheries Management Plan of Thailand (FMP)" in October 2015. FMP 2015-2019 outlines the nature of the management challenges facing Thailand and details what actions and management measures are required to transform what is now essentially an open-access fishery into a limited-access fishery based on balancing the fishing effort with the productivity of the resources (MSY). FMP of Thailand is closely linked to the National Plan of Action to NPOA-IUU 2015 and the National Plan of Control and Inspection (NPCI) 2015. Thailand will be implemented the e-logbook, e- licencing and Port State Measure (PSM) in 2016 and catch quota og longtail tuna in 2018. Enhance the operational capacity for Port in – Port out control to cover all Thai Waters has conducted since 2015. Thailand started and implemented the VMS system on all fishing vessels (> 30 gross ton) in 2015 and observer programme in 2015 (Department of Fisheries, 2015).

Thailand has ratify the United Nations Fish Stocks Agreement (UNFSA) and agree on Port State Measures (PSM) in 2016 (Department of Fisheries, 2015).

Logbook and port sampling schemes have regularly conducted and calculated total production of neritic tuna in the Gulf of Thailand and the Andaman sea.

Fishing License System and Fisheries Controls by zonation between Gulf of Thailand and Andaman Sea and commercial fishing vessel have code and marking scheme by gross togges and type of gears.

The assessment of maximum sustainable yield (MSY) and optimal fishing effort in Thai waters since 2015 to present.

Fishing vessel have code and marking scheme

Thank you

Annex 12

Country Profile: Viet Nam by *Mr. Bach Van Hanh*

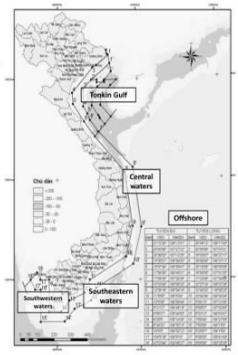
4TH MEETING OF SCIENTIFIC WORKING GROUP ON NERITIC TUNAS STOCK ASSESSMENT AND ADVANCE TRAINING COURSE ON RISK ASSESSMENTS OF LONG TAILED TUNA AND KAWAKAWA IN THE SOUTHEAST ASIAN WATERS
7TH-9TH NOVEMBER 2017, KUALA LUMPUR, MALAYSIA

NERITIC TUNAS FISHIERIES IN VIETNAM WATERS

Bach Van Hanh
Department of Science, Technology and International Cooperation – Directorate of Fisheries
Hoang Ngoc Son
Department of Marine Fisheries Resources - Research Institute for Marine Fisheries

OVERVIEW

- Vietnam's marine fisheries are largely small-scale, multi-species and multi-gear.
- Land area: 329.560 km²
- Coast line: 3.260 km
- EEZ area: 1.000.000 km²
- The Sea of Vietnam:
  - Tonkin Gulf (I)
  - Central waters (II)
  - South-eastern waters (III)
  - South-western waters (IV)
  - Offshore (V)
- Marine explotation: 2.876 thousand tons (⇧2,21% compared to 2015)

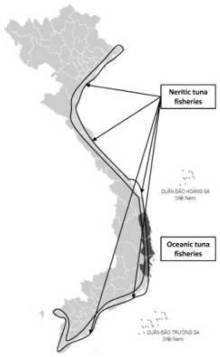


Tunas Fisheries in Vietnam

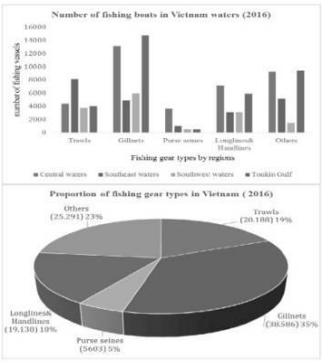
- **Oeanic tuna fisheries:** Binh Dinh, Phu Yen, Khanh Hoa province.
- **Neritic tuna fisheries:** Scattered along coastal provinces, from North to South Vietnam.

