



Report of the Sixth Meeting of Scientific Working Group on Neritic Tunas Stock Assessment in the Southeast Asian Waters

**SEAFDEC / MFRDMD,
Kuala Terengganu, Malaysia**

2 December 2020





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

SEAFDEC/MFRDMD, Kuala Terengganu, Malaysia

2 December 2020

**Southeast Asian Fisheries Development Center
Marine Fishery Resources Development and Management Department**

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

SEAFDEC/MFRDMD, Kuala Terengganu, Malaysia

2 December 2020

Prepared by:

Annie Nunis Billy
Mohammad Faisal Md Saleh
Adam Luke Pugas
Wahidah Mohd Arshaad
Mazalina Ali
Hamizah Nadia Alias@Yusof
Muhammad Amirullah Al-Amin Ayob
Dr Masaya Katoh

**Southeast Asian Fisheries Development Center
Marine Fishery Resources Development and Management Department**

2021

PREPARATION AND DISTRIBUTION OF THIS DOCUMENT

Report of the Sixth Meeting of Scientific Working Group on Neritic Tunas Stock Assessment in the Southeast Asian Waters, SEAFDEC/MFRDMD, Kuala Terengganu, Malaysia, 2 December 2020 was prepared by Marine Fishery Resources Development and Management Department.

BIBLIOGRAPHIC CITATION

Annie-Nunis, B., Mohammad-Faisal, M.S., Adam-Luke, P., Wahidah, M.A., Mazalina, A. Hamizah-Nadia, A.Y., Muhammad-Amirullah-Al-Amin, A. and Katoh, M. 2021. Report of the Sixth Meeting of Scientific Working Group on Neritic Tunas Stock Assessment in the Southeast Asian Waters. Southeast Asia Fisheries Development Center. SEAFDEC/MFRDMD/RM/41. 34 pp.

Coverpage image photographed by: Raihana Abdul Rahman

NOTICE OF COPYRIGHT

The publication may not be reproduced, in whole or in part, by any method or process, without written permission from the copyright holder. Application for such permission with a statement of the purpose and extent of the reproduction desired should be made through and address to:

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu,
Malaysia.

CONTENTS

I.	INTRODUCTION	1
II	OPENING ADDRESS	1
III.	ADOPTION OF AGENDA	1
IV.	INTRODUCTION ON REVISED TOR FOR SWG NERITIC TUNAS	1
V.	RESULTS ON REVISED STOCK ASSESSMENT FOR TWO (2) NERITIC TUNAS IN THE SOUTHEAST ASIAN WATERS	2
VI.	RESULTS ON THE POPULATION STUDY OF <i>Thunnus tonggol</i> IN THE SOUTHEAST ASIAN REGION	4
VII.	GENERAL DISCUSSION AND WAY FORWARD	6
VIII.	CLOSING OF THE MEETING	7
	ANNEX 1	9
	ANNEX 2	15
	ANNEX 3	18
	ANNEX 4	19
	ANNEX 5	22
	ANNEX 6	26
	ANNEX 7	29
	ANNEX 8	30



**The Sixth Meeting of Scientific Working Group on Neritic
Tunas Stock Assessment in the Southeast Asian Waters
2 December 2020
SEAFDEC/MFRDMD, Kuala Terengganu, Malaysia**

I. INTRODUCTION

1. The Sixth Meeting of Scientific Working Group on Neritic Tunas Stock Assessment in the Southeast Asian Waters was convened by SEAFDEC/MFRDMD on 2 December 2020 via teleconference. The meeting was attended by participants from Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, and Viet Nam; resource person from Hokkaido University; Deputy Secretary-General of SEAFDEC; officials from SEAFDEC Secretariat, SEAFDEC Training Department; Chief, Deputy Chief, Special Departmental Coordinator and officials from SEAFDEC/MFRDMD. The list of participants appears as **Annex 1**.

II. OPENING OF THE MEETING

2. The meeting was officiated by Chief of SEAFDEC/MFRDMD, *Dr Ahmad Ali*. He welcomed all the participants to "The Sixth Meeting of Scientific Working Group on Neritic Tunas Stock Assessment in the Southeast Asian Waters." He began his speech by highlighting the importance of neritic tunas fisheries in the Southeast Asian Region, which leads to the establishment of The Regional Plan of Action on Sustainable Utilization of Neritic Tunas in the Southeast Asian waters (RPOA-Neritic Tunas). As a result, The Scientific Working Group on Neritic Tuna Assessment (SWG-Neritic Tunas) was established by SEAFDEC Council Directors to assess neritic tuna's stock status and trends at the regional level. He further explained the three (3) main objectives of this year's meeting and, last but not least, expressing his appreciation to all SEAFDEC/MFRDMD staff, representatives of SEAFDEC Secretariat, resource person, and *Dr Tom Nishida*. The opening address appears as **Annex 2**.

III. ADOPTION OF AGENDA

3. The agenda was presented to the meeting and adopted without any amendment as appeared in **Annex 3**. The Chairperson informed the meeting that's no co-chair from the member countries for this meeting, as stated in the ToR, due to online meeting limitations.

IV. INTRODUCTION ON REVISED TOR FOR SWG NERITIC TUNAS

4. The Policy and Program Coordinator of SEAFDEC Secretariat, *Dr Worawit Wanchana*, presented the "Revised Term of Reference (ToR) for Scientific Working Group on Neritic Tunas" as appeared in **Annex 4**. He briefly explains the endorsement of SWG-Neritic Tunas by the SEAFDEC Council during the Forty-seventh Meeting in 2015, which initially included data collection activities, genetic study, and stock assessment of neritic tunas, including mackerel (seerfish). Among the key outputs are the RPOA-Neritic Tunas, the Standard Operating Procedures (SOP) for Data Collection on Stock Assessment of Neritic Tunas and DNA Tissue Sampling and Preservation for Genetic Study of Neritic Tunas. He highlighted revisions in the ToR which was endorsed during the Fifty-second SEAFDEC Council Meeting in 2020. Significant changes in the ToR include i) the expansion of work

scope to include other important pelagic species, *i.e.*, anchovies, sardines, *etc.*, and ii) meeting composition, which will be presided by Chief of SEAFDEC/MFRDMD and co-host by member countries. The revised ToR also stipulated that SEAFDEC/MFRDMD will be responsible as the meeting secretariat. Additionally, SWG-Neritic Tunas is scheduled to convene at least once every other year, where the meeting will be partially funded under relevant programs or projects under SEAFDEC, while member countries will bear the cost of participation.

5. The representative of Thailand, *Ms Praulai Nootmorn*, suggested the meeting to amend the title of ToR to reflect the inclusion of small pelagic species and neritic tunas. *Dr Worawit* responded that any amendment of the title would require endorsement from the SEAFDEC Council.

6. The representative of Indonesia, *Dr Fayakun Satria*, suggested to include species-specific small pelagic in the ToR. In response, *Dr Worawit* explained that currently, there are two (2) on-going initiatives under SEAFDEC; i) small pelagic project under the Japanese Trust Fund and ii) neritic tunas.

7. The representative of Viet Nam, *Mr Nguyen Viet Nghia*, suggested that the ToR should not be limited to small pelagic species but also includes other species in the future. The Deputy Chief of SEAFDEC/MFRDMD, *Dr Masaya Katoh*, and *Dr Worawit* responded that currently, the SWG-Neritic Tunas focuses on important small pelagic species and two (2) species of neritic tunas, and any plan to include other species will be proposed to SEAFDEC Council endorsement.

V. RESULTS ON REVISED STOCK ASSESSMENT FOR TWO (2) NERITIC TUNAS IN THE SOUTHEAST ASIAN WATERS

8. The Assistant Project Manager for the Japanese Trust Fund (JTF) Program, *Mr Isao Koya*, commended the project presentation by the Project Coordinator, *Mr Mohammad Faisal Md Saleh*. He inquired about the distinction between his previous project and the current one, as well as the output for this project. He recommended developing total allowable catch (TAC) either through fishery or fishing gear since this project's final objective is to develop management strategies for the neritic tunas. *Mr Mohammad Faisal's* presentation appears as **Annex 5**.

9. *Mr Mohammad Faisal* responded that since the SEAFDEC-Sweden project was ended in 2019, the SWG-Neritic Tunas has no official funding. Thus, currently, the SWG-Neritic Tunas is attached to the JTF project starting from 2020 for funding purposes and, therefore, conducting activities corresponding to the second objective of JTFVI Phase II project "Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region." He informed the meeting that the neritic tuna stock assessment results were from two (2) regional workshops prepared by the resource person, *Dr Nishida*. The First Regional Workshop was conducted in 2016, utilizing data until 2014, and the second was from the Fourth Regional Workshop, which was conducted in February 2020 and utilizing data until 2018 as a comparison. He mentioned that the detailed results of the second workshop are elaborated on in his presentation. Furthermore, *Dr Katoh* informed that the SWG-Neritic Tunas activities

were previously undertaken under the SEAFDEC-Sweden Project during 2013-2019, so the information and findings previously were not funded by JTF.

