The Second Core Expert Meeting on Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region

SEAFDEC/MFRDMD, Kuala Terengganu, Malaysia

28th- 29th September 2022

Southeast Asian Fisheries Development Center

Marine Fishery Resources Development and Management Department

PREPARATION AND DISTRIBUTION OF THIS DOCUMENT

The report of The Second Core Expert Meeting on Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region, SEAFDEC/MFRDMD, Kuala Terengganu, Malaysia, 28th- 29th September 2022, was prepared by Marine Fishery Resources Development and Management Department.

BIBLIOGRAPHIC CITATION

Annie-Nunis, B., Mohammad-Faisal, M.S., Wahidah, M.A., Adam-Luke, P., Hamizah-Nadia, A.Y., Muhammad-Amirullah, A., and Hirota, M. 2022. The Second Core Expert Meeting on Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region. 28th- 29th September 2022, SEAFDEC/MFRDMD, Kuala Terengganu, Malaysia. 54 pp.

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ABBREVIATION

AMS	ASEAN Member State
ASEAN	Association of Southeast Asian Nations
CPUE	Catch Per Unit Effort
DOF	Department of Fisheries
ECPM	East coast of Peninsular Malaysia
etc	*Et cetera*
FAO	Food and Agriculture Organization
GoT	Gulf of Thailand
GRT	Gross Register Tonnage
JTF	Japanese Trust Fund
MSY	Maximum sustainable yield
mtDNA	Mitochondrial Deoxyribonucleic Acid
NFRDI	National Fisheries Research & Development Institute
Nm	Nautical miles
RIMF	Research Institute of Marine Fisheries
TAC	Total Allowable Catch

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The Second Core Expert Meeting on Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region
28th- 29th September 2022
SEAFDEC/MFRDMD, Kuala Terengganu, Malaysia

I. INTRODUCTION AND OPENING OF THE MEETING

1. The Second Core Expert Meeting on Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region was organized by SEAFDEC/MFRDMD via Google Meet webinar on 28th- 29th September 2022. The meeting was attended by the representatives from Brunei, Cambodia, Malaysia, Myanmar, Philippines, Thailand, and Viet Nam; as well as resource persons from Japan and Malaysia; the observers, the representatives from SEAFDEC Secretariat and SEAFDEC/TD; the Chief, Deputy Chief, and Officials from SEAFDEC/MFRDMD. The list of participants appears in **Annex 1**.

2. The meeting was officiated by the Chief of SEAFDEC/MFRDMD, *Mr Abdul Haris Hilmi Ahmad Arshad*. He welcomed all the participants to the Second Core Expert Meeting on Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region. He elucidated the aims of this meeting, which are i) To determine the method of stock analysis for three (3) selected small pelagic species, ii) To share the stock status of three (3) selected small pelagic species of all ASEAN Member States (AMSs), and iii) The way forward for the project's remaining years. *Mr Abdul Haris Hilmi* anticipated that at the conclusion of the meeting, the method of stock analysis for three (3) selected small pelagic species would be identified, the stock status of three selected small pelagic species in all AMSs would be updated, and recommendations for the future planning of this project would be established. He extended his gratitude to the Japanese Trust Fund (JTF) for supporting this project and the Deputy Chief of SEAFDEC/MFRDMD for his efforts in preparation for this meeting. The opening address appears in **Annex 2**.

II. ADOPTION OF AGENDA

3. The agenda was presented to the meeting and adopted without amendment, as in **Annex 3.**

III. PROGRESS ON STOCK ASSESSMENTS OF SELECTED SMALL PELAGIC SPECIES

4. The project coordinator, *Mr Mohammad Faisal Md Saleh*, presented the "Progress on Stock Assessments of Selected Small Pelagic Species". His presentation appears in **Annex 4**.

5. The resource person, *Prof. Dr Takashi Fritz Matsuishi*, contested the data quality utilised for the study in *Mr Mohammad Faisal*'s presentation. He proposed spending more time ensuring the validity of the data. In addition, he stated that the data is nonsensical due to the significant increase in Catch per Unit Effort (CPUE). However, if the data increment is valid, *Mr Mohammad Faisal* must present a good reason to justify the scenario.

6. *Mr Mohammad Faisal* stated that the previous project, "JTFVI: Comparative Studies of the Purse Seine Fisheries in the SEA Region," concluded in 2019. Moreover, he did the Harvested Feedback Control: Rule 2-2 analysis utilising just the landing data taken from Food and Agriculture Organization (FAO): Fish Stat J. *Mr Mohammad Faisal* indicated further that the outcome for Harvested Feedback Control Rule 2-2 was omitted since the data set employed was distinct from the data set used for Harvested Feedback Control Rule 2-1 and the Surplus Production Model analysis. He also requested recommendations on the future work plan from the meeting.

7. *Dr Matsuishi* remarked that given the data originates from the same ecosystem, it should reflect the same trend. Additionally, he proposed rechecking the data before the completion of the analysis. Consequently, he proposed gathering more data and information from AMSs. Observer, *Dr Masaya Katoh*, recommended that all AMS focal points investigate and examine the quality of the effort data, which corresponds to the number of fishing vessels.

8. *Mr Mohammad Faisal* explained that only the number of vessels might be utilised as a fishing effort since the number of fishing trips is restricted and not all AMSs have accurate data for the number of trips per gross register tonnage (GRT).

IV. RESULTS ON THE POPULATION STUDY OF *E. affinis* IN THE SOUTHEAST ASIAN REGION

9. Senior Research Officer, *Ms Wahidah Mohd Arshaad*, presented the "Kawakawa, *E. affinis*: A Single Population Stock Revealed in Southeast Asia Region". This study aims to investigate the genetic diversity and population structure of *E. affinis* in the Southeast Asian region using the mitochondrial deoxyribonucleic acid (mtDNA) D-loop marker due to its capacity to assess intraspecific genetic variation. Her presentation appears in **Annex 5**.

10. *E. affinis* is one of the most valuable fisheries in Southeast Asia, with Indonesia recording the highest landings from both the Pacific and Indian Oceans. Past studies in the Southeast Asian region using several genetic markers have established that the stock status of other neritic tuna *Thunnus tonggol* is panmixia, or a single population stock, indicating that the stock should be jointly managed.

11. Until recently, 610 samples of *E. affinis* were collected from 13 locations around the Southeast Asia region, representing the Andaman Sea, South China Sea, and Sulu Sulawesi Sea, with 100 samples deposited at the Research Institute of Marine Fisheries (RIMF) Indonesia and yet to be evaluated. Meanwhile, 430 samples were successfully examined, and the results revealed 97% genetic similarity among the *E. affinis* population in this region.

12. A total of 275 haplotypes were identified; the high haplotype diversity and low nucleotide diversity imply a recent population increase in a large population. In addition, Maximum Likelihood Analysis found no discernible pattern of separation between *E. affinis* populations. Moreover, genetic distance within and between *E. affinis* populations has been determined to be minimal to nonexistent. This suggests that the *E. affinis* population throughout Southeast Asia region originated from a single stock.

13. *Dr Katoh* urged additional evaluation of individual specimens due to certain result disparities revealed by a small fraction of samples from Thailand. Due to the migratory behavior of this species and the presence of many spawning sites, *Dr Matsuishi* urged caution in assuming a single-stock population based on the genetic finding. His comments were based on the study conducted by Santos *et al.* (2010).

V. PROGRESS ON THE LIFE-HISTORY STUDY OF *E. affinis*

14. Research Officer, *Ms Annie Nunis Billy*, presented the "Progress on the Life-History Study of *E. affinis*". She highlighted how the age study might be utilised for population study, stock enhancement, and management. She further stated that the hard part analysis was employed in this study since it is the most precise and reliable method. Her presentation appears in **Annex 6**.