Fishing gears

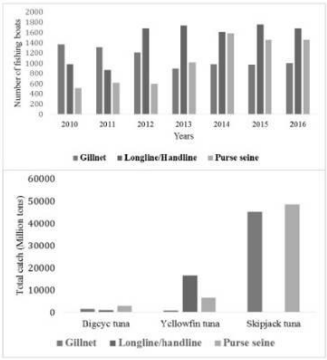
- Longline, Drift-gillnet, Purse seine



Fishing vessels and fishing gears in Vietnam



Oceanic tuna fisheries in Vietnam



Neritic tunas in Vietnam waters

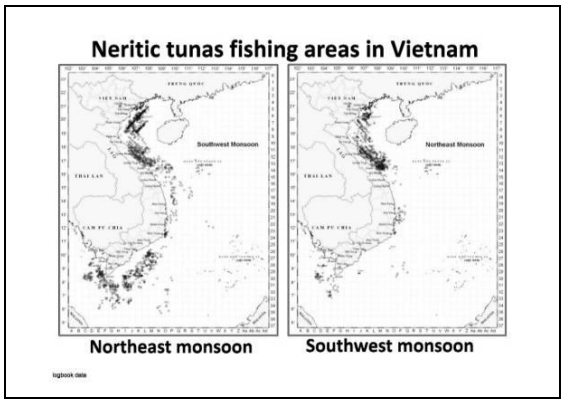
+ Frigate tuna – *Auxis thazard*

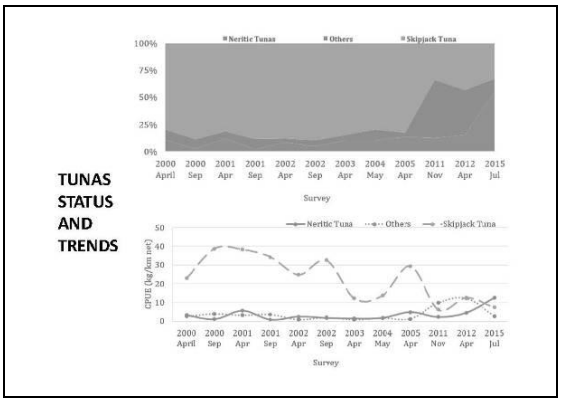
+ Bullet tuna – *Auxis rochei*

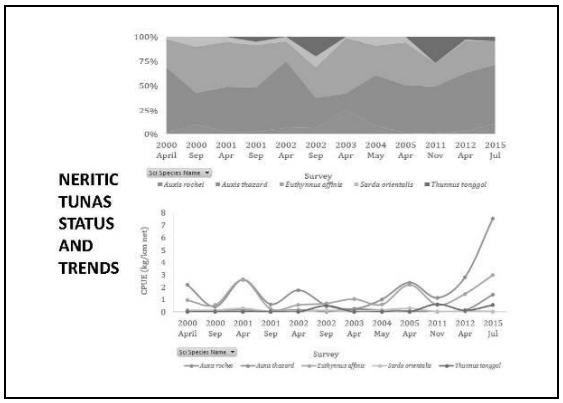
+ Kawakawa – *Euthynnus affinis*

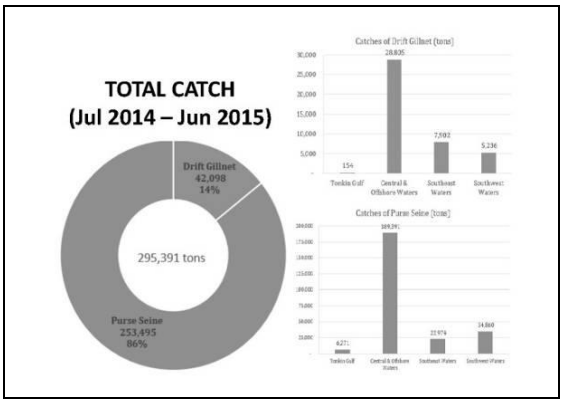
+ Stripped bonito – *Sarda orientalis*

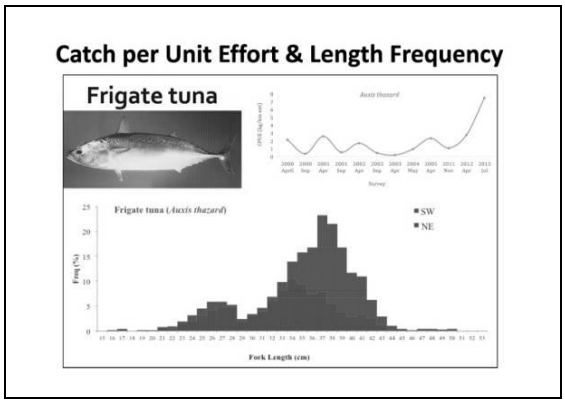
+ Long tail tuna – *Thunnus tongol*

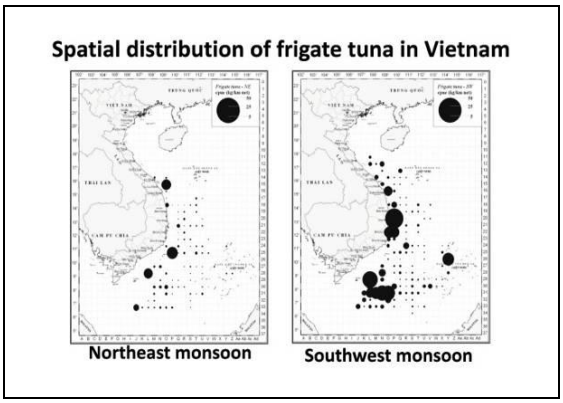

Neritic tunas fishing areas in Vietnam
Southwest Monsoon
Northeast Monsoon
Northeast monsoon
Southwest monsoon
logbook data


TUNAS STATUS AND TRENDS
Neritic Tunas
Others
Skipjack Tuna
100%
75%
50%
25%
0%
2000 April
2000 Sep
2001 Apr
2001 Sep
2002 Apr
2002 Sep
2003 Apr
2004 May
2005 Apr
2011 Nov
2012 Apr
2015 Jul
Survey
CPUE (kg/km net)
Neritic Tuna
Others
Skipjack Tuna