10. The representative of Malaysia, *Mr Sallehudin Jamon*, agreed with the suggestion to reduce or increase the total catch of kawakawa (*Euthynnus affinis*), as it is imperative to sustain fishery resources and return to “healthy” status as previous. He proposed to devise a formula on how to allocate the total catch quota for each ASEAN Member States (AMSs). In the case of the Indian Ocean Tuna Commission (IOTC), he provided an example in which allocation of TAC quota is still under development and decided. He hoped that SEAFDEC/MFRDMD and all AMSs and the resource person, *Mr Supapong Pattarapongpan*, could suggest any idea or opinion regarding this matter.

11. *Mr Mohammad Faisal* commented that it is quite challenging to devise a formula at the regional level since the decision to increase or reduce catch numbers depends on each AMS's fisheries situation, respectively. He added that tuna and any tuna-like species are mainly caught as multispecies, which is a challenge and constraint to management efforts.

12. *Mr Supapong* agreed with *Mr Sallehudin's* suggestion as it is essential to establish divided catch quotas for each AMS. This is due to DNA results indicating that longtail tuna (*Thunnus tonggol*) is a single stock while kawakawa's status is still unknown. He recommended a study on migratory patterns, which includes information on spawning ground, as catch data of each country is different, depending on migratory patterns of individual species. He also urged the meeting to consider utilizing the standardize CPUE as abundance index. *Mr Supapong* assured the meeting that he would be continued to study this subject matter.

13. *Dr Worawit* suggested categorizing results from the previous project into three (3) independent locations, i) South China Sea (SCS), ii) Gulf of Thailand (GoT), and iii) the Indian Ocean. This is due to GoT located beyond IOTC and Western and Central Pacific Fisheries Commission (WCPFC) management mandate. He added that it is complicated to determine the catch quota since AMSs have no shared fishing grounds, unlike other fishery management under the International Fisheries Management Organisation (IFMO).

14. *Mr Nguyen* commented on TAC allocation for each AMS. In his opinion, it is difficult to determine the TAC of each AMS, and the meeting should consider the social aspect and capacity of each AMS in addition to scientific outputs. He also recommended the development of the Regional Plan of Action (RPOA) Tunas in the future.

15. *Ms Praulai* inquired on methods to improve stock assessment for neritic tunas in the region. For example, she revealed that the common name for *Scomberomorus guttatus*, which is king mackerel, as presented by Mr Mohammad Faisal, is reported as *Scomberomorus commerson* in Thailand. Species misidentification could lead to confusion and misinterpretation during the stock assessment. She highlighted another issue, previous DNA studies involving longtail tuna, which categorized samples into two (2) separate regions, i) the Andaman Sea and ii) GoT. However, the subsequent study, which utilizing the microsatellite marker, indicated that longtail tuna from those two (2) regions is a single stock. Dr Katoh responded that there is room for improvement. Previously, some of the data cannot be

incorporated into the model. Hence, he expected all AMSs to improve data collection to obtain more samples for comprehensive genetic information.

16. *Dr Fayakun* commented on the TAC quota for AMSs and information on fishery gears. Additionally, he also inquired if any biological or length data can be applied to generate other analyses such as spawning potential ratio (SPR) to complement the existing stock assessment. In response, the representative of Malaysia, *Ms Norazlin Mokhtar*, recommended reducing the number of fish aggregating devices (FADs) to influence the number and catch of kawakawa indirectly.

17. *Mr Mohammad Faisal* responded to *Dr Fayakun* by suggesting the Production Model (Schaefer and Fox) as an alternate TAC option. This is because solid catch and effort data are compulsory for the Production Model. He also requested a suggestion or opinion regarding the SPR. *Mr Supamong* clarified that presently, the model employed A Stock-Production Model Incorporating Covariates (ASPIC) for a non-equilibrium situation; therefore, it can provide a realistic result compared to the equilibrium model.

18. *Dr Fayakun* recommended to incorporate outcomes of the stock assessment and verify species-specific biological status by other methods. *Mr Supamong* revealed that the Regional Fisheries Management Organisations (RFMOs) applied several models to verify fish stock assessment, including tuna. As for Southeast Asia, he advised the meeting to obtain biological information through reliable resources, such as FishBase. Another option is to apply a more straightforward model, such as Yield-per-recruit (YPR) analysis or SPR.

19. *Dr Fayakun* highlighted that the SPR is based on length data and additional biological information. He added that while longtail tuna is considered a single stock based on the genetic study, there is no information regarding its migratory pattern. *Dr Katoh* also agreed that information on migratory patterns and spawning grounds is beneficial for stock assessment. He welcomed any information regarding this matter.

VI. RESULTS ON THE POPULATION STUDY OF *Thunnus tonggol* IN THE SOUTHEAST ASIAN REGION

20. The senior research officer of SEAFDEC/MFRDMD, *Ms Wahidah Mohd Arshaad*, presented the result of “Genotyping of Microsatellite Markers to Study Genetic Structure of the Longtail Tuna, *Thunnus tonggol* in the Southeast Asian Region.” This project was funded by the Department of Fisheries Malaysia. The main objectives were i) to identify the level of genetic diversity of *T. tonggol* in the Southeast Asian Region and the Andaman Sea, and ii) to identify the genetic structure of *T. tonggol* by using DNA microsatellite. She informed that a total of 373 individual samples from ten (10) sampling sites were analysed using the same samples from a previous study funded by Sweden from 2016 to 2018 based on DNA mitochondrial regions (Displacement loop and Cytochrome B). She concluded that while all samples from nine (9) sampling sites exhibited high genetic diversity, nevertheless samples Ranong, Thailand recorded the highest genetic diversity. Lastly, she added that *T. tonggol* in the Southeast Asian region is from a single stock. Her presentation appears as **Annex 6**.

21. *Dr Fayakun* informed the meeting that Indonesia might require further discussion on the sample selection procedure and result combination with mtDNA requirements despite Indonesia's former genetic collection. He also suggested discussing the issue with the focal person, *Dr Achmad Taufik*. Moreover, he also seeks clarification from *Dr Worawit* and *Ms Wahidah* regarding the study's conclusion, particularly on terminology definition for "Southeast Asian waters" and "boundaries," as this study only comprises SCS and not in the broader study area, *i.e.*, Pacific Ocean.

22. Currently, *Ms Wahidah* explained that there is no DNA analysis using microsatellite marker as samples are stored in Indonesia. As for JTFVI Phase II genetic study on kawakawa, she will contact *Dr Achmad* regarding analyses of samples collected by RIMF Indonesia from two (2) sampling sites during the SEAFDEC-Sweden Project. As for terminologies used in the project title, she explained that the details are available in the project document.

23. *Dr Worawit* expressed his appreciation to *Ms Wahidah* for her comprehensive genetic study. He suggested verifying the result of a DNA study on the stock structure in the Andaman Sea and SCS, whereby the stock structure is identified as a single stock in both populations. Otherwise, the study's conclusion should be revised into simpler terms such as, "at the moment, we do not have any scientific evidence to prove that the stock structure of this species in the Indian Ocean and SCS are different." He suggested this revision is appropriate unless there is another option available to support the results of the DNA study.

24. *Ms Wahidah* responded that findings and conclusions are based on samples collected, in which only a few samples were collected at one (1) time. Ideally, samples should include a variety of sample sizes at different times and fishing vessels. She agreed with the suggestion by *Dr Worawit*, as it is quite tricky to conclude this study. She reasoned that findings might be caused by genetic information similarities as the species originated from the same ancestor. Furthermore, mutation through environmental adaptation occurs very slowly, and high migration behavior might also contribute to this finding. She also agreed with *Mr Supapong* to continue studying migratory patterns, though it is quite challenging as it is heavily dependent on the recovery rate. Previously, the JTF II project showed a low recovery rate of less than 10%, which is insufficient to conclude a migratory pattern for the studied species. *Dr Katoh* added that the genetic study area could be expanded to the Indian Ocean and expected to produce more results using other genetic markers in the future.

25. On the suggestion of amending the ToR, *Dr Ahmad* mentioned that additional species are included in the newly revised ToR. Moreover, Scope of Work indicated that SWG-Neritic Tunas would include data collection, genetic study, and other relevant activities to support stock assessment on neritic tunas, mackerel species (seerfish), and the other important pelagic fishes for the management of neritic tunas and the other important pelagic fishes in Southeast Asian waters.

26. *Dr Fayakun* suggested incorporating issues related to COVID-19 into the revised ToR, which affected many activities and work scheduled in the year 2020, *i.e.*, delayed sampling activities, inability to conduct physical meetings, *etc.*

27. *Dr Katoh* informed the meeting that the draft report "Stock and Risk Assessments of Kawakawa (*Euthynnus affinis*) and Longtail Tuna (*Thunnus tonggol*) Resources in the Southeast Asian Waters using ASPIC" is completed by *Dr Nishida* and *Mr Supapong*. This

report will be disseminated to all SWG-Neritic Tunas members. He expected to receive additional comments or feedback within two (2) weeks. All comments and feedback will be compiled by SEAFDEC/MFRDMD and further discussed with *Dr Nishida* and *Mr Supapong* to prepare the final report.