15. Based on *Ms Annie*'s findings, the average age of *E. affinis* throughout the east coast of Peninsular Malaysia (ECPM) from January 2020 to July 2021 is four years. According to the results of the preliminary study conducted in 2020, she also hypothesised that the spawning season for *E. affinis* along the ECPM occurs between April and June when the gonads are in stages three and four and that stock recruitment may occur between July and October when smaller individuals were captured in more significant numbers. *Ms Annie* noted that the growth rate of *E. affinis* is modest because larger specimens are obtained more frequently than smaller specimens. In addition, she deduces that the age of *E. affinis* is related to its size.

16. *Dr Katoh* requests clarification on methods to expedite the study, as there are over 900 samples still awaiting analysis. *Ms Annie* explained that the sample collection for 2022 is still ongoing; however, the existing samples had been prepared until the mounting phase. She also emphasises that only the observation of otoliths will be performed in 2023, as sample collection will cease at the end of 2022.

VI. PRESENTATION ON STOCK STATUS OF SELECTED SMALL PELAGIC SPECIES IN AMSs FOR THE LAST 20 YEARS

- **Brunei Darussalam**

17. The representative of Brunei Darussalam, *Ms Siti Nur Nisrina Matali*, presented the "Stock Status of Selected Small Pelagic in Brunei Darussalam" focusing on three species: short mackerel, Indian mackerel and scads. Her presentation appears in **Annex 7**.

18. In Brunei Darussalam waters, Zone 1 is characterized by small-scale fisheries targeting short mackerel, while Zones 2 and 3 are dominated by large-scale fisheries catching Indian mackerel and scads. The landings of Indian mackerel varied between 2004 and 2020, with the highest catch being between 2005 and 2010. From 2015 to 2020, landings were lower than in previous years. For scads, landings varied between 2004 and 2020, although a steady increase was observed from 2004 to 2007 and a decreasing trend from 2007 to 2013. However, the landing statistics for short mackerel were insufficient for presentation because this species is mainly captured by small-scale fisheries.

19. *Dr Matsuishi* stated that Brunei Darussalam should be aware of and more cautious about overfishing activities owing to the decline of CPUE for some species.

- **Cambodia**

20. The representative of Cambodia, *Dr Chea Tharith*, presented marine landings documented in Cambodia. In Cambodia, marine landings are not reported by species but by groups. There are three types of marine, motorized fishing vessels: small-scale, medium-scale, and large-scale. Most catches are caught by small-scale fisheries, making it challenging to report catches at the species level. The trawl is the most common fishing gear, followed by crab traps and crab gillnets. These gears reported catches with a high value, while other equipment recorded comparatively low value. In general, the overall number of marine landings has increased during the previous two decades. The maximum sustainable yield (MSY) value exhibits a similar upward pattern as the number of fishing vessels rises. His presentation appears in **Annex 8**.

- **Indonesia**

21. The representative of Indonesia, *Mr Arief Wujdi*, presented the "Stock Status of Indonesia's Small Pelagic Fisheries". His presentation focused mainly on the overview, historical examples, statistics, stock status initiative, and issues associated with Indonesia's small pelagic fisheries. *Mr Arief's* presentation appears in **Annex 9.**

22. *Dr Matsuishi* inquires about the current status of the One Data System in Indonesia during the presentation. *Mr Arief* elucidated that One Data System was initiated in 2017 under a different Directorial. He stated that in Indonesia, scientific authority is independent of management authority. The management authority collects the data, and the data must undergo a validation procedure before the scientific authority may utilize them. Since the management authority has a time constraint on validating the data, *Mr Arief* and his team could only utilize the data up to 2016 to determine the current stock status. In terms of advancement, the One Data System is still in the works, and numerous enumerators are employed to record landing data at landing sites.

24. *Dr Matsuishi* stated that the One Data System is excellent, provided it operates efficiently. He hopes Indonesia's present challenges will be resolved quickly so that One Data System may be used for stock assessment.

- **Malaysia**

25. The representative of Malaysia, *Mr Sallehudin Jamon*, presented "The Stock Status of the Pelagic Fishes in Malaysian Waters". His presentation included analyses of the Surplus Production Model and Harvested Feedback Control for Malaysian waters. In addition, he provided past stock assessments and recommendations for small pelagic. His presentation appears in **Annex 10.**

- **Myanmar**

26. The representative of Myanmar, *Mr Soe Win*, presented the "Current Status of Pelagic Species in Myanmar". He explained that in September 2021, the Department of Fisheries (DOF) in Myanmar proposed to gather gonadal stages of fish landing at the Yangon jetty, length-weight data, and catch and effort data for 22 species of pelagic fish landed in Myanmar waters. Since March 2022, when the data collection process began, the teams have been separated into three groups: the trainer, the data collector, and the data analyzer. The task has thus far been impeded by a lack of cooperation from local fishermen and fishmongers, adverse weather conditions, budgetary restrictions, local regulations (no data is available during the closed season), and the inexperience of the enumerators. However, the department hopes to continue collecting comprehensive information about the status of pelagic species in Myanmar waters. His presentation appears in **Annex 11.**

- **Philippines**

27. The representative of Philippines, *Mr Francisco Torres Jr.*, presented "*Decapterus* spp. in the Philippines". In his presentation, he stated that small pelagic fish account for 39% of the overall marine fisheries catch and constitute a significant food source in the Philippines. Additionally, *Mr Torres Jr.* indicated that since the Philippines had reached the MSY, a decrease in the fishing effort has been implemented, although it is difficult to accomplish. Subsequently, around 33% of the small pelagic catch was attributed to the *Decapterus* species. However, by 2021, the output of round scads had fallen at an annual rate of 0.44%.

28. Both commercial and municipal fishers target round scads throughout the year, and the Sulu Sea is the most abundant fishing ground for round scads. Correspondingly, the National Fisheries Research & Development Institute (NFRDI) wishes to profile the fishing area with the local fisherman so that they can understand the round scad's movement and associate it with fishing refuges.

29. *Mr Torres Jr.* also remarked that sardines are one of the cheapest pelagic fish, so SEAFDEC/AQD attempts to cultivate sardines in the hopes that they would reach a marketable size. He hopes the other participants will provide feedback and recommendations to help them enhance their knowledge. His presentation appears in **Annex 12.**

- **Thailand**

30. The representative of Thailand, *Dr Pavarot Noranarttragoon*, presented "Small Pelagic Fisheries in Thailand". His presentation appears in **Annex 13.**

31. The Thai marine fisheries consist of the Gulf of Thailand (GoT) (Pacific oceanside) and the Andaman Sea (Indian oceanside), with pelagic fisheries accounting for 40% of yearly landings. The fishing fleet is divided into two categories: commercial and artisanal. Typically, artisanal vessels weigh less than ten gross tonnes, whereas commercial vessels weigh more than ten gross tonnes. Classification also depends on gear types; artisanal vessels employ traditional gear such as gill nets, traps, *etc.*, whereas commercial vessels utilize more efficient fishing gear such as purse seine nets, *etc*. Based on the catch statistics, significant catches of small pelagic are recorded in the GoT.

32. The management of Thailand's fishery resources, especially small pelagic species, is congruent with MSY. The total allowed catch (TAC) given to fishing vessels will be determined by the MSY assessment. In addition, the number of fishing days with high-efficiency gear is restricted. There is a prohibition on purse seine fishing within three nautical miles (nm) of the shore. Likewise, purse seine with a mesh size of less than 2.5 mm is prohibited from fishing at night. Some locations in the GoT are also subject to closed areas and closed seasons. Last but not least, Thailand emphasized the difficulties associated with managing small pelagic fish, where pelagic fish are grouped and managed as a single reference point.