NERITIC TUNAS STATUS AND TRENDS
100%
75%
50%
25%
0%
Survey
CPUE (kg/km net)


TOTAL CATCH
(Jul 2014 – Jun 2015)
Drift Gillnet
42,098
14%
295,391 tons
Purse Seine
253,495
86%
Catches of Drift Gillnet (tons)
Catches of Purse Seine (tons)


Catch per Unit Effort & Length Frequency
Frigate tuna
Frigate tuna (Auxis thazard)
SW
NE
Freq (%)
Fork Length (cm)


Spatial distribution of frigate tuna in Vietnam
Northeast monsoon
Southwest monsoon

Existing Management strategies

Currently, Vietnam lack of specific legal framework for neritic tunas fisheries management.

Some parts of the legal frameworks for fisheries management have been considered as management tools for neritic tunas fisheries, 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 Vietnam waters; administrative sanctions regulations in the fisheries sector.

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;

Technical matters

- Overfishing capacity
- Poor handling practices and high proportion of post harvest lost;
- Not all fishers comply and willing to use *Fishing vessels monitoring system (VMS)*;
- 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;

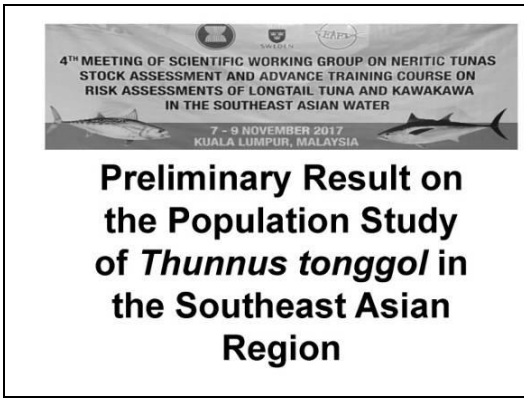
Conclusion

- 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 tunas (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;

Thank you for your attention

Annex 13

Preliminary result of population study of LOT in Southeast Asia waters by *Ms. Wahidah Mohd Arshaad*



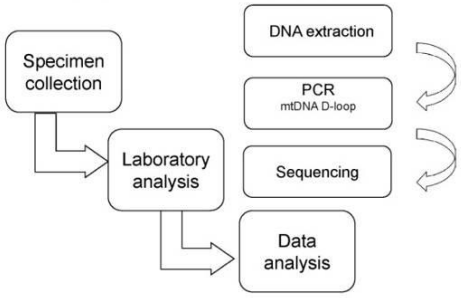
Introduction

- Longtail tuna (LOT) *Thunnus tonggol* (Bleeker, 1851) is among the economically important species of tuna and is the second smallest among the eight species in the genus Thunnus.
- DNA sampling two species, LOT & KAW
- Mitochondrial DNA (mtDNA) displacement loop (D-loop) marker
- Project duration: 2 years (Oct 2016 – Sept 2018)

Objectives

- To identify the level of genetic diversity of *Thunnus tonggol* (Longtail tuna) in the South China Sea and Andaman Sea.
- To identify the genetic structure of *Thunnus tonggol* (Longtail tuna) in the South China Sea and Andaman Sea waters by using mitochondrial DNA (mtDNA) displacement loop (D-loop) marker.

Materials and methods



Sampling Activities

Kuantan: 5-7 April 2017 and 12 April 2017
Kuala Perlis: 19-21 April and 7-10 April 2017

Specimen Collection

No.	Sampling site	No. of Specimens
Andaman Sea		
1.	Kuala Perlis, Malaysia	50
2.	Ranong, Thailand	50
South China Sea		
3.	Sihanoukville, Cambodia	50
4.	Kuantan, Malaysia	50
5.	Trat, Thailand	50
6.	Vung Tau, Viet Nam	50
	Total	300

* No. of specimens collection for LOT and KAW

RESULTS

General Results

Locality	N	No. of haplotypes	Polymorphic sites	Hd*	Nd*
MYKP	43	43	108	1	0.01721
MYKT	47	47	76	1	0.01449
CBSV	50	50	86	1	0.01460
CBVT	49	49	84	1	0.01388

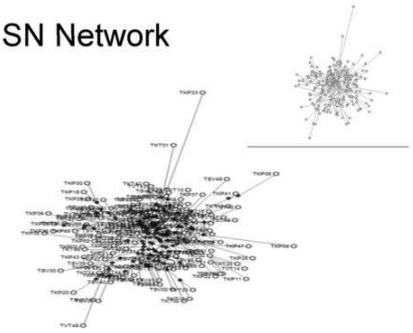
*Hd = Haplotypes diversity
*Nd = Nucleotide diversity

865 bp
No of haplotypes: 186
Shared haplotypes: 3
Hd: 0.9998

Phylogenetic relationship

Tree

MSN Network



Genetic Distance

	MYKP	MYKT	CBSV	VTVT
MYKP	0.018			
MYKT	0.016	0.015		
CBSV	0.016	0.015	0.015	
VTVT	0.016	0.014	0.015	0.014

Discussion

Mitochondria DNA D-loop marker analysis of 189 specimens from four locations:

- The overall haplotype diversity (0.998) and nucleotide diversity 0.01516.
- No significant genetic differentiation was found between the four sampling localities. Mean, *Thunnus tonggol* in South China Sea and Andaman Sea is a single stock.