28. *Dr Worawit* revealed that the SEAFDEC Secretariat plans to submit the final report to the SEAFDEC Council Meeting in early 2021. Once all the SWG-Neritic Tunas members revise the final report, SEAFDEC Secretariat will request the SEAFDEC Council Meeting to submit the endorsed report to the ASEAN Mechanism.

VII. GENERAL DISCUSSION AND WAY FORWARD

• GENERAL DISCUSSION

29. *Ms Praulai* thanked *Dr Worawit* for his presentation and stated that the ToR is useful for managing neritic tuna in the Southeast Asian region. Nevertheless, she inquired whether to amend the ToR to include small pelagic species such as Indian mackerel, Indo-Pacific mackerel, round scads, and anchovies into the study.

30. *Dr Worawit* proposed to amend the SWG-Neritic Tunas before revising its ToR. If the meeting agreed, it could be proposed to SEAFDEC Council Meeting for their consideration and, subsequently, ASEAN Mechanism. However, the meeting was informed that the SEAFDEC Council Meeting had endorsed the revised ToR in SWG-Neritic Tunas, including pelagic species.

31. *Dr Fayakun* stated that the revised ToR had expanded its work scope for anchovies, sardines, and Indo-Pacific mackerel, which is also considered shared stock. Therefore, he inquired whether there is any prioritization within ToR for the suggested species group. Additionally, he seeks clarification of whether SEAFDEC/MFRDMD has the resources to work on those species. He also requested the inclusion of anchovies identification up to species level as there is no such information in the ToR.

32. *Dr Worawit* clarified two (2) initiatives currently implemented under SEAFDEC/MFRDMD; i) pelagic fisheries resource program and ii) neritic tuna program. Pelagic fisheries resources will be incorporated in the pelagic fisheries project of SEAFDEC/MFRDMD. He requested SEAFDEC/MFRDMD to inform the meeting on the targeted small pelagic species selected during the First Core Expert Meeting on Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region, which was held on 24th November 2020.

33. *Mr Nguyen* agreed with the ToR proposed by *Dr Worawit*. He suggested establishing a general ToR under the SWG-Neritic Tunas in terms of stock assessment for the fishery resources in the region and amendment for the scope of work to include more species other than the neritic tuna and pelagic species. *Dr Katoh* clarified that the revised ToR also included important small pelagic fishes and neritic tuna, which seems appropriate. *Dr Worawit* agreed with *Mr Nguyen*. However, he also highlighted that the SEAFDEC Council recently endorses the revised ToR. Hence, he suggested focusing on the stock assessment of pelagic resources before considering general resource assessment programs for other species in the future.

34. *Dr Katoh* also commented that since the SEAFDEC Council recently endorsed the revised ToR at its Fifty-second Meeting, SWG-Neritic Tunas should continue its activities as

planned. The expansion of ToR, including the proposal from Thailand, will be considered in the future.

- **WAY FORWARD AND FUTURE PLANNING**

35. *Mr Mohammad Faisal* presented “Way Forward and Future Planning of the Project,” focusing on three (3) main components; i) regular or routine assessment of stock and catch available of the neritic tunas, ii) mechanism for reporting or submitting results of the assessment to the respective tuna RFMOs or country (s), and iii) strengthen collaboration with the tuna RFMOs. His presentation appears as Annex 7.

36. *Dr Katoh* highlighted future planning of the project, especially on the need to update stock and risk assessments of neritic tunas at least every two (2) or three (3) years, depending on their stock status. Thus, the following workshop will be organized in the next two (2) or three (3) years as the stock and risk assessment was conducted earlier this year.

37. *Dr Worawit* informed the meeting on the requirement to assess the Pacific Ocean and the Indian Ocean as two (2) separate areas during the report's submission to the Food and Agriculture Organization (FAO). However, it is not required to collaborate with the WCPFC since it is not mandated to manage neritic tunas stock in SCS. He will consult with IOTC on the possibility of countries in the Southeast Asian region reporting the endorsed results as AMSs. *Dr Katoh* mentioned that current IOTC members are Indonesia, Malaysia, and Thailand and requested them to present the results after endorsement by SEAFDEC Council Meeting.

38. *Ms Norazlin* proposed that Thailand present the preliminary report of the “Stock and Risk Assessments of Kawakawa (*Euthynnus affinis*) and Longtail Tuna (*Thunnus tonggol*) Resources in the Southeast Asian Waters using ASPIC” during the Working party on Neritic Tunas of IOTC. *Dr Katoh* clarified that data from Thailand is indeed utilized for the report. *Ms Prulai* accepted the proposal.

39. Lastly, *Dr Katoh* mentioned that SEAFDEC/MFRDMD would work hard to ensure reliable and long term landing data collection, including biological data such as migration pattern, spawning season, and stock structure. Thus, AMSs are advised to improve their national data collection, especially on the afore-mentioned data. SEAFDEC/MFRDMD will also continue to discuss the ToR for neritic tunas, and any revision may be considered if necessary. He once again notified the meeting that the preliminary report would be distributed to all SWG-Neritic Tunas members, and he expected to receive their feedback within two (2) weeks. SEAFDEC/MFRDMD will compile all the comments and feedback and discussed it with *Dr Nishida*, *Mr Supapong*, and SEAFDEC Secretariat before finalizing it.

VIII. CLOSING OF THE MEETING

40. *Dr Katoh* thanked all focal points for their active participation. JTFVI Phase II, which supported the “Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region,” strives to provide scientific advice for sustainable management of important

pelagic resources. He hoped that all parties would work closely and continuously to obtain the project goals. His closing remarks appear as **Annex 8**.

LIST OF PARTICIPANTS

Brunei Darussalam

Muhammad Jumkhairun Haji Jumat (Mr) Fisheries Officer	Department of Fisheries Brunei Darussalam Email: jumkhairun.jumat@fisheries.gov.bn
Matzaini Haji Juna (Mr)	Department of Fisheries Brunei Darussalam Email:matzaini.juna@fisheries.gov.bn

Cambodia

Suy Serywath (Mr) Director	Marine Fisheries Research and Development Institute Email: serywath@gmail.com
Kao Monirith (Mr) Deputy Director	Marine Fisheries Inspectorate Email: kaomonirith@yahoo.com

Indonesia

Fayakun Satria (Dr) Senior Researcher	Research Institute for Marine Fisheries Email: fsatria70@gmail.com
Tegoeh Noegroho (Mr) Researcher	Research Institute for Marine Fisheries. Email: teguhnug80@gmail.com, tegoeh_brtechnik@yahoo.com

Malaysia

Sallehuddin Jamon (Mr) Director of FRI Kg. Aceh	Fisheries Research Institute Kg Aceh Department of Fisheries Malaysia Email: sallehudin_jamon@dof.gov.my
Effarina Mohd Faizal Abdullah (Ms) Senior Research Officer	Fisheries Research Institute Kg Aceh Department of Fisheries Malaysia Email: effarina@dof.gov.my
Norazlin Mokhtar (Ms) Fisheries Officer	Licensing and Capture Fishery Division Department of Fisheries Malaysia Email: nor_azlin@dof.gov.my

Myanmar

Soe Win (Mr)
Fishery Officer

Department of Fisheries Myanmar
Email: soewinn67@gmail.com

Min Khaing (Mr)
Assistant Fishery Officer

Department of Fisheries Myanmar
Email: mykhinn25@gmail.com

Philippines

Grace Lopez (Ms)

National Fisheries Research and
Development Institute
Email: gmvlopez@yahoo.com

Sheryll Mesa (Ms)

RFO6
Bureau of Fisheries and Aquatic
Resources
Email: smyl2428@gmail.com

Thailand

Prulai Nootmorn (Ms)
Senior Expert in Marine Fisheries

Senior Expert in Marine Fisheries
Marine Fisheries Research and
Development Division
Email: nootmorn@yahoo.com

Weerapol Thitipongtrakul (Mr)
Fisheries Biologist

Marine Fisheries Research and
Development Division
Email: weerapol.t@gmail.com

Viet Nam

Nguyen Viet Nghia (Mr)
Deputy Director

Research Institute of Marine Fisheries
Email: nghia.rimf@gmail.com

Nguyen Van Minh (Mr)
Technical Officer

Department of Conservation and
Fisheries Resources Development
Email: minh.hn2@gmail.com

Resource Person

Supapong Pattarapongpan (Mr)
Fishery Oceanographer

SEAFDEC/TD
Email: supapong@seafdec.org

SEAFDEC SECRETARIAT

Koichi Honda (Mr) Deputy Secretary-General, and Japanese Trust Fund Program Manager	SEAFDEC Secretariat Email: dsg@seafdec.org
Worawit Wanchana (Dr) Policy and Program Coordinator	SEAFDEC Secretariat Email: worawit@seafdec.org
Isao Koya (Mr) Assistant Project Manager for the Japanese Trust Fund Programs	SEAFDEC Secretariat Email: atfm@seafdec.org
Pattaratjit Kaewnuratchadasorn (Ms) Senior Policy Officer	SEAFDEC Secretariat Email: pattaratjit@seafdec.org
Suwanee Sayan (Ms) Senior Program Officer	SEAFDEC Secretariat Email: suwanee@seafdec.org