VII. GENERAL DISCUSSION AND WAY FORWARD

33. *Dr Matsuishi* thanked all presenters and complimented their effort and informative presentation. He stated that several countries have already undertaken a thorough stock assessment, and the results are intriguing. He noted that the outcome of the stock assessment is precarious from a political standpoint and should not be made public, and the output should be handled with care. To minimize confusion, he reminded the participants that incomplete work should be explicitly labelled "provisional." He emphasized the need to confirm the data's quality because the conclusion may be incorrect when the data is flawed. Without current information on fisheries, it is impossible to analyze the data.

34. Afterwards, he requested that the countries confirm the data quality, particularly the CPUE. The CPUE is an indicator of the fish population, and it cannot change rapidly, particularly for neritic tuna. Every country should attempt to perform stock assessments using national data, but stock assessment should be undertaken by any data representing the stock status. For example, log books from selected fishers can be better than national statistics. However, he reminded the meeting that if the country shares its stock with other countries, the loss of stock cannot be attributed to a single country. He requested that countries evaluate the stock as a single unit.

35. Next, various countries employ diverse methodologies and models. The outcomes should be comparable if the data and the model are accurate. A country with different results for each model should evaluate the data and explain why the results differ.

36. *Dr Matsuishi* also suggested gathering logbooks from several vessels if the CPUE data is unfavourable and the logbook record is more dependable than the total catch divided by total effort. He proposed estimating the stock's status using the Fox Model. The ABC technique may be employed in the absence of long-term CPUE data, but he cautions the meeting that the model requires good CPUE data from recent years.

37. He encourages AMSs to approach university experts or SEAFDEC staff if their country wishes to conduct stock assessments but lacks the requisite expertize or experience. He also expressed willingness to assist the countries in analysing their stock assessments. His comments and recommendations appear in **Annex 14.**

VIII. CLOSING OF THE MEETING

38. The Deputy Chief of SEAFDEC/MFRDMD, *Dr Masahito Hirota*, thanked all AMSs for their active engagement. He explained that due to the ongoing COVID-19 pandemic, SEAFDEC/MFRDMD has decided to organize the meeting via video conference. *Dr Hirota* mentioned that The JTFVI Phase II, "Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region," supports the project activities and is halfway through the five-year road map. He is hopeful that the members will be able to work closely and consistently together to provide scientific recommendations for sustainable management of pelagic resources in this region. His closing remarks appear in **Annex 15.**

Annex 1

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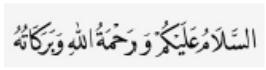
Annex 2

OPENING ADDRESS

Mr Abd Haris Hilmi Ahmad Arshad
Chief of SEAFDEC/MFRDMD

The Second Core Expert Meeting on Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region

SEAFDEC/MFRDMD, Kuala Terengganu, Malaysia
28 September 2022



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 honoured guests Prof. Dr Matsuishi Takashi Fritz from Hokkaido University and Dr Rumeaida Mat Piah from University Malaysia Terengganu
Dr Katoh Masaya, Former Deputy Chief of SEAFDEC/MFRDMD
Dr Masahito Hirota, Deputy Chief of SEAFDEC/MFRDMD
All Observers and
Officers and staff of SEAFDEC/MFRDMD

First, I would like to welcome you to “The Second Core Expert Meeting on Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region”.

Ladies and gentlemen

The project, entitled "Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region," is a second-phase project under the Japanese Trust Fund VI programme that started in 2020 and will be completed in 2024.

This Second Core Expert Meeting is one of the activities planned for this project, which will involve all SEAFDEC member countries.

JTFVI Phase II was introduced during the First Core Expert Meeting in November 2020. The objective of JTFVI Phase II is to obtain more information and data for future assessment and management of five dominant pelagic species in the Southeast Asian region. In order to strengthen the information, there is a need to carry out stock assessments (SA) and risk assessments (RA) for those species.

And as agreed in the 1st Core Expert Meeting, this project targets three small pelagic species (*R. kanagurta, R. brachysoma,* and *Decapterus* spp.) and two neritic tunas species (*T. tonggol* and *E. affinis*) that dominate the catch in the Southeast Asian region.

The objectives of this meeting are;

- to determine the method of stock analysis for three selected small pelagic species
- to share the stock status of the three selected species from all AMSs
- to find a way forward for the remaining years of the project.

At the end of this meeting, we will have defined methods for the stock analysis of the three selected small pelagic species, updated information on their stock status from all AMSs, and recommendations for the future planning of this project. I hope that the information and results of this project will help us manage the resource in a way that is good for the environment.

Finally, I would like to record my appreciation and congratulations to all of you, our resource person, SEAFDEC/MFRDMD staff, especially Deputy Chief Dr Masahito Hirota, Mr Mohammad Faisal, and Ms Mazalina, as well as Dr Worawit Wanchana from the SEAFDEC Secretariat, for making this 2nd Core Expert Meeting a reality. I officially open the Second Core Expert Meeting on Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region.

Thank you

Annex 3

2nd Core Expert Meeting on Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region

28th and 29th September 2022

PROVISIONAL AGENDA AND TIME TABLE (MALAYSIAN TIME) *Moderator: Special Departmental Coordinator of SEAFDEC/MFRDMD*	
Day 1 **(28th September 2022)**	
Agenda 1: Opening of the Meeting	
1000-1015	Opening Address *By Chief of SEAFDEC/MFRDMD*
Chairperson: Chief of SEAFDEC/MFRDMD	
Agenda 2: Adoption of Agenda	
1015-1030	Introduction and Adoption of the Agenda *By Deputy Chief of SEAFDEC/MFRDMD*
1030-1045	Tea break
Agenda 3: Progress on Stock Assessments of Selected Small Pelagic Species	
1045-1100	Progress on Stock Assessments of Selected Small Pelagic Species *By Mr. Mohammad Faisal Md Saleh from SEAFDEC/MFRDMD*
Agenda 4: Results on the Population Study of *Thunnus tonggol* in the Southeast Asian Region	
1100-1115	Results on the Population Study of *Thunnus tonggol* in the Southeast Asian Region *By Ms. Wahidah from SEAFDEC/MFRDMD*
Agenda 5: Progress on the Life-History Study of *Euthynnus affinis*	
1115-1130	Progress on the Life-History Study of *Euthynnus affinis* *By Ms. Annie Nunis Billy from SEAFDEC/MFRDMD*
Day 2 **(29th September 2022)**	
Agenda 6: Presentation on Stock status of Selected Small Pelagic Species in AMSs for the last 20 years	
1000-1015	Brunei Darussalam
1015-1030	Cambodia
1030-1045	Tea break
1045-1100	Indonesia
1100-1115	Malaysia
1115-1130	Myanmar

1130-1145	Philippines
1145-1200	Thailand
1200-1215	Viet Nam
Agenda 7: General Discussion and Way Forward	
1215-1245	Future Planning for Meeting and Workshop, Funding and Activities *Moderator: Chief of SEAFDEC/MFRDMD*
Agenda 8: Closing of Meeting	
1245-1300	*Closing Remarks by Deputy Chief of SEAFDEC/MFRDMD*

The 2nd Core Expert Meeting on Fisheries Management Strategies for Small Pelagic Resources in the Southeast Asian Region
28th -29th September 2022
SEAFDEC/MFRDMD Kuala Terengganu, Terengganu

Progress on Stock Assessments of Selected Small Pelagic Species

By:
Mohammad Faisal Md. Saleh
Mohamad Syahidan Azmi

SEAFDEC/MFRDMD
Kuala Terengganu

Introduction

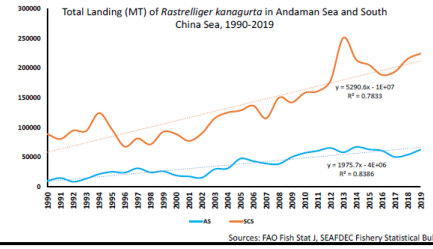
- Year 1 and Year 2 of project (2020-2021) – data collection
- Collect data through questionnaire send to all AMSs
- Unfortunately, MFRDMD still not received respond from almost all AMSs country.