- This preliminary finding in line with:

1) LOT shows genetic partitioning across, but not within, basins of the Indo-Pacific based on mtDNA (Willette et.al 2015). (Vung Tau, Palawan, Pemangkat & Pekalongan). D-loop, 885bp, specimen no. is 139. Found: 132 haplotypes.
2) Genetic homogeneity in LOT from the northwest coast of India inferred from direct sequencing analysis of the mitochondrial DNA D-loop region (Swaraj et. al 2014). (Verarel and Ratnagiri). Using D-loop, 500bp, specimen no. is 98. Found: 95 haplotypes.

Conclusion

Based from mitochondria DNA D-loop region analysis of 189 specimens from four locations (Kuantan, Kuala Perlis, Sihanoukville and Vung Tau), found that the *Thunnus tonggol* in South China Sea and Andaman Sea is a single stock.

Annex 14

Review on Stock and Risk Assessment of Seer fish and work plan by *Dr. Tsutumo Nishida*

Agenda 6

Reviews on preparatory work on Stock and Risk Assessment of Seer Fish in the Southeast Asia

Tom Nishida
Resource person

(1) Backgrounds
(2) Global reviews
(3) Procedures of Our works
(4) Work plan

References (8)

(1) Part I ASPIC KAW+LOT (final) pdf
(2) Part II KAW+LOT Risk assessment (final).pdf
(3) Indo-Pacific_king_mackerel_Executive_Summary.pdf
(4) Indo-Pacific_king_mackerel_Supporting_information.pdf
(5) Narrow-barred Spanish mackerel Executive Summary.pdf
(6) Narrow-barred Spanish mackerel Supporting Information.pdf
(7) IOTC-2016-WPB14-24 (REV_1)-ASPIC (BUM).pdf
(8) King mackerel (T&T).pdf

SEAFDEC
IOTC
JICA

Please raise your hands
ANYTIME
if you have questions
and/or comments
(informal session)

Backgrounds: Why we need to do?

Regional Plan of Action on Sustainable Utilization of Neritic Tunas in the Southeast Asian waters
(RPOA-Neritic Tunas)

Endorsed by (highest decision makers)
47th SEAFDEC Council (2015)
23rd ASEAN Sectoral Working Group on Fisheries (ASWGFi) (2015)

Backgrounds: Why we need to do?

First phase: Small tuna (LOT and KAW)
(2016-2017) Done

Now Second phase: Seer fish
(Spanish and King mackerels)
(2017-2018)

(1) Backgrounds
(2) **Global reviews**
(3) Procedures of Our works
(4) Work plan

Mandated Management species of Neritic tuna (5 tuna RFMO)

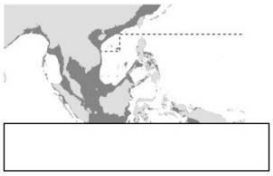
	Longtail	Kawkawa	Frigate	Bullet tuna	King mackerel	Spanish mackerel
CCSBT						
IATTC						
ICCAT						
IOTC						
WCPFC						

IOTC cover all ← WCPFC(jealousy) why?

Global review of stock status (Indian, Atlantic and Pacific)
King and Spanish Mackerel

Distribution in SE Asian waters

Narrow-barred Spanish Mackerel
Scomberomorus commerson
(SEFADEC)



Indo-Pacific King Mackerel
Scomberomorus guttatus
(not in Philippines)

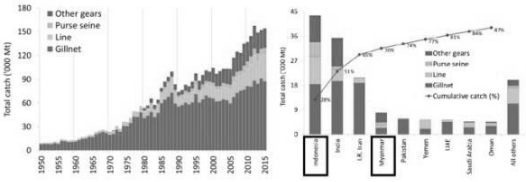
Indian Ocean
I-P King mackerel and N-B Spanish mackerel

IOTC : Executive Summary and supporting information

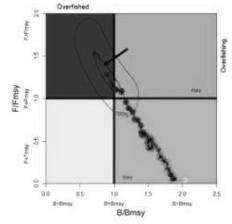
	Stock Status	Executive Summary	Supporting information
Bullet tuna (*Auxis rochei*)			
Frigate tuna (*Auxis thazard*)			
Kawakawa (*Euthynnus affinis*)			
Longtail tuna (*Thunnus tonggol*)			
Indo-Pacific king mackerel (*Scomberomorus guttatus*)			
Narrow-barred Spanish mackerel (*Scomberomorus commerson*)			