SEAFDEC/TD

Sukchai Anupapboon (Mr) Fishing Ground and Oceanography Section Head.	SEAFDEC/Training Department Email: sukchai@seafdec.org
---	--

SEAFDEC/MFRDMD

Ahmad Ali (Dr) Chief SEAFDEC/MFRDMD	SEAFDEC/MFRDMD Taman Perikanan Chendering 21080 Kuala Terengganu Malaysia Email: aaseafdec@seafdec.org.my
Masaya Katoh (Dr) Deputy Chief SEAFDEC/MFRDMD	SEAFDEC/MFRDMD Taman Perikanan Chendering 21080 Kuala Terengganu Malaysia Email: katoh@seafdec.org.my
Abd Haris Hilmi Ahmad Arshad (Mr) Senior Research Officer	SEAFDEC/MFRDMD Taman Perikanan Chendering 21080 Kuala Terengganu Malaysia Email: haris_arshad@seafdec.org.my
Mazalina Ali (Ms) Special Departmental Coordinator SEAFDEC/MFRDMD	SEAFDEC/MFRDMD Taman Perikanan Chendering 21080 Kuala Terengganu Malaysia Email: mazalina@seafdec.org.my

Mohammad Faisal Md Saleh (Mr)
Senior Research Officer

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu Malaysia
Email: mohd_faisal@seafdec.org.my

Wahidah Mohd Arshaad (Ms)
Senior Research Officer

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu Malaysia
Email: wahidah@seafdec.org.my

Annie Nunis Billy (Ms)
Senior Research Officer

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu Malaysia
Email: annie@seafdec.org.my

Muhammad Amirullah Al-Amin Ayob (Mr)
Research Officer

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu Malaysia
Email: amin_ayob@seafdec.org.my

Hamizah Nadia Alias@Yusof (Ms)
Research Officer

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu Malaysia
Email: hamizah@seafdec.org.my

Rapporteur

Annie Nunis Billy (Ms)
Senior Research Officer

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu Malaysia
Email: annie@seafdec.org.my

Muhammad Amirullah Al-Amin Ayob (Mr)
Research Officer

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu Malaysia
Email: amin_ayob@seafdec.org.my

Hamizah Nadia Alias@Yusof (Ms)
Research Officer

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu Malaysia
Email: hamizah@seafdec.org.my

Adam Luke Pugas (Mr)
Assistant Research Officer

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu Malaysia
Email: adamlp@seafdec.org.my

Nurul Nadwa Abdul Fatah (Ms) Contract officer	SEAFDEC/MFRDMD Taman Perikanan Chendering 21080 Kuala Terengganu Malaysia Email: mseafdec@gmail.com
Mohamad Syahidan Azmi (Mr) Contract staff	SEAFDEC/MFRDMD Taman Perikanan Chendering 21080 Kuala Terengganu Malaysia Email: syahidanazmi0311@gmail.com
Noorhani Syahida Kasim (Ms) Contract staff	SEAFDEC/MFRDMD Taman Perikanan Chendering 21080 Kuala Terengganu Malaysia Email: hanisyahidakasim.nsk@gmail.com
Raihana Abdul Rahman (Ms) Contract Staff	SEAFDEC/MFRDMD Taman Perikanan Chendering 21080 Kuala Terengganu Malaysia Email: raihanaabdulrahman97@gmail.com

Meeting Secretariat

Annie Nunis Billy (Ms) Senior Research Officer	SEAFDEC/MFRDMD Taman Perikanan Chendering 21080 Kuala Terengganu Malaysia Email: annie@seafdec.org.my
Muhammad Amirullah Al-Amin Ayob (Mr) Research Officer	SEAFDEC/MFRDMD Taman Perikanan Chendering 21080 Kuala Terengganu Malaysia Email: amin_ayob@seafdec.org.my
Hamizah Nadia Alias@Yusof (Ms) Research Officer	SEAFDEC/MFRDMD Taman Perikanan Chendering 21080 Kuala Terengganu Malaysia Email: hamizah@seafdec.org.my
Abdul Aziz Yusof (Mr) Assistant Research Officer	SEAFDEC/MFRDMD Taman Perikanan Chendering 21080 Kuala Terengganu Malaysia Email: abdulaziz@seafdec.org.my
Norharm binti Abdul Rahim Assistant IT Officer	SEAFDEC/MFRDMD Taman Perikanan Chendering 21080 Kuala Terengganu Malaysia Email: norharm@seafdec.org.my

Adam Luke Pugas (Mr)
Assistant Research Officer

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu Malaysia
Email: adamlp@seafdec.org.my

Nurul Nadwa Abdul Fatah (Ms)
Contract officer

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu Malaysia
Email: mseafdec@gmail.com

Mohamad Syahidan Azmi (Mr)
Contract staff

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu Malaysia
Email: syahidanazmi0311@gmail.com

Noorhani Syahida Kasim (Ms)
Contract staff

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu Malaysia
Email:
hanisyahidakasim.nsk@gmail.com

Raihana Abdul Rahman (Ms)
Contract Staff

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu Malaysia
Email:
raihanaabdulrahman97@gmail.com

OPENING ADDRESS

Dr Ahmad Ali
Chief of SEAFDEC/MFRDMD

**The Sixth Meeting of Scientific Working Group on Neritic Tunas Stock Assessment in
the Southeast Asian Waters**

SEAFDEC/MFRDMD, Kuala Terengganu, Malaysia

2 December 2020

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

السَّلَامُ عَلَيْكُمْ وَرَحْمَةُ اللَّهِ وَبَرَكَاتُهُ

Very good morning

Representatives from Brunei Darussalam
Representatives from Cambodia
Representatives from Indonesia
Representatives from Malaysia
Representatives from Myanmar
Representatives from Philippines
Representatives from Thailand
Representatives from Viet Nam

Representatives from SEAFDEC Secretariat
Representatives from SEAFDEC/TD
Our Resource Person Mr Supapong Pattarapongpan (PhD Students from Hokkaido
University)
All officers from SEAFDEC/MFRDMD

First of all, I would like to welcome all of you to **The 6th Meeting of the Scientific Working Group- Neritic Tunas Stock Assessment in the Southeast Asian Waters organise by SEAFDEC/MFRDMD**

Ladies and gentleman,

Recognizing the importance of neritic tuna fisheries in the Southeast Asian waters, the regional or subregional cooperation to promote the sustainable utilization of neritic tuna is needed. The Regional Plan of Action on Sustainable Utilization of Neritic Tunas in the Southeast Asian waters (RPOA-Neritic Tunas) was finalized by all ASEAN Member States (AMSs) and was endorsed by the 47th Meeting of SEAFDEC Council on April 2015 and the 23rd Meeting of the

ASEAN Sectoral Working Group on Fisheries (ASWGF). The RPOA-Neritic Tuna was also supported by ASEAN Senior Officials MEETING (S-SOM) during the 36th ASEAN Ministerial Meeting on Agriculture and Forestry (AMAF) in late 2015.

One of the key actions in implementation of the RPOA-Neritic Tunas is to enhance the regional cooperation in which aims to develop Sub-regional Action Plans for neritic tuna fisheries and to support the assessment of the stock status and trends of neritic tuna at regional level. In this connection, the Scientific Working Group on Neritic Tuna Assessment was therefore established by SEAFDEC Council directors.

The Meeting of the Scientific Working Group on Neritic Tunas (SWG-Neritic Tunas) was conducted Yearly and the 1st meeting was held in collaboration with the Department of Fisheries (DOF) Malaysia in year 2014. The meeting reviewed the updating status and trends of neritic tuna fisheries in the southeast Asian region especially the stock status of the longtail tuna resources, and drafting of the Term of Reference (ToR) for a long-term establishment of the regional working group in which the Member Countries agreed to support its implementation after ending of the project.

Series of meetings were conducted between 2015-2019 and the 2nd Meeting was held in Viet Nam in year 2015, the 3rd Meeting in Thailand in 2016, the 4th Meeting in Malaysia in 2017 and the 5th Meeting was held in Thailand in 2019.

Three Objectives of the 6th Meeting of Scientific Working Group- Neritic Tunas Stock Assessment in the Southeast Asian Waters organise this year are:

1. To share updated information on the revised **Term of Reference** of the Scientific Working Group for Stock Assessment on Neritic Tunas in the Southeast Asian Region and latest list of members.
2. To share the results on a series of regional programs on "Assessment on Stock Status and Total Catch Available for Neritic Tunas in Southeast Asia".
3. To discuss on future work plan of activities, in three main areas namely;
 - a. Regular/routine assessment of stock and catch available of the neritic tunas.
 - b. Mechanism for reporting/submitted the results of the assessment to the respective tuna Regional Fisheries Management Organisations (RFMOs) or country (s) and
 - c. How to strengthening collaboration with the tuna RFMOs for the Scientific Working Group on Neritic Tunas.