- Aim: to observe the scenarios regarding the current status of selected small pelagic species in this region based on the extracted data from:
  a) FAO Fish Stat J
  b) SEAFDEC – Fishery Statistical Bulletin of Southeast Asian
  c) Previous JTFVI project – Comparative Studies on Management of Purse Seine Fisheries in the SEA Region

- Two method were used to analysed the data:
  a) Harvested Feedback Control – Rule 2-1
  b) Surplus Production Model

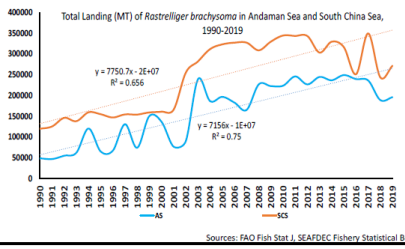
Inter-annual variation of catch

A) *Rastrelliger kanagurta*



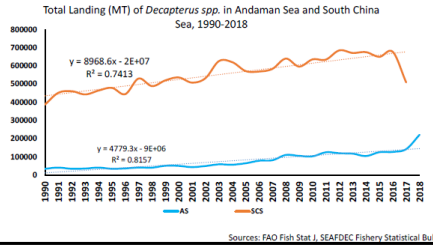
Sources: FAO Fish Stat J, SEAFDEC Fishery Statistical Bulletin (2010-2019)

B) *Rastrelliger brachysoma*

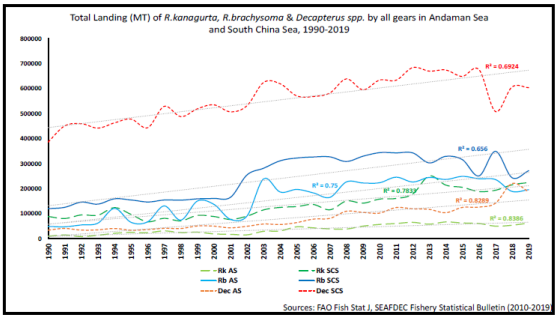


Sources: FAO Fish Stat J, SEAFDEC Fishery Statistical Bulletin (2010-2019)

C) *Decapterus spp.*



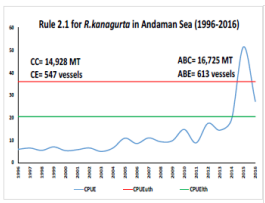
Sources: FAO Fish Stat J, SEAFDEC Fishery Statistical Bulletin (2010-2019)

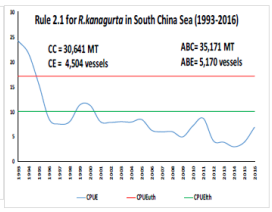


Sources: FAO Fish Stat J, SEAFDEC Fishery Statistical Bulletin (2010-2019)

Harvested Feedback Control 2-1

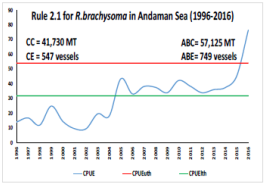
A) *Rastrelliger kanagurta*

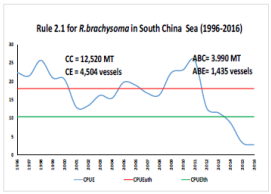




Source: JTFVI Project: Comparative Studies on Management of Purse Seine Fisheries in the SEA Region, 2013-2015

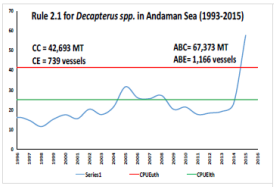
B) *Rastrelliger brachysoma*

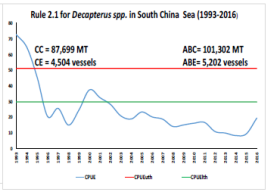




Source: JTFVI Project: Comparative Studies on Management of Purse Seine Fisheries in the SEA Region, 2013-2015

C) *Decapterus spp.*





Source: JTFVI Project: Comparative Studies on Management of Purse Seine Fisheries in the SEA Region, 2013-2015

Surplus Production Model (Fox Model) and Harvested Feedback Control, Rule 2.1

Species	Ecosyst.	Year	Current Catch (MT)	Current Effort (unit)	R^2	MSY (MT)	fMSY (unit)	0.8 fMSY	Harvested Feedback Control, Rules 2.1	
									ABC	ABE
Rastrelliger kanagurta	AS	1997-2016	14,928	547	0.78	27,194	1,333	1067	16,725	613
	SCS	1995-2016	30,541	4,504	0.79	32,994	7,710	6168	35,171	5,170
Rastrelliger brachysoma	AS	2005-2016	41,730	547	0.73	101,466	3,937	3150	57,125	749
	SCS	1996-2016	12,520	4,504	0.39	67,002	5,534	4427	3,990	1,435
Decapterus spp.	AS	1993-2015	42,693	739	0.75	66,975	1,356	1085	67,373	1166
	SCS	1993-2016	87,699	4,504	0.78	83,670	4,838	3870	101,302	5,202

Conclusion & Discussion

- Landing data from FAO and SEAFDEC Fishery Statistical Bulletin (2010-2019) are used to plot graph of Inter-Annual Variation.
- In Harvested Feedback Control Rule 2-1, number of vessels (JTFVI Purse Seine Project) are used as effort unit, since not every AMSs can provide data for the number of trip based on fishing gear.
- As we already know, the smaller the effort unit, the precise the analysis.
- To predict the current stock status in some ecosystems (e.g. Safe, Recovery, Overfishing & Overfished), other analysis method can be used such as ASPIC – Kobe Plot.

- As a suggestion please note that the optimum catch level are different by species and by ecosystem. This three selected species are exploited by multi-gears and multi-species fishery e.g. the catch of *R.kanagurta* and *Decapterus spp.* in the both waters can be increased but *R. brachysoma* status or resource might be worse as *R. brachysoma* catch need to be reduced. And not to forget this three selected species were caught dominantly by major gear *i.e.* purse seine.
- Thus, simple increase or reduction of catch would be difficult to undertake because the gear used in the fisheries could catch the other species with healthy and unhealthy stock status respectively. Therefore, especially catch reduction strategies should be developed and implemented holistically considering factors relevant to the fisheries of such species *i.e.*, species composition, stock status, fishing seasons, fishing ground, commercial values and the socio-economy of fishers.
- Each AMSs should consider such strategy holistically based on its own unique situation of these factors.
- However, before going deeper and details into the successfulness of this project, the data used need to be good enough especially for effort data..
- And for that, MFRDMD encourage every AMSs to cooperate with MFRDMD in providing the requested data.