	Stock Status	Executive Summary	Supporting information
Bullet tuna (*Auxis rochei*)	?		
Frigate tuna (*Auxis thazard*)	?		
Kawakawa (*Euthynnus affinis*)	SEFDEC		
Longtail tuna (*Thunnus tonggol*)	SEFDEC		
Indo-Pacific king mackerel (*Scomberomorus guttatus*)	?		
Narrow-barred Spanish mackerel (*Scomberomorus commerson*)			

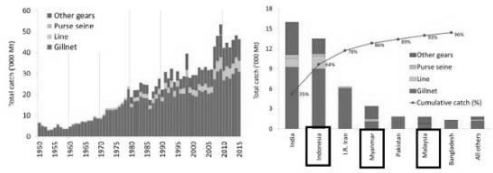
IOTC : Narrow-barred Spanish Mackerel



IOTC N.B. Spanish mackerel (Red)
Data poor (catch only) method
(SEAFDEC may be same ???)➔will see next year !)

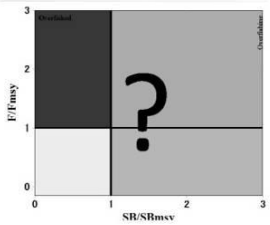


IOTC: Indo-Pacific King mackerel



IOTC: Indo-Pacific King mackerel

(not good data? ➔even catch only method)
We may face the same problem?
➔ Indicators based assessments



Annex 15

Introduction for Risk Assessments for Neritic Tunas in Southeast Asia
by *Dr. Tsutumo Nishida*

Atlantic Ocean

Some case studies: 3stocks
US East, Gulf of Mexico and Caribbean Sea

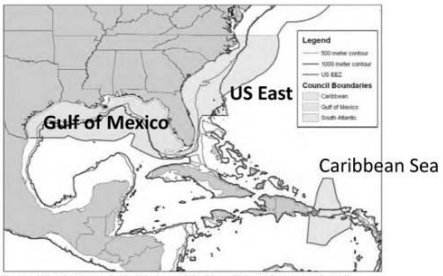


Figure 4.1: South Atlantic, Gulf of Mexico, and Caribbean Fishery Management Council boundaries, and United States EEZ.

JICA Project (Trinidad and Tobago) (snaps) (paper)

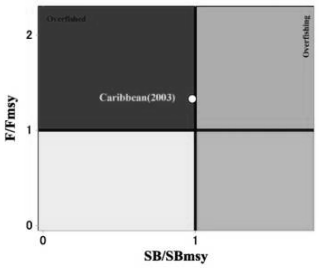
Stock assessments training (2005)

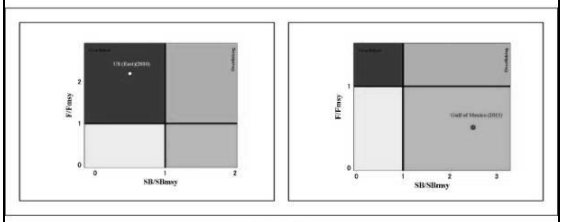
Stock status of king mackerel (*Scomberomorus cavalla*)

in the Caribbean

L. Martin, L. Ferreira, S. Soomai, H. Yanagawa and T. Nishida

Results





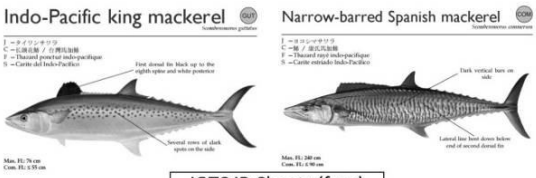
US studies
East coast (page 36)and Gulf of Mexico (page 23)

Summary: Generally not good commercially important & valuable (expensive) ➔ can not touch ?

Ocean	Indian		Pacific			Atlantic		
RFMO/Region	IOTC		WCPFC		Australia (East)	Carribian	Gulf of Mexico	US (East)
Stock status	King	Spanish	King	Spanish	Spanish	King	Spanish	Spanish
2015		SRA	not management species					
2014		SRA						
2013	unknown SRA	SRA						
2012		SRA			?			
2011							SS	SS
2003						ASPIC		

(1) Backgrounds
(2) Global reviews
(3) Procedures of Our works
(4) Work plan

Data preparation for seer fish stock + risk assessments
(Indo-Pacific king mackerel and narrow-barred Spanish mackerel)



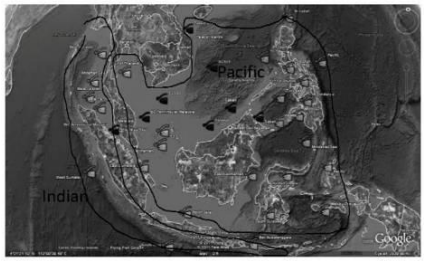
IOTC ID Sheets (free)

1st step : Stock structure

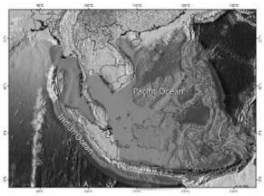
Any knowledge ?