Finally, I would like to record my appreciation and congratulation to all MFRDMD staff especially Deputy Chief Dr Masaya Katoh, Mr Mohammad Faisal and Ms Mazalina as well as Dr Worawit Wanchana and Ms Suwanee Sayan from SEAFDEC Secretariat, resource person Mr Supamong Pattarapongpan for making this meeting a reality. We also appreciate expertise services provided by Dr Tom Nishida in the past and hope to work again with him

in future. With that, I officially open the **The 6th Meeting of the Scientific Working Group - Neritic Tunas Stock Assessment in the Southeast Asian Waters.**

Thank you.

PROVISIONAL AGENDA and TIMETABLE (MALAYSIAN TIME) <i>Moderator: Special Departmental Coordinator of SEAFDEC/MFRDMD</i>	
Agenda 1: Opening of the Meeting and Photo Session	
1000 – 1005	Opening Address <i>By Chief of SEAFDEC/MFRDMD</i>
<i>Chairperson: Chief of SEAFDEC/MFRDMD</i>	
Agenda 2: Adoption of Agenda	
1005 - 1015	Introduction and Adoption of the Agenda <i>By Deputy Chief of SEAFDEC/MFRDMD</i>
Agenda 3: Overview of the Program Activity	
1015 - 1030	Introduction on Revised TOR for SWG Neritic Tunas <i>By Dr WorawitWanchana, SEAFDEC/Sec</i>
Agenda 4: Results on Revised Stock Assessment for Two Neritic Tunas in the Southeast Asian Waters	
1030 – 1050	Results on Revised Stock Assessment for Two Neritic Tunas in the Southeast Asian Waters <i>By Mr Mohammad Faisal Md Saleh from SEAFDEC/MFRDMD</i>
Agenda 5: Results on the Population Study of <i>Thunnus tonggol</i> in the Southeast Asian Region	
1050 - 1105	Genotyping of Microsatellite Markers to Study Genetic Structure of the Longtail Tuna, <i>f Thunnus tonggol</i> in the Southeast Asian Region <i>By Ms Wahidah from SEAFDEC/MFRDMD</i>
1105 - 1120	Tea break
Agenda 6: General Discussion and Way Forward <i>Moderator: Deputy Chief of SEAFDEC/MFRDMD</i>	
1120 - 1150	Future Planning for Meeting and Workshop, Funding and Activities
Agenda 7: Closing of the Meeting	
1150 - 1200	Closing Remarks by Deputy Chief of SEAFDEC/MFRDMD

INTRODUCTION ON REVISED TOR FOR SWG-NERITIC TUNAS

The 6th Meeting of the SWG-Neritic Tunas Stock Assessment in the Southeast Asian Water
2 December 2020
Worawit Wanchana, SEAFDEC Secretariat

Terms of Reference: SWG-Neritic Tunas

- The 1st TOR of SWG-Neritic Tunas, 2015 at 47th Meeting of SEAFDEC Council
- Scope of the TOR/SWG-Neritic Tunas:
 - data collection
 - genetic study and
 - relevant activities to support stock assessment of neritic tunas and mackerel species (seerfish) for mgt of neritic tunas in SEA

Key Outputs: Stock Assessment: Longtail and Kawakawa

Stock status (2013 and 2014), MSY and current catch level (2000 to 2013, 2014)

Stock status (2018), MSY, current catch level (average of 2016-2018)

Key Outputs (Continued)

- RPOA Neritic Tunas (2015)
- SOPs: data collection and DNA Tissue Sampling

RPOA NT SOP Data Collection SOP DNA Tissue Sampling Area coverage

Background

- ToR of the Scientific Working Group for Stock Assessment on Neritic Tunas in the Southeast Asian Region (TOR SWG-Neritic Tunas) was endorsed by the 52nd Meeting of SEAFDEC Council in 2020
- TOR (2015) indicated to the SEAFDEC-Sweden Project (completed in 2019)
- The 50th Meeting of Council in 2018: to expand the work of the SWG Neritic Tunas to cover small pelagic species, e.g. anchovies, sardines and scads

Revisions of the TOR: Introduction

To facilitate the work of Scientific Working Group, SEAFDEC formulated the Term of Reference (ToR) and finalized by all members of the SWG at the 1st Meeting of the Scientific Working Group on Neritic Tunas Stock Assessment in the Southeast Asian Waters, 18-20 November 2014 in Malaysia, and later adopted at the 47th Meeting of the Council in April 2015 (<http://www.seafdec.or.th/neritic-tunas/tor.php>). The objective of the ToR is to ensure that the regional cooperation from the ASEAN Member States (AMS) on the stock assessment of the neritic tunas can be effectively implemented by the SWG as well as SEAFDEC to continue support under the TOR framework after the end of the funded project. During the 50th Meeting of SEAFDEC Council in 2018, the Council suggested that the TOR of Scientific Working Group should expand to other shared stocks, such as anchovy, sardines, Indo-Pacific mackerels and also suggested SEAFDEC could continue the activities on the stock and risk assessments of neritic tunas that will be provided the results which undertaken in coordination with the relevant RFMOs. This TOR was revised based on the 2015 adopted TOR on SWG Neritic Tuna accommodating the suggestions from the 50th Meeting of SEAFDEC Council.

II. Role of SWG-Neritic tunas

Scope of Work & TOR of the SWG-Neritic Tunas

III. Scope of Work

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

IV. Terms of Reference of the SWG-Neritic tunas

- To review and assess the current resource status of the neritic tuna and the other important pelagic fishes in the region;
- To provide scientific based recommendations on priority fisheries management issues which may include policy consideration, and coordinated fisheries management actions for sustainable utilization of neritic tunas and the other important pelagic fishes;
- To share the national catch and effort data/information including the biological data (if available) for regional stock assessment of the neritic tunas and the other important pelagic fishes;
- To identify the needs for human capacity requirements in Member Countries; and

Composition of the SWG-Neritic Tunas

V. Composition of the SWG-Neritic tunas

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

- SWG-Neritic tunas:**
The SWG comprises at least two standing members representing the SEAFDEC Member Country by nomination with Four-year fixed tenure of members and possibility for reappointment.
- Chief Scientist(s):**
An interim Chief Scientist for stock assessment of neritic tunas shall be a stock assessment expert from MFRDMD. A work period of the Chief Scientist is depended upon the tenure of the study period as decided by the SWG.
- Chairperson:**
SWG-Neritic tunas shall be chaired by Chief MFRDMD and co-chaired by a representative of its Member Countries on an annual/biennial rotational basis following alphabetical in order.

Secretariat of SWG-Neritic Tunas

e. Secretariat:

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

f. Rapporteur:

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

Activities and Financial Arrangements

VI. Nature of SWG Activities and Financial Arrangements

1. SWG is scheduled to meet at least once a every other year. The timing of the meeting(s) should be set in accordance with SEAFDEC annual working cycle before the SEAFDEC Program Committee Meeting.
2. Inter-sessional activities may be conducted as the need arises and subject to availability of funds.
3. The SWG meetings will be partially funded by relevant programs/projects of SEAFDEC Sweden-Project, managing by the secretariat of the working group. Under this condition, annually a certain amount of the money would be used for the meeting cost and participation of members from SEAFDEC MFRDMD and Secretariat to the SWG meetings; while the Member Countries would bear the cost for their participation to the SWG meetings starting from 2020.
4. The cost for attendance of the resource persons during SWG meeting (s) or during the inter-sessional activities should be from SEAFDEC-Sweden project and extra-budgetary sources under the responsible of the Secretariat the relevant program/activity, while the cost for the experts/representatives from international/regional organizations will be shouldered by their respective organizations.

Activities and Financial Arrangements (cont)

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


Summary

- Activities of the SWG-Neritic Tunas from now will be covered mainly by the JTF6 Phase 2
- Lead Department: MFRDMD in collaboration with TD and SEC
- Ongoing regional initiatives: stock Assessment of: 2 species neritic tunas, 2 species of pelagic (TBC)
- MFRDMD updated list of SWG-Neritic Tunas Members as of 25 Nov. 2020



Thank you!



 The 6th Meeting of the SWG-Neritic Tunas in the SEA
2nd December 2020
SEAFDEC/MFRDMD Kuala Terengganu, Terengganu

Results of Assessment on Stock Status of Neritic Tunas in the Southeast Asian Region

By:
Mr Mohammad Faisal Md Saleh
Ms Wahidah Mohd Arshaad
Ms Mazalina Ali
Ms Nurul Nadwa Abdul Fatah

SEAFDEC/MFRDMD
Kuala Terengganu

Implementation of SWG-Neritic Tunas Meetings

The series of the Scientific Working Group for Neritic Tunas in the Southeast Asian waters (SWG-Neritic Tunas) Meetings:

- 1st SWG- 18-20 Nov 2014, Shah Alam, Malaysia: a) TOR and Mechanism of SWG endorsed by ASEAN, b) Work plan for Stock Assessment of Neritic Tunas.
- 2nd SWG- 15-17 June 2015, Hai Phong, Viet Nam: a) SOP for Data Collection, b) SOP for Genetic Study and Sampling in the Region.
- 3rd SWG- 27-29 June 2016, Chonburi, Thailand: a) Stock & Risk Assessment for LOT & KAW (2014), b) Genetic Samplings and Study for LOT and KAW.
- 4th SWG- 7-9 Nov 2017, Kuala Lumpur, Malaysia: a) Review the Stock and Population of Seer fish, b) Preliminary results of Genetic Study for LOT.
- 5th SWG- 9-11 Jan 2019, Bangkok, Thailand: a) Stock & Risk Assessment for Spanish and King mackerel, b) Results of Genetic Study for LOT.
- 6th SWG – 2nd Dec 2020, via online by SEAFDEC/MFRDMD, Kuala Terengganu: a) Introduce the revised TOR for SWG-Neritic Tunas, b) Results from a series of Workshops, c) Discussion and Recommendation on the future plan of SWG activities.