Thank You

Annex 5

The Second Core Expert Meeting of Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region, 28-29 September 2022

KAWAKAWA, *Euthynnus affinis*: A SINGLE POPULATION STOCK REVEALED IN SOUTHEAST ASIA REGION

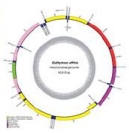
By
Wahidah Mohd Arshaad
SEAFDEC/MFRDMD

Introduction

- Kawakawa, *Euthynnus affinis*, is a small epipelagic migratory tuna species that inhabit coastal marine realms where the water temperature ranges from 18 to 29°C (Collette & Naeun, 1983) – mostly familiar in tropical and subtropical climate of the Indo-Pacific region (Kumar *et al.*, 2012).
- Kawakawa is among the most important fishing resources in this region.
- In Southeast Asia (SEA) region, Indonesia is the major landing for both Pacific (70%) and Indian (73%) Ocean, followed by Philippines, Thailand and Malaysia, respectively (MFRDMD, 2021).
- The stock status (from Kobe Plot) is in the green zone in 2018. However, the current catch (2016-2018) is still higher than the MSY level (MFRDMD, 2021).

- Long-term effect to fisheries industries may be resulted if the landing is not monitored regularly.
- Mitochondrial DNA (mtDNA) D-loop region has been utilised in this present studies due to its abilities to evaluates intraspecific genetic variation as well as population genetic (Kasim et al., 2020; Nabilsyafiq et al., 2019).
- 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.

- A pilot study in Southeast Asia (5 areas in the Philippines & 1 area in Pangkor Island, Malaysia) indicated kawakawa is near "panmixia" or mixing in Southeast Asia (Santos *et al.* 2010).
- A single genetic stock of KAW identified along the Indian coast inferred analysis of mtDNA D-loop region (Kumar *et al.* 2012).



Objectives

- To identify the level of genetic diversity of Kawakawa, *Euthynnus affinis* in the Southeast Asian region.
- To identify the genetic structure of Kawakawa, *Euthynnus affinis* in the Southeast Asian region by using DNA mitochondrial control region (D-loop) markers.
- To share the result for management of these neritic tuna fisheries in the region.

DETAIL OF SAMPLES COLLECTED

NO.	COUNTRY	SAMPLING SITES	CODE	TOTAL NO OF SPECIMEN
1	Brunei	Muara	ABR	20
2	Cambodia	Sihanouk Ville	ASV	50
3	Malaysia	Kuala Perlis	AKP	59
4		Kota Kinabalu	AKK	50
5		Kuantan	AKT	57
6		Semporna	ASP	50
7	Myanmar	Yangon	AMY	50
8	Philipines	Palawan (Sulu Sea)	APS	39
9		Palawan (West Philipines Sea/South China Sea)	APC	26
10		Zamboanga (Sulu Sea)	APZ	59
11	Thailand	Ranong	ARG	50
13		Trat	ATR	50
13	Viet nam	Vung Tau	AVT	50
			TOTAL	618

+ 100 KAW samples from 2 locations (Banda Aceh & Pemangkat) were collected and stored by Research Institute for Marine Fisheries (RIMF), Indonesia.

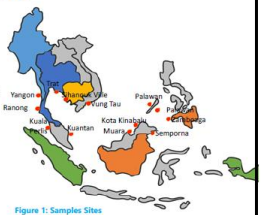


Figure 1: Samples Sites

Methodology

- A total of **610 samples** from **13 sampling locations** around Southeast Asian region (Figure. 1).
- Genomic DNA was extracted using the Qiagen DNeasy Blood & Tissue Kit.
- ***D-loop* region** (858 bp) were amplified using forward primer, **CB3R420** (5'CCC CTA ACT CCC AAA GCT AGG 3') and reverse primer, **12Sar430** (5' GCC TGC GGG GCT TTC TAG GGC C 3') (Willette *et al.* 2016) with the final volume 25µl.

Result

No.	Country	Sampling Sites	Code	Total no. of Samples	Total no. of Samples Sequences
1	Brunei	Muara	ABR	20	9
2	Cambodia	Sihanouk Ville	ASV	50	30
3	Malaysia	Kuala Perlis	AKP	59	54
4		Kota Kinabalu	AKK	50	40
5		Kuantan	AKT	57	40
6		Semporna	ASP	50	21
7	Myanmar	Yangon	AMY	50	39
8	Philippines	Palawan (Sulu Sea)	APS	39	31
9		Palawan (West Philippines Sea/South China Sea)	APC	26	26
10		Zamboanga (Sulu Sea)	APZ	59	42
11	Thailand	Ranong	ARG	50	38
12		Trat	ATR	50	36
13	Viet nam	Vung Tau	AVT	50	24
			TOTAL	610	430

Table 1: Genetic diversity indices calculated for *Euthynnus affinis* population based on mtDNA D-loop sequences.

Country	Pop	Genetic Diversity			
		N	H (S)	H	π
Brunei	ABR	9	8 (20)	0.9722	0.0058
Cambodia	ASV	36	30 (130)	0.9857	0.0166
Malaysia	AKP	54	43 (60)	0.9853	0.0059
	AKT	40	30 (43)	0.9705	0.0047
	AKK	40	37 (41)	0.9949	0.0049
	ASP	21	15 (26)	0.9524	0.0042
Myanmar	AMY	39	30 (40)	0.9703	0.0041
Thailand	ATR	38	15 (24)	0.8009	0.0036
	ARG	30	24 (37)	0.9770	0.0051
Philippines	APZ	42	37 (50)	0.9919	0.0055
	APS	31	28 (44)	0.9936	0.0063
	APC	26	23 (40)	0.9877	0.0055
Vietnam	AVT	24	21 (26)	0.9855	0.0046
Overall		430	275 (217)	-	-
Mean		-	-	0.9816	0.0061

Table 2: Pairwise F_{ST} estimates (below diagonal) and genetic distance (upper diagonal) of *E. affinis* inferred by mtDNA D-loop. (All significant P values were in blue font)

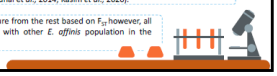
Pop	APZ	APS	APC	ABR	AKP	AKT	AKK	ASP	ASV	AVT	ATR	ARG	AMY
APZ	0	0.0059	0.0056	0.0056	0.0056	0.0053	0.0052	0.0049	0.0118	0.0052	0.0054	0.0054	0.0048
APS	-0.0025	0	0.0061	0.0060	0.0060	0.0058	0.0056	0.0054	0.0123	0.0056	0.0058	0.0058	0.0053
APC	0.0070	0.0223	0	0.0057	0.0056	0.0053	0.0054	0.0049	0.0119	0.0052	0.0055	0.0054	0.0048
ABR	-0.0122	-0.0054	-0.0098	0	0.0057	0.0054	0.0054	0.0050	0.0119	0.0052	0.0053	0.0053	0.0049
AKP	-0.0020	0.0055	-0.0030	-0.0171	0	0.0053	0.0053	0.0050	0.0119	0.0052	0.0054	0.0049	0.0054
AKT	0.0043	0.0253	0.0057	0.0108	0.0008	0	0.0050	0.0045	0.0115	0.0049	0.0052	0.0045	0.0051
AKK	0.0008	-0.0041	0.0182	0.0110	0.0020	0.0169	0	0.0046	0.0116	0.0049	0.0052	0.0045	0.0051
ASP	-0.0027	0.0120	-0.0165	-0.0042	-0.0108	-0.0108	0.0002	0	0.0112	0.0045	0.0047	0.0047	0.0041
ASV	0.0214	0.0279	0.0123	-0.0300	0.0267	0.0172	0.0295	0.0068	0	0.0115	0.0117	0.0116	0.0111
AVT	0.0161	0.0244	0.0044	0.0133	0.0098	0.0239	0.0310	0.0031	0.0168	0	0.0046	0.0049	0.0044
ATR	0.1536	0.1511	0.1634	0.1551	0.1396	0.1857	0.1763	0.1743	0.0852	0.1051	0	0.0051	0.0047
ARG	0.0052	0.0172	-0.0036	-0.0207	-0.0004	0.0014	0.0125	-0.0108	0.0179	0.0075	0.1543	0	0.0046
AMY	-0.0029	0.0190	-0.0050	-0.0032	-0.0052	0.0001	0.0055	-0.0151	0.0217	0.0191	0.1811	-0.0041	0