We assume that different stock between
Indian and Pacific side (like LOT and KAW)

2 stock hypothesis



Geographically gene flow limited but unknown



Stock structure : Genetic analyses (good news)

IOTC (neritic : top priority): New EU project (US$ 1.2 million)
Tuna research Institute (Indonesia)
➔ one of implementing countries

IOTC Member countries
Indonesia, Thailand, Malaysia and Philippines

More meaningful to collect from whole Indian Ocean
and Pacific Ocean(← no project) (Jealous)

Pacific and Indian stocks covered by country

	(a) Pacific stock	(b) Indian stock
(1) Brunei		
(2) Cambodia		
(3) Indonesia (2 stocks)		(Malacca)
(4) Malaysia (2 stocks)		(Malacca)
(5) Myanmar		(Bay of Bengal and Andaman)
(6) Philippines		
(7) Thailand (2 stocks)		(Andaman)
(8) Viet Nam		

What type of data we need to collect for stock assessments?

… depends on stock assessment type, i.e.,

Data required by stock assessment models

	Structure	Model (example)	Data				
			Catch	CPUE	size	biology	space/tag
(1)	Catch (datapoor)	SRA					
(2)	Production model	ASPIC					
(3)	Age/size	VPA					
(4)	Integrated	SCAA/SCAS					
		SS3					

As the 1st step, we attempt simple models (1) or (2) as for LOT and KAW (ASPIC), later we do (3) with biological info.

Differences between SRA and PM (ASPIC) (theory and Estimation)

Method==>	PM (ASPIC)	SRA (data poor)
basic model	Population growth equation (e.g. logistic curve)	
catch	available	
CPUE	available	not available
Estimation : r and K	r and K will be estimated statistically	optimum r and K will be searched by simulations
Estimation process	simpler	Complex ==> Highly computing intensive approach
software	available	we absolutely need to be developed

How about FiSAT/indicators based assessment/managements
➔ if we can not conduct even data poor SA, we might think of integrated indicators based assessments….

Standard stock assessments

Covers the same stock area (global stock status)
⇩
Target/Limit RP (based on intrinsic Pop. dynamics using historical data)

FiSAT/indicator based assessments

Snap shot
Local stock status
Target/Limit RP
(Domestic)

For highly migratory species (seer fish)

We need the global stock assessments (same stock area)
➔ global MSY and Risk assessment

Domestic management (limited time + area)
FiSAT/indicator based assessments・management
(SA based Risk assessment on not possible)

We prefer to ASPIC.. Why ?

SRA (data poor method)
➔ Results are not ROBUST (based on simulation)
➔ very computer intensive + complicated (no software)

ASPIC
➔ Results are more Robust (real data)
➔ Simple (software available)

But if we don't have CPUE ➔ catch model

If we have CPUE,

ASPIC (as applied for LOT and KAW)
⇩
CPUE standardization (simple version for GLM is ready)
We need further functions for GLM (interaction terms etc.)
In addition, we expect a lot of 0 CPUE (seer fish)
We need other models (Negative binominal, delta log normal…)
⇩
Need to include additional functions + models (**further development**)
ASPIC (software are available)

To conduct SRA or ASPIC

We need 2 information

(1) Global catch both SRA and ASPIC
(2) Nominal CPUE ASPIC only
****
(3) (extra) Species compositions

1st step
historical data mining and compilation
by member country (NO collection🡐 no time)

but you are requested to continue to **collect** CPUE, biological data at sampling sites following **SOP**
⇩
In the future they will be used for age/size structured integrated stock assessments (SCAA)

How to compile and submit seer fish catch and CPUE data

Indo-Pacific King Mackerel
Narrow-barred Spanish Mackerel

Indonesia, Malaysia and Thailand: 2 data sets (Indian and Pacific)

Pacific and Indian stocks covered by country

	(a) Pacific stock FAO 71 area	(b) Indian stock FAO 57 area
(1) Brunei		
(2) Cambodia		
(3) Indonesia (2 stocks)		
(4) Malaysia (2 stocks)		
(5) Myanmar		
(6) Philippines		
(7) Thailand (2 stocks)		
(8) Viet Nam		

(1) **Global** catch

What is the global catch ?

In any Stock assessment models---
Need total <u>removals</u> (catch) (same stock area)
(all countries + all gears + all fishing areas)
to estimate F (fishing mortality)
➔ **<u>Not Good</u>** if we use **partial** catch, i.e.,

Template for data submissoin by excel (Example)

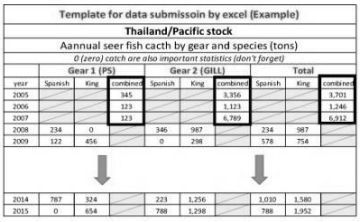
Thailand/Pacific stock

Annual seer fish cacth by gear and species (tons)

0 (zero) catch are also important statistics (don't forget)