Implementation of Regional Workshops

- The practical workshop is one of the major activities in the SEAFDEC neritic tuna project.
- ASPIC - stock and risk assessments as recommended by the neritic tuna Scientific Working Group (SWG) since 2015.
- During the workshop - preliminary results.
- After the workshop - final results, presented today.
- Results should be looked at with caution, due to uncertainties in data, stock structure, CPUE standardization, factors not incorporated in ASPIC (age structures and biological factors) and environmental factors.

Home page at: <http://www.seafdec.or.th/neritic-tunas/>

Implementation of Regional Workshops

The series of Regional Workshop of Stock and Risk Assessment on Neritic Tunas was organized:

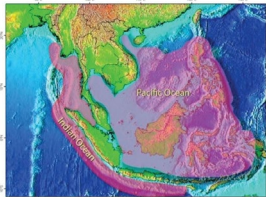
- 1st Regional Workshop (17-25 April 2016), SEAFDEC MFRDMD, Kuala Terengganu, Malaysia: Workshop on Stock Assessments on Kawakawa and Longtail Tuna Resources in SEA.
- 2nd Regional Workshop (7-9 November 2017), Kuala Lumpur, Malaysia: Advance Training Course on Risk Assessments of Kawakawa and Longtail Tuna in the SEA Waters.
- 3rd Regional Workshop (16-20 July 2018), SEAFDEC Training Department, Samut Prakan, Thailand: The Practical Workshop on Stock Assessments of Indo-Pacific King Mackerel and Narrow-barred Spanish Mackerel in the Southeast Asian Waters.
- 4th Regional Workshop – 10 to 15 Feb 2020, SEAFDEC Training Department, Samut Prakan, Thailand: The Practical Workshop on Tuna Stock and Risk Assessment for Longtail Tuna (*Thunnus tonggol*) and Kawakawa (*Euthynnus affinis*) in Southeast Asian Waters. Reassessment of the latest annual catch and effort data for this 2 species than compare with result from the 1st regional workshop in 2016.

Data used for Regional Workshops

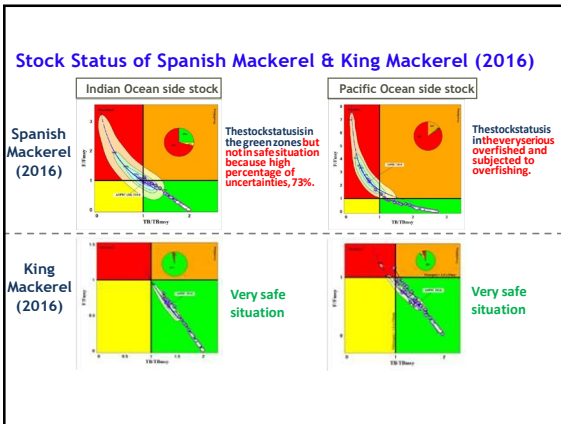
- Historical nominal catches - obtained from data coordinators from each AMs
- Published catch data - obtained from IOTC and FAO.
- The data used to built catch by species at two areas (Pacific Ocean side and Indian Ocean side).
- Preferred - catch data from IOTC (Indian Ocean side) and FAO (Pacific Ocean side) as they are based on the official data submitted by each government.
- Alternatives - data obtained from the data coordinators were used if FAO and IOTC catch data are missing.

A) Stock & Risk Assessment for Spanish and King Mackerel - 3rd Regional Workshop -16 to 20 July 2018 , SEAFDEC TD

The stock and risk assessment for Narrow-barred Spanish mackerel (*Scomberomorus commerson*) and Indo-Pacific king mackerel (*S. guttatus*) resources were conducted in 2018 based on the assumption that there are two stocks of each species in the Southeast Asian waters.

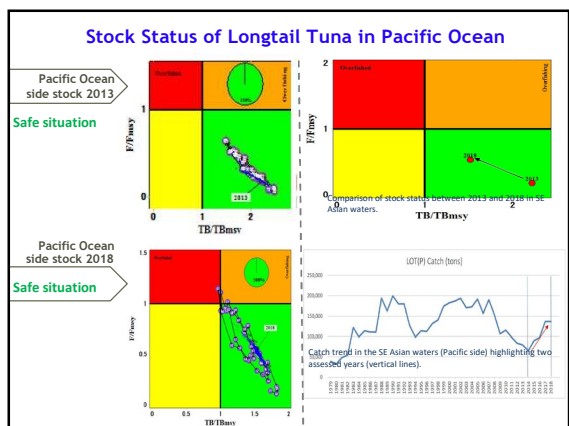
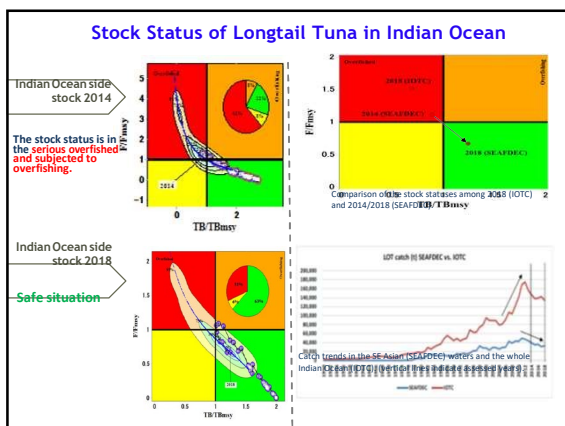
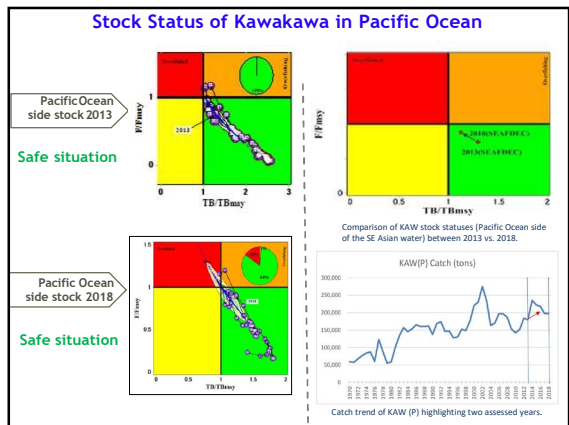
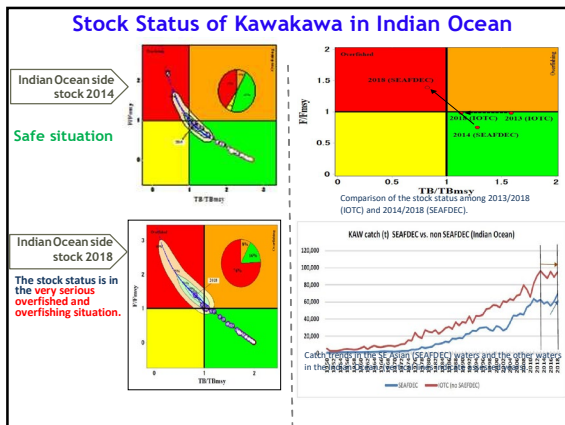


Picture from: SEASOFIA 2017



B) Stock & Risk Assessment for Kawakawa and Longtail Tuna

- 1st Regional Workshop – 17 to 25 Apr 2016, SEAFDEC/MFRDMD. The stock and risk assessment for kawakawa (*Euthynnus affinis*) and Longtail tuna (*Thunnus tonggol*) resources were first conducted in 2016 based on the assumption that there are two stocks of each species in the Southeast Asian waters.
 - Note: 4 stock assessments (2 species for 2 stocks)
- 2nd 4th Regional Workshop - 10 to 15 Feb 2020, SEAFDEC/ID. The stock and risk assessment for Kawakawa (*Euthynnus affinis*) and Longtail tuna (*Thunnus tonggol*) resources were reassessed using the latest annual catch data.
 - This effort is to get the latest current status of these 2 neritic tuna species in the region.