Results of Analysis of Molecular Variance (AMOVA) to determine genetic variance in mtDNA D-loop. (d.f. = degree of freedom)

Source of variation	d.f	Sum of squares	Variance components	% of total variance	Fixation index	P-value
Among population	12	71.54	0.0926 Va	3.07	0.0307	0
Within population	417	1220.27	2.9263 Vb	96.93		
Total	429	1291.81	3.0189	100		

Summary

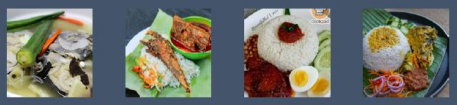
- Out of 610 samples, only 430 was successfully sequenced for mtDNA *D-loop*, which generated 275 haplotypes.
- **High haplotypes diversity** coupled with **low nucleotide diversity** (Table 1) indicates a large population size that has undergone recent population expansion (Chen *et al.*, 2015, Kasim *et al.*, 2020).
- The **phylogenetic analysis** using maximum likelihood (ML) tree method displayed **no obvious separation pattern** for all populations.
- Correspondingly, pairwise genetic comparisons (F_{ST}) showed **low and non-significant value** between all populations except for twelve significant pairwise involving ATR. In addition, **genetic distance** within and among population **were very low** (Table 2).
- AMOVA analysis also revealed **high contribution within population**
- These result strongly suggest that the *Euthynnus affinis* population in Southeast Asian region were panmictic with shallow genetic structure due to high gene flow (Kunal et al., 2014; Kasim *et al.*, 2020).
- ATR population showed significant genetic structure from the rest based on F_{ST} however, all other analyses suggested genetic homogeneity with other *E. affinis* population in the Southeast Asian region.



Conclusion

"Based on the available information, due to lacks the population structure suggested by the mtDNA D-loop, it is identify that the *Euthynnus affinis* population in Southeast Asian region is a **single population stock**".

Thank You



Annex 6

Progress on the Life History Study for *Euthynnus affinis* in the East Coast of Peninsular Malaysia

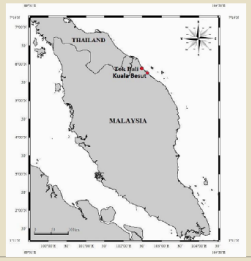
ANNIE NUNIS BILLY
RAIHANA BT ABDUL RAHMAN

IQ WUR GX FWIR Q

Euthynnus affinis (Photo: Collette & Nauen, 1983)

- SEAFDEC/MFRDMD is currently conducting a study to determine the age of kawakawa at the time of fishing mortality. The study is under the project "Fish Management Strategies for Pelagic Fish Resources in the Southeast Asian Region" implemented from 2020 to 2024 supported by the Japanese Trust Fund VI Phase II. The findings of this study could aid the population research and stock management of *E. affinis* to enhance the development of fisheries management measures such as the regulation of fishing gear.
- The hard part analysis was employed in this study which is the most precise and dependable technique to determine the growth parameters of fish by examining the hard component of its body (*e.g.* otolith) (Morales-Nin, 1992). The development of otolith is proportional to the size of fish and typically follows an allometric rise in dimensions when measuring the age of a fish.

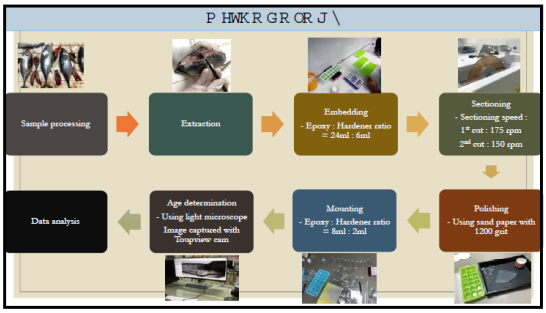
VDP SOLQ J HR FD WIR Q



- LKIM Tok Bali, Kelantan
- LKIM Kuala Besut, Terengganu

Both sampling location has the same fishing area (Terengganu Waters, Pahang Water and Johor Waters)

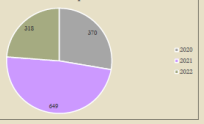
P HWK R GR OR J \



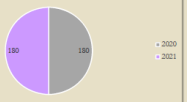
- From 2020 – 2022, a total of **1,337** samples of *Euthynnus affinis* has been collected. **360** samples has been successfully analysed from January 2020 – July 2021. Lab work and sample collection is still on going.

n (number of samples collected) = **1,337** n (number of samples analysed) = **360**

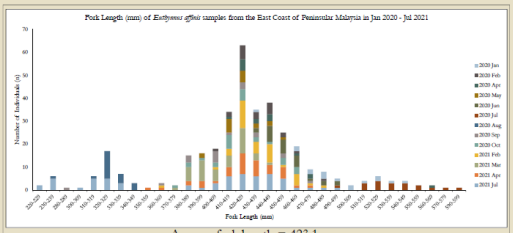
Total Sample Collected of *Euthynnus affinis* in the East Coast of Peninsular Malaysia in Jan 2020 - Sep 2022



Analysed sample of *Euthynnus affinis* in the East Coast of Peninsular Malaysia in Jan 2020 - July 2021

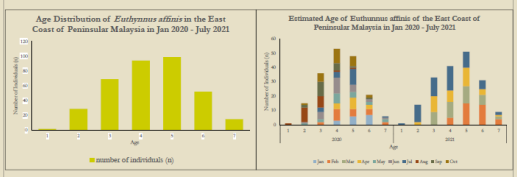


Fork Length (mm) of *Euthynnus affinis* samples from the East Coast of Peninsular Malaysia in Jan 2020 - Jul 2021



Average fork length = 423.1 mm
$L\infty$ = 542.95 mm
K = 0.24 yr^{-1}

As for January 2020 until July 2021, 360 samples has been analysed. 27.5 % (99 individuals) of total samples analysed are 5 years old. The rest of the samples are still in progress to be analysed.



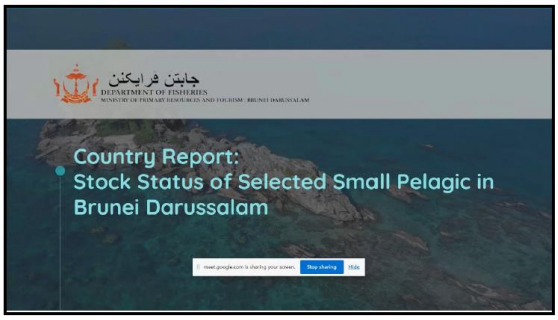
Average age (Jan 2020 – Jul 2021) = 4 years

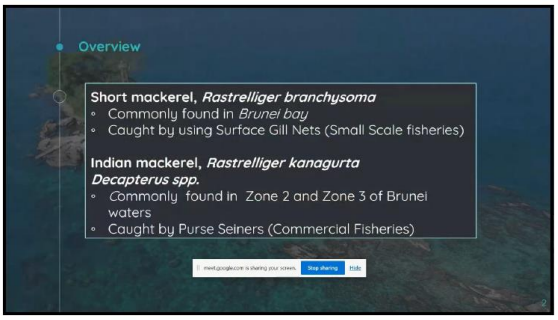
Z D\#R UZ DUG

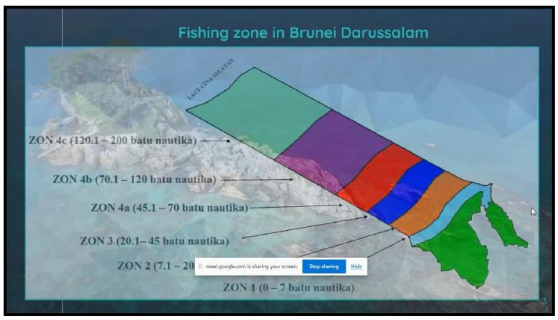
- Starting from May 2022, MFRDMD has started to collect samples of *Euthynnus affinis* from the West Coast of Peninsular Malaysia for preliminary study of the age determination of *E. affinis* from the West Coast. 175 samples has been collected.
- MFRDMD suggested for age determination study of kawakawa from the West Coast of Peninsular Malaysia for JTF VII.
- MFRDMD also suggesting for age determination study of Rastrelliger kanagurta from the East Coast of Peninsular Malaysia for JTF VII.