	Gear 1 (PS)			Gear 2 (GILL)			Total		
year	Spanish	King	combined	Spanish	King	combined	Spanish	King	combined
2005			345			3,356			3,701
2006			123			1,123			1,246
2007			123			6,789			6,912
2008	234	0		346	987		234	987	
2009	122	456		0	298		578	754	
2014	787	324		223	1,256		1,010	1,580	
2015	0	654		788	1,298		788	1,952	

If you don't have dis-aggregate catch by species
report the aggregated catch (it is OK)



Template for data submissoin by excel (Example)

Thailand/Pacific stock

Aannual seer fish cacth by gear and species (tons)

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	Gear 1 (PS)			Gear 2 (GILL)			Total		
year	Spanish	King	combined	Spanish	King	combined	Spanish	King	combined
2005			345			3,356			3,701
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2009	122	456		0	298		578	754	
2014	787	324		223	1,256		1,030	1,580	
2015	0	654		788	1,298		788	1,952	

But if you can dis aggregate catch using species compositions, please do so.

Or send (detail) species compositions by year, season and area

(2) Nominal CPUE

What is the nominal CPUE?

Raw (original) CPUE data
(based on catch and effort)

We need nominal CPUE by country, gear, area, year, month, day and set (boat name) as <u>fine scale</u> as possible (<u>set by set is ideal</u>) <u>important for CPUE standardization</u>

If you don't have set by set data, you can send aggregated levels of CPUE that you have…

For example CPUE **by gear, area and month**

CPUE Example 1 (if species are separated)
<u>0 and other catch are very important ! Don' t forget !!</u>
You may have more than 2 types of efforts

Thailand Pacific stock Gear :GILL Area: 5 (Gulf of Thailand)

year	month	date	boat name	set	catch (kg)			effort		
					King	Spanish	others	hours	hauls	days
1999	1	1	A	1	34	0	234	12	4	2
1999	1	1	A	2	0	0	566	23	4	4
2015	12	27	C	1	0	0	999	44	5	5
2015	12	27	C	2	0	0	234	23	3	4
2015	12	28	C	1	23	11	333	12	4	5

CPUE Example 2 (aggregated case)
(if species are combined and if you have only monthly data ➔ OK)
0 and other catch are very important ! Don' t forget !!

Thailand Indian stock Gear :GILL Area: 6 (Andaman)						
year	month	catch (kg)		effort		
		king+Spanish combined	others	hours	hauls	days
1999	1	34	234	12	4	2
1999	1	0	566	23	4	4
2015	12	0	999	44	5	5
2015	12	0	2334	23	3	4
2015	12	23	333	12	4	5

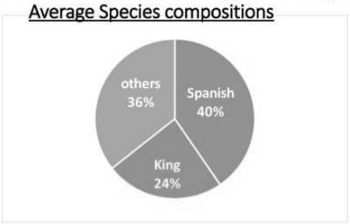
(3) (Extra data) Species compositions

If species of catch/CPUE are aggregated

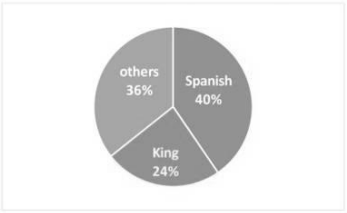
We need information on Species compositions
(King + Spanish + Others)
by year, season and area (as fine scale as possible)

If you don't have fine scale information,
even **coarse scale** information are also important

For example (fine scale)
Thailand, GILL, Area 3 (Andaman Sea) (December, 2016)
Average Species compositions



For example (highly aggregated still useful)
but should be by gear
Indonesia 2016 annual average species composition (PS)



(1) Backgrounds
(2) Global reviews
(3) Procedures of Our works
(4) Work plan

Work plan: Seer fish (Spanish and King mackerel)

Year	2017		2018								
Month	11	12	1	2	3	4	5	6	7	8	9
Historical seer fish data mining and compilation	member countries, SEAFDEC and Nishida										
Development of advanced GLM software (CPUE standardization)	Nishida and Environment Simulation Laboratory										
Development SRA soft				only if needed							
Risk assessment software (completed)											
Stock + Risk assessment training (seer fish)						(a)					
5th SWG –neritic tunas											

(a) 10 days (3rd-4th week)

Summary: software

	CPUE standardization	stock assessments	Kobe plot	Risk assessment
	GLM with more functions + other models (NB, DLN etc)			
SRA (Stock Reduction Analysis)	No need	(1) need to develop ($$$) if we use	(3) available	(1) available
ASPIC	(1) Need to develop ($$$)	(2) available		

Note
(1) SEAFDEC property (need permission from Secretariat to use)
(2) Free software : web link will be available soon
(3) Free software available http://ocean-info.ddo.jp/kobeaspm/kobeplot/KobePlot.zip

Summary: Steps of our works

(1) Before training
- Data mining and compilation (catch and CPUE)

(2) Training (April, 2018)(?)
- CPUE standardization (software)
- Stock and Risk assessments (Kobe plot I+II)

(3) 5th SWG (July, 2018)(?)
- Management advice

(4) After 5th SWG
- Consider management measures (higher levels)

Member countries ➔ SEAFDEC➔ ASEAN (?)