Summary of results of stock and risk assessments (2018) - The 4th Workshop

	KAW(P)	KAW(I)	LOT (P)	LOT(I)
Stock status (2018) (color in the Kobe plot)	TB/TBmsy=1.12 F/Fmsy=0.86	TB/TBmsy=0.82 F/Fmsy=1.28	TB/TBmsy=1.52 F/Fmsy=0.53	TB/TBmsy=1.24 F/Fmsy=0.67
MSY (1,000 tons)	201	56	167	40
Current catch level (1,000 tons) (average in 2016-2018)	205	62	124	33
Optimum catch levels (*) (tons) (need update every few years)	164	37	167	40
Reduction (-) or increase (+) from the current to the optimum catch levels	-20%	-40%	+35%	+20%

(*) based on the results of the risk assessment i.e., the risk probability of TB and F violating their MSY levels < 50%.

- The optimum catch levels are based on the risk assessment and also different by species.
- Kawakawa (Pacific Ocean side) showed the stock status is in the green zone, but the current catch (2016-2018) is still higher than the MSY level. The catch need to be reduced even though the stock status is safe.
- Kawakawa (Indian Ocean side): The current catch (62,000 tons) needs to be reduced at least 40% (37,000) to avoid 50% risks of TB and F violating their MSY levels
- Longtail (Pacific Ocean side): The current catch (124,000 tons) can be increased to the MSY level (167,000 tons), in which case the probability of TB and F violating their MSY levels is less than 50%.
- Longtail (Indian Ocean side): Stock status is in the green zone of Kobe Plot and the current catch (33,000 tons) can be increased by 20% (40,000 tons), in which case the probability of TB and F violating their MSY levels is less than 50%.

CHALLENGE & ISSUES ON STOCK ASSESSMENT OF NERITIC TUNAS

IOTC and FAO data are major sources as they have the long time series data. These data are officially provided by SEAFDEC member countries. However, quality of the data from developing countries is not good in general according to the IOTC data evaluation results (for example, IOTC, 2020).

Reasons of low quality data are:

- Catch statistics collection system does not cover well spatially and temporally (i.e., one sampled data per month are raised to estimate the total monthly landings).
- In many cases, visual estimation are used.
- Majority of nominal CPUE are not plausible because of poor quality of catch and effort data.
 - caused the value of r^2 to be low.
- Thus, it is should be well noted that such uncertainties affect the results of stock and risk assessments.

Difficulties of practical management advices due to multispecies situation.

- i.e.: Spanish and King mackerel are exploited together with other pelagic species by same gears.
- However, TAC advices of these two species are completely contrast, i.e. catch of Spanish mackerel needs to be decreased, while King mackerel increased.
- Therefore each AMS needs to consider multi-species nature and multi-gears of fisheries in developing optimum management strategies as well as multispecies managements in the future.

NERITIC TUNAS STUDY
under
JTF VI PHASE II
Fisheries Management Strategies
for Pelagic Fish Resources in the
Southeast Asian Region

SEAFDEC/MFRDMD

Background

- The transboundary fish i.e. tunas, anchovies and mackerels are the economically important pelagic species that highly consumed within SEA countries, and dominated the fishery exports of the SEA countries to other regions of the world.
- In 2014, the neritic tuna contributed approximately 40% of the region's total marine tuna production, with the value of around USD 1 million (SEASOFIA 2017).
- The upcoming JTF VI Phase II aims to evaluate the pelagic fish resources in the Southeast Asian region in order to establish the sustainable management strategy for the pelagic fisheries.
- This new project targets **two neritic tuna species** and two small pelagic species dominated the catch in each AMSs in the SEA region.
- The **SWG of the neritic tuna** activities complied with/fall within the second objective of this JTF 6-Phase II project which is: **"To evaluate the current status of two neritic tuna species through stock assessment and risk assessment studies"**

Proposed activities for Neritic Tuna

- Stock Assessments and Risk Assessments for two species of neritic tunas (Kawakawa and Longtail tuna) in the Southeast Asian region.
- Clarification of the stock structure for neritic tuna species (Kawakawa) in the Southeast Asian region.
- Life-history study for neritic tuna (Kawakawa) species in the SEA region.
- Workshops for targeted neritic tuna species in the Southeast Asian region.

RECOMMENDATION

- AMSs especially those exploiting KAW largely, will consider reducing the current catch to the suggested levels to conserve resources and to secure sustainable yield for the long-term future.
- As kawakawa and longtail tuna are among most important fisheries resources in the SEAFDEC member countries, stock and risk assessments need to update at least every three years (two years for the stocks in the unhealthy status).

REQUIRED CONSIDERATION BY THE 6th SWG-NERITIC TUNAS

- ▣ To take note & approve the results on the stock status in 2018 of kawakawa and longtail tuna in the SEA region (The 4th Workshop, Feb 2020)
- ▣ Later to be approved by SEAFDEC Council and then circulated to the FCG/ASSP focal persons for endorsement prior to submission to the 29th Meeting of ASWGF in 2021.

**THANK YOU
FOR YOUR KIND
ATTENTION**

The Six Meeting of the SWG on Neritic Tunas Stock Assessment in the Southeast Asian Waters, 2 November 2020



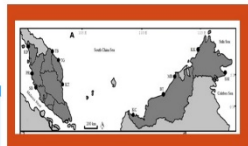
By Wahidah Mohd Arshaad
SEAFDEC/MFRDMD



Recent population expansion of longtail tuna *Thunnus tonggol* (Bleeker, 1851) inferred from the mitochondrial DNA markers

Noorhaini Syahida Khatim¹, Tun Nural Aini Mui Jusuf¹, Ramadani Mar Fidiy¹, Wahidah Mohd Arshaad¹, Siti Azzah Mohd Nur¹, Ahanas Habib^{1,2}, Muzlis Abd. Ghaffar¹, Yong Yik Seng¹, Mohd Danish-Din^{1,3} and Min Pui Tan^{1,4}

ABSTRACT
The population genetic diversity and demographic history of the longtail tuna *Thunnus tonggol* in Malaysian waters was investigated using mitochondrial DNA D-loop and ND4H (deletion/insertion 5' DSD). A total of 201 (20 haplotypes and 208 (ND5) individuals of *T. tonggol*) were sampled from 11 localities around the Malaysian coastal waters. **Key genetic differentiation** between populations was found, possibly due to the past demographic history, dispersal potential during egg and larval stages, seasonal migration in adults, and lack of geographical barriers. The gene trees, constructed based on the maximum likelihood method, revealed a **major genetic population with conserved maternal lineages, indicating an absence of structure among the population studied.** Analysis on population pairwise comparison Φ_{ST} suggested the absence of limited gene flow among study sites. Taken all together, high haplotype diversity ($H_d = 0.981$, $ND5 = 0.648$ - 0.963), coupled with a low level of nucleotide diversity ($D_{loop} = 0.019$ - 0.025 , $ND5 = 0.007$ - 0.008), "star-like" haplotype network, and unimodal mismatch distribution, suggests a recent population expansion for populations of *T. tonggol* in Malaysia. Furthermore, molecular age and goodness of fit tests supported the signature of a relatively recent population expansion during the Pleistocene epoch. To provide additional insight into the phylogeographic pattern of the species within the Indo-Pacific Ocean, we included haplotypes from GenBank and a few samples from Taiwan. Preliminary analyses suggest a more complex genetic demarcation of the species than an explicit Indian Ocean versus Pacific Ocean delineation.



PeerJ 8:e9679
DOI 10.7717/peerj.9679

Submitted 13 August 2019
Accepted 17 July 2020
Published 6 August 2020
Corresponding author: Min Pui Tan, tan@seafdec.org
Academic editor: International Science Journals
Additional Information and Declarations can be found on page 17
DOI 10.7717/peerj.9679
© Copyright 2020 Noorhaini Khatim et al.
Distributed under Creative Commons CC-BY 4.0

Keywords: Aquaculture, Fisheries and Fish Science, Zoology, Population Biology, Genetics, Genetic diversity, Mitochondrial DNA, Control region (D-loop), *Thunnus tonggol*, ND4H deletion/insertion 5' (ND5), Population expansion, Longtail tuna

INTRODUCTION

- This DNA microsatellite analysis were funded by Development Fund, Department of Fisheries Malaysia using the same samples collected during SEAFDEC/Sweden project (2016-2018).
- Analysis using DNA mitochondrial (Displacement loop and Cytochrome B) regions suggests the longtail tuna in the Southeast Asian Region are single stock (SEAFDEC/SWEDEN, 2016-2018).

- Different molecular marker, like mtDNA (COI, Cytb, D-loop, ATPase) or nuclear DNA (microsatellite, SNP or RAPD, RFLP) were used in fisheries and aquaculture for efficient and sustainable resource management.
- These molecular markers has different mode of inheritance and were displaying the different amount of molecular information.
- Microsatellite markers are routinely used to investigate the genetic structuring of natural populations.

What is DNA Microsatellite?

- Microsatellite = Simple Sequence Repeats (SSRs) = Short Tandem Repeats (STR).
- Repeats motifs – 1 to 10 nucleotides
- Types of repeats units
 - Single nucleotide. (TTTTTTTTTTTTTTTT) = (T)₁₈
 - Dinucleotide (TA)(TA)(TA)(TA) = (TA)₄
 - Trinucleotide (GAA)(GAA)(GAA)(GAA) = (GAA)₄
 - Tetranucleotide (AATC)(AATC)(AATC)(AATC) = (AATC)₄
 - Pentanucleotide (TGAAA)(TGAAA)(TGAAA)(TGAAA) = (TGAAA)₄
 - Hexanucleotide (TACAGA)(TACAGA)(TACAGA) = (TACAGA)₃
- Repeated, typically 5-50 times

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 DNA microsatellite markers.
- To share the result for management of these neritic tuna fisheries in the region.