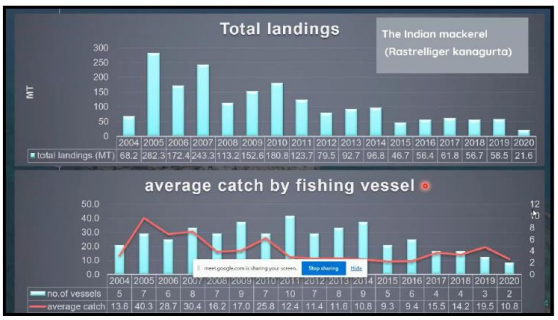
UHIHUHQ F'HV

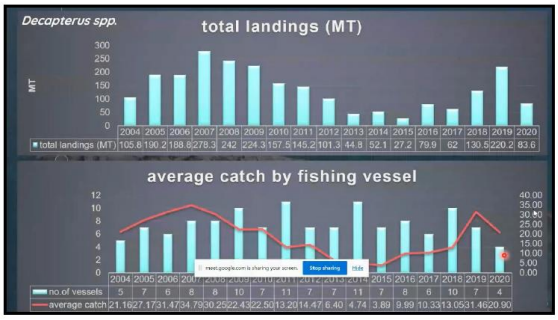
- Collette, B. B., & Nauen, C. E. (1983). *Scombrids of the world: An annotated and illustrated catalogue of tunas, mackerels, bonitos, and related species known to date*. Food and Agriculture Organization of the United Nations.
- Morales-Nin, B. (1992). Determination of Growth in Bony Fishes from Otolith Microstructure. FAO Fisheries Technical Paper. No. 322. Rome.

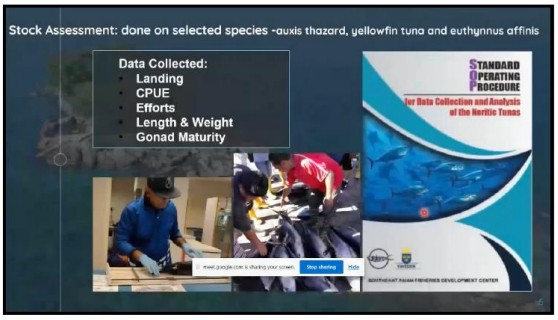

جابتن فرايكنن
DEPARTMENT OF FISHERIES
MINISTRY OF PRIMARY RESOURCES AND TOURISM : BRUNEI DARUSSALAM
Country Report:
Stock Status of Selected Small Pelagic in Brunei Darussalam


Overview
Short mackerel, *Rastrelliger branchysoma*
Commonly found in *Brunei bay*
Caught by using Surface Gill Nets (Small Scale fisheries)
Indian mackerel, *Rastrelliger kanagurta*
Decapterus spp.
Commonly found in Zone 2 and Zone 3 of Brunei waters
Caught by Purse Seiners (Commercial Fisheries)


Fishing zone in Brunei Darussalam
ZON 4c (120.1 – 200 batu nautika)
ZON 4b (70.1 – 120 batu nautika)
ZON 4a (45.1 – 70 batu nautika)
ZON 3 (20.1– 45 batu nautika)
ZON 2 (7.1 – 20
ZON 1 (0 – 7 batu nautika)


Total landings
The Indian mackerel (Rastrelliger kanagurta)
MT
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
total landings (MT) 68.2 282.3 172.4 243.3 113.2 152.6 180.8 123.7 79.5 92.7 96.8 46.7 56.4 61.8 56.7 58.5 21.6
average catch by fishing vessel
no.of vessels 5 7 6 8 7 9 7 10 7 8 9 5 6 4 4 3 2
average catch 13.6 40.3 28.7 30.4 16.2 17.0 25.8 12.4 11.4 11.6 10.8 9.3 9.4 15.5 14.2 19.5 10.8


Decapterus spp.
total landings (MT)
MT
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
total landings (MT) 105.6 190.2 188.8 278.3 242 224.3 157.5 145.2 101.3 44.8 52.1 27.2 79.9 62 130.5 220.2 83.6
average catch by fishing vessel
no.of vessels 5 7 6 8 8 10 7 11 7 7 11 7 8 6 10 7 4
average catch 21.16 27 17 31.47 34 79 30 25 22.43 22.50 13.20 14.47 6.40 4 74 3.89 9.99 10.33 13.05 31.46 20 90


Stock Assessment: done on selected species -auxis thazard, yellowfin tuna and euthynnus affinis
Data Collected:
Landing
CPUE
Efforts
Length & Weight
Gonad Maturity
STANDARD OPERATING PROCEDURE
for Data Collection and Analysis of the Neritic Tunas


Capture Fisheries Management – Management of fisheries resources under the Fisheries Order 2009
Moratorium for Commercial Bottom Trawlers
New Mesh Size Regulations for the Trawl Cod-End
ASEAN Catch Documentation Scheme (ACDS)
Moratorium on Small-Scale Fishing Activities
Establishment of Marine Protected Areas (MPAs)
Banning of Catches, Landings and Importation of Sharks
01
02
03
04
05
06
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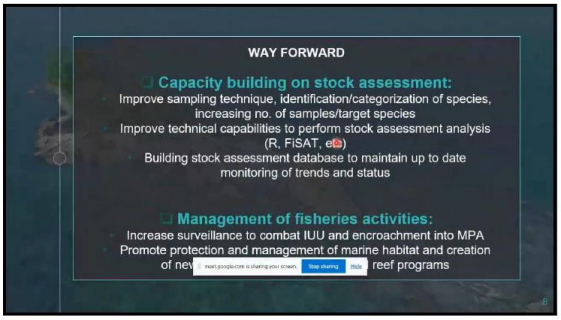
WAY FORWARD
Capacity building on stock assessment:
Improve sampling technique, identification/categorization of species, increasing no. of samples/target species
Improve technical capabilities to perform stock assessment analysis (R, FiSAT, etc)
Building stock assessment database to maintain up to date monitoring of trends and status
Management of fisheries activities:
Increase surveillance to combat IUU and encroachment into MPA
Promote protection and management of marine habitat and creation of new
reef programs
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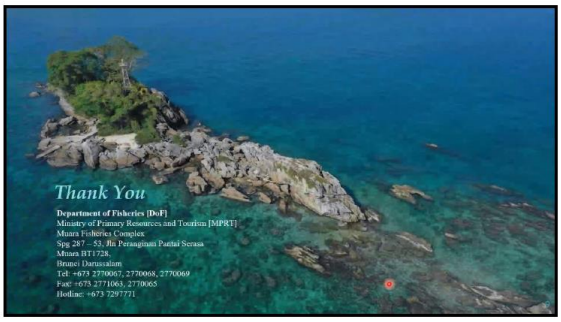