Before starting,
we need to **check your PC in advance**
for smooth trainings
late this afternoon and tomorrow

Minimum requirement for participant's PC

- Operation System: MS window 7or newer version that must include **Word, Excel and PowerPoint.**
- No MAC (apple) PC are allowed as our software cannot be used.
- RAM: minimum: 2GB
- Both 32bit/64bit are OK.
- If you don't have **"R"** in your PC, please pre-install "R" language from the internet, which needs for Kobe plot software
- If you don't have **".NET Framework4"** in your PC, please pre-install ".NET Framework4" from the internet, which needs for Kobe plot software.
- **If you have the Kobe plot software in your PC, please un-install in advance. We will provide the new versions at site.**

19 Data coordinator for seer fish (draft)

No	Country	stock		Coordinators	Post	Agency	e-mail
1	Brunei	1	1	Ms Noorizan Karim	Head	Department of Fisheries	noor6263@gmail.com
			2	Mr Matzaini Juna	Head		matzaini.juna@fisheries.gov.bn
			3	Muhammad Adam Ramlee	Fisheries Assistant		adam.ramlee@fisheries.gov.bn
			4				muhd.adam1804@gmail.com
2	Cambodia	1	5	Mr. Suy Serywath	Director	Fisheries Research and Development Institute, Fisheries Administration (FiA)	serywath@gmail.com
			6	Mr. Kao Monirith	Deputy Director		kaomonirith@yahoo.com
3	Indonesia	2	7	Dr Khairul Amri	Chief scientist	Research Institute for Marine Fisheries	Kh_amri@yahoo.com
			8	Mr Thomas Hidayat	Researcher		hidayatthomas245@gmail.com

19 Data coordinator for seer fish

No	Country	stock		Coordinators	Post	Agency	e-mail
4	Malaysia	2	9	Mr Samsudin Bin Basir	Chief scientist	Department of Fisheries	s_basir@yahoo.com
			10	Mr Sallehudin Jamon	Scientist		dinjamon@rocketmail.com
			11				sallehudin_jamon@dof.gov.my
5	Myanmar	1	12	Dr Htun Thein	Assistant Director	Marine Resources Survey &	htunthein.akyab@gmail.com
			13	Mr Nay Myo Aye	Assistant Fisheries Officer	Research Unit, Department of Fisheries	nvnghia@rimf.org.vn
6	Philippines	1	14	Mr Noel Barut	Director	Bureau of Fisheries and	noel_c_barut@yahoo.com
			15	Ms Grace Lopetz	Aquaculturist II	Aquatic Resources (BFAR)	gmvlopez@yahoo.com
7	Thailand	2	16	Ms. Suwantana Tossapornpitakkul	Fishery Biologist	Marine Fisheries Technology Research and Development Institute, Department of Fisheries	tsuwantana@yahoo.com
			17	Ms. Praulai Nootmorn	Senior Expert in Marine Fisheries		nootmorn@yahoo.com
8	Viet Nam	1	18	Mr Nguyen Viet Nghia	Deputy Director	Research Institute for Marine Fisheries	nvnghia@rimf.org.vn
			19	Mr Pham Hung	Officer	Research Institute for Marine Fisheries	hungfam83@gmail.com

Annex 16

Closing Remarks

By Chief of SEAFDEC/MFRDMD
Mr. Raja Bidin Raja Hassan

Assalamualaikum WBT and very good afternoon,
Mr Shamsudin Basir, Co-Chair for SWG on Neritic Tuna
Dr Tom Nishida, Our resource person from Japan,
Dr Kenji Taki, Deputy Chief of SEAFDEC/MFRDMD,
Members of Scientific Working Group on Neritic Tuna
Senior Officers from Secretariat, TD and MFRDMD
Observers,
Ladies and Gentlemen:

Today is the last day for our program, which focus on advance training course on risk assessment of longtail tuna and kawakawa in the Southeast Asian waters.

It is indeed a great pleasure for me to say few words before we end our meeting and training program, which organized by SEAFDEC/MFRDMD in collaboration with SEAFDEC/Sec. This training program was conducted back to back with SWG meeting, because as you was informed, Dr Tom Nishida was not available during August training program, so we try to fix one day training, especially on application of risk assessment program for benefit of member countries.

I am really hope that you are able to catch up all the procedures to to analyses the data and are able to determine TAC or TAE for management of your targeted resources.

In this opportunity, I would like to express our sincere thanks and gratitude to Dr Tom Nishida and all of you, who are able to join our meeting and training.

I hope you all have a safe journey home and hopefully we could meet again in future.
Lastly, I would like to take this opportunity to express our sincere thanks to the organizing committee and all peoples behind the screen.

Finally, in the name of Allah, the most Gracious and Merciful, I would like to declare our SWG Meeting and **Training on Longtail Tuna and Kawakawa in Southeast Asia"** officially close.

Thank you, Sayonara.