SAMPLES

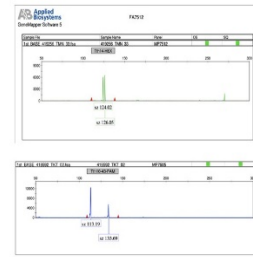


Figure 1: The sampling collections of *T. longtail* in the Southeast Asian Region

Country	No.	Sample Locality	Sample Locality Code	No. of Specimen
Andaman Sea Sub-region				
Malaysia	1	Kuala Perlis	TEP	42
Myanmar	2	Yangon	TMN	47
Thailand	3	Ranong	TRG	44
South China Sea Sub-region				
Brunei	4	Muara Port	TBR	10
Malaysia	5	Kamies	TKT	36
	6	Erisa Enabahu	TEK	25
Viet Nam	7	Viang Tau	TVT	49
Gulf of Thailand Sub-region				
Cambodia	8	Sihanokville	TSV	49
Thailand	9	Trae	TTR	46
Sub-Sea Sub-region				
Malaysia	10	Seopensa	TSP	18
		Total		373

METHODOLOGY

No.	Locus	Repeat motif	Primer sequence 5'-3'	Size
1	TN 4	(GT) _n	F: GAAACCGCGCGGCGGGCGGCGG R: AAGTGTAGGGGGATGCGGCGCTGT	183-202
2	TN 14	(AC) _n	F: AAGATPAGGGGACAAAGAGG R: TTTTTCAGCCGAGGAGCTC	116-132
3	TN 17	(CAG) _n	F: TGTGTGAGCGAGGAGGCTTCTG R: TCTGAGGCGACTCATCT	81-97
4	TN 112	(CTCA) _n (CTCTTC) _n	F: TAGCGACAGCCGCTAGAGA R: GAAAGTCTATCAATCAAG	112-134
5	TN 114	(CTT) _n (CT) _n	F: TCCGAGAGATATCCGATTCTGA R: AAGCCCTAGCGAAGCCTAAC	153-215
6	TN 178	(CTCA) _n (CTCA) _n (CT) _n	F: AGACACTCCAGGAGGTC R: AAGAGACTCCAGCATGCA	123-174
7	TN 217	(GT) _n	F: ACTTCCAGCCCGGAGAGAG R: CTCTGACACTATTCCTAAC	239-274
8	TN 238	(CA) _n	F: ATTCGCTACACCACAC R: ACACCTGCTACACTACTTA	184-190
9	TN 23-43	(CTCA) _n	F: ATTTTCTGCTGCTACTACTCT R: CACACCGCGGATTTGAG	194-192



RESULT AND DISCUSSION

- A total of 164 alleles were detected ranged from 7 to 45 per locus.
- Observed heterozygosity (H_o) varied from 0.619 to 0.693.
- Expected heterozygosity (H_e) from 0.735 to 0.792.
- All populations have high genetic diversity, especially the population in Ranong, has higher genetic diversity than the others.
- The test for genetic bottleneck did not detect any significant bottleneck effects
- Pairwise comparison revealed that $F_{ST} = 0.021$ ($0.05 < F_{ST} < 0.15$) showed a little genetic differentiation among the overall populations

Analysis Of Molecular Variance (AMOVA)

Source of variation	d.f.	Sum of squares	Variance components	Percentage of variation
Among populations	9	42.87	0.0173 Va	0.49
Within populations	736	2568.34	3.4898 Vb	99.51
Total	745	2611.21	3.5069	100

The AMOVA revealed 99.51 % of genetic variation within individuals and only a small variation of 0.49 % was found between populations. The result showed similarity with the analysis done by mtDNA (D-loop & Cyt b).

The examination of population structure of longtail tuna through STRUCTURE program also suggested a lack of definite structure where the proportion of the sample assigned to each population is roughly symmetric (~1/K in each population), and most individuals were fairly admixed.

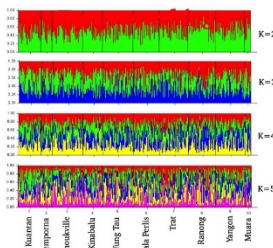



Figure 2: Assignment test for K = 2 to K = 5 subdivisions of Longtail tuna in Southeast Asian Region population structure analysis.

CONCLUSION

- In this analysis of population structure failed to distinguish any subpopulations and this was supported by a high genetic exchange among the sample localities.
- The analysis found that the analysis using DNA microsatellite support the finding analysis by DNA mitochondrial markers (D-loop and Cyt b) which found that longtail tuna in Southeast Asian region are single stock (Wahidah, SEAFDEC/SWEDEN project).
- The present study offer useful information on genetic conservation of longtail tuna in this region.

THANK YOU





The 6th Meeting of the SWG-Neritic Tunas in the SEA
2nd December 2020
SEAFDEC/MFRDMD Kuala Terengganu, Terengganu

WAY FORWARD & FUTURE PLANNING

By:
Mr Mohammad Faisal Md Saleh
Ms Wahidah Mohd Arshaad
Ms Mazalina Ali
Ms Nurul Nadwa Abdul Fatah

SEAFDEC/MFRDMD
Kuala Terengganu

Future Work Plan of Activities

1. Regular/routine assessment of stock and catch available of the neritic tunas.
 - As suggested by our resource person, Dr Tom Nishida, AMSS need to update the stock and risk assessments of neritic tunas at least every three years (two years for the stocks in the unhealthy status).
 - In future it is hope to use the same method of the stock and risk assessment (KOBÉ plot and ASPIC) for result consistency.
 - AMSS are invited to suggest other options as alternatives??
2. Mechanism for reporting/submitting the results of the assessment to the respective tuna RFMOs or country (s).
 - By using SEAFDEC-ASEAN mechanism, results of the assessment should be endorsed by SEAFDEC Council and then supported by the ASWGF.
3. Strengthen collaboration with the tuna RFMO (i.e. IOTC, WCPFC).
 - The meeting members are invited to give suggestion.

THANK YOU

CLOSING REMARKS

Dr Masaya Katoh
Deputy Chief of SEAFDEC/MFRDMD

**The Sixth Meeting of Scientific Working Group on Neritic Tunas Stock Assessment in
the Southeast Asian Waters**

SEAFDEC/MFRDMD, Kuala Terengganu, Malaysia

2 December 2020

Mr Koichi Honda, Deputy Secretary-General of SEAFDEC, Dr Ahmad Ali, Chief of SEAFDEC/MFRDMD, Mr Supamong Pattarapongpan, a Ph.D. candidate of Hokkaido University and Ladies, and Gentlemen, Good morning and good afternoon

Thank you very much for active participation from focal points from eight SEAFDEC Member Countries during COVID-19. Because of the pandemic, we cannot host face-to-face international meetings. Instead we had a video meeting today. Activities of SWG-neritic tunas are supported by the Japanese Trust Fund 6 Phase II project started this year, namely “Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region.” We will provide scientific advice for sustainable management of important pelagic resources in the region and I hope we will work closely and continuously to obtain our goal. Now, I declare the meeting closed. Thank you very much.



The South Asian Fisheries Development Center (SEAFDEC) is an intergovernmental organization established in December 1967 to promote sustainable fisheries development in the region. Its current Member Countries are Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam.

Representing the Member Countries is the Council of Directors, the policy-making body of SEAFDEC. The Chief administrator of SEAFDEC is the Secretary-General whose office, the Secretariat is based in Bangkok, Thailand.

SEAFDEC undertakes research on appropriate fishery technologies, trains fisheries technicians and disseminates fisheries information. Five Departments, namely Training Department (TD), Marine Fisheries Research Department (MFRD), Aquaculture Department (AQD), Marine Fishery Resources Development and Management Department (MFRDMD), Inland Fishery Resources Development Management Department (IFRDMD) were established in Thailand, Singapore, The Philippines, Malaysia and Indonesia, respectively, to pursue the objectives of the Center.

Since 1998, technical cooperation between ASEAN and SEAFDEC towards sustainable fisheries development has been initiated under the regional **ASEAN-SEAFDEC Fisheries Consultative Group Mechanism (FCG)** framework; and the promotion of sustainable fisheries development through this mechanism is well accredited within the ASEAN.

To assure that the efforts of ASEAN and SEAFDEC in tackling a number of challenges that have impacts on the development and management of the fisheries sector are sustained, and in support of various activities for the benefit of Member Countries, the **ASEAN-SEAFDEC Strategic Partnership (ASSP)** was formalized in November 2007. ASSP is envisaged to enhance closer cooperation between ASEAN and SEAFDEC and its Member Countries, paving the new phase for ASEAN-SEAFDEC collaboration in achieving long term common goals towards collective regional development and management of sustainable fisheries.

ISBN 978-983-9114-93-5



9 78 983 9114 935