Thank You
Department of Fisheries [DoF]
Ministry of Primary Resources and Tourism [MPRT]
Muara Fisheries Complex
Spg 287 – 53, Jln Perangimam Pantai Serasa
Muara BT1728,
Brunei Darussalam
Tel: +673 2770067, 2770068, 2770069
Fax: +673 2771063, 2770065
Hotline: +673 7297771

The 2nd Core Expert Meeting of Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region

on 28-29 September 2022

Prepared by: Dr. Chea Tharith

Marine Fisheries Research and Development Institute

Introduction

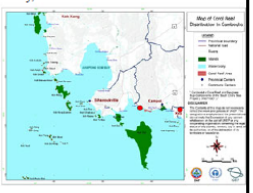
Cambodia has 435 Km coastlines in the Gulf of Thailand, in which is stretched between Vietnamese borders in the south to Thai border in the west. There are four provinces located along this coastline namely,

Koh Kong (237 Km),

Preah Sihanouk (105 Km),

Kampot (67 Km) and Kep (26 Km)

Furthermore, the Kingdom of Cambodia has her own Exclusive Economic Zone (EEZ), the area extended from the shoreline 55,600 Km^2



Overview

- The Cambodian marine fish production for 2019 is reported at around 122,250 MT, which is 20% of the total reported catch.
- In Cambodia, with more than 39% of all households involved in fishing activities. In the coastal zone about 47% of the households are involved in fishing activities.

3

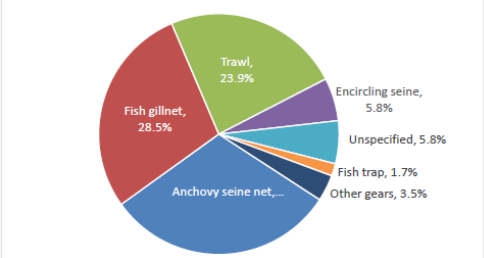
Marine motorised fishing vessels, classified by total length classes, by province (2018 Vessel Census Database)

Vessel type	Length class (m)	Koh Kong	Preah Sihanouk	Kampot	Kep	Total
	<6	886	34	4	0	924
	6-<12	1,538	944	406	227	3,115
Small scale		2,424	978	410	227	4,039
	12-<18	895	1,503	623	367	3,388
	18-<24	67	42	6	0	115
Middle scale		962	1,545	629	367	3,503
Large scale	≥24	10	0	0	0	10
Total		3,396	2,523	1,039	594	7,552

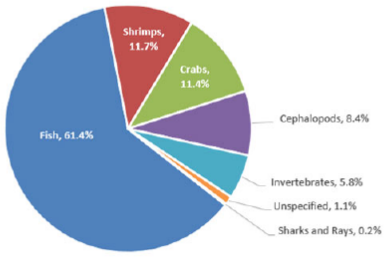
Number of vessels by size class operating primary gears, as reported in the 2018 Vessel Census

Rank	Fishing gear type	Size boat >24 m	Size boat 18-24m	Size boat12-18m	Size boat 6-12m	Size boat <6m	Total of fishing gears
1	Trawl		50	399	1120	0	1569
2	Crab trap		4	224	455	490	1173
3	Crab gillnet		1	204	705	139	1049
4	Fish Gillnet		21	346	483	67	917
5	Collapsible fish trap			310	308	6	624
6	Shrimp gillnets		1	258	290	5	554
7	Squid tow longline		1	54	332		387
8	Octopus trap longline		4	201	61	5	271
9	Push net		2	26	170	9	207
10	Blood cockle dragnet			33	68		101
11	Fish trap		3	41	37	7	88
12	Anchovy seine net	10	24	14			38
13	Capture by hand				30	70	100
14	Fish hook				38	37	75

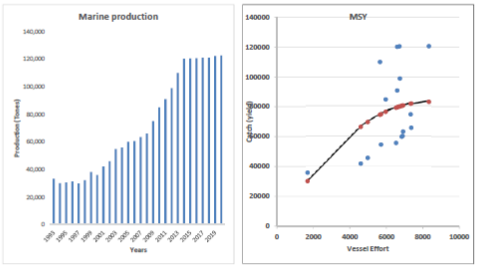
Trawlers almost exclusively are sampled in Preah Sihanouk, boat seine nets in Kampot and a large number of gears only are sampled in Koh Kong, including Anchovy seine nets.



The average monthly catch by gear and vessel class



Marine Production and MSY



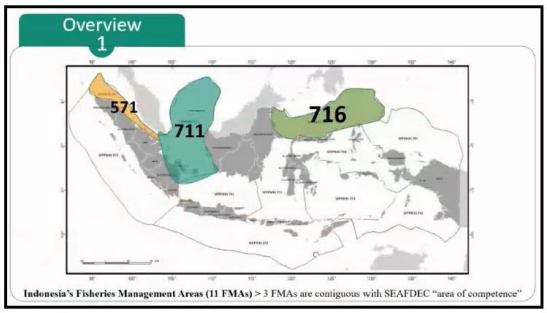
8

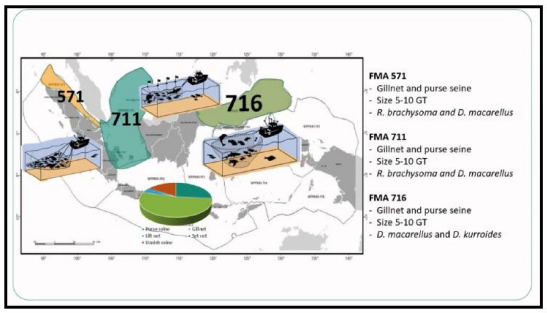
Thank You for Your Kind Attention

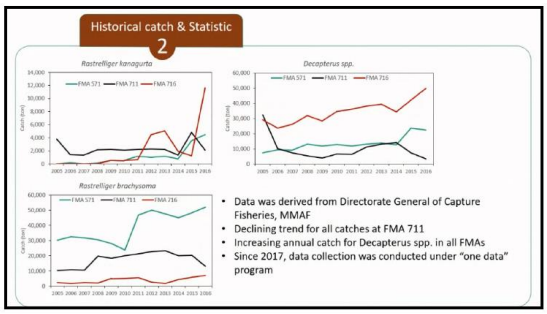
9

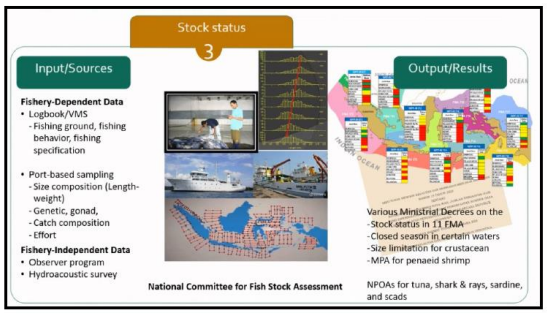

Stock status of Indonesia's small pelagic fisheries
Arief Wujdi, Moh Fauzi, Khairul Amri, Duto Nugroho, and Fayakun Satria
Research Center for Fisheries
Indonesian National Research and Innovation Agency
2nd Core Expert Meeting on Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region
28-29th September 2022


Content
1 Overview
2 Historical catch and statistic
3 Stock status
4 Challenges
5 Suggestion & Conclusion


Overview
1
571
711
716
Indonesia's Fisheries Management Areas (11 FMAs) > 3 FMAs are contiguous with SEAFDEC "area of competence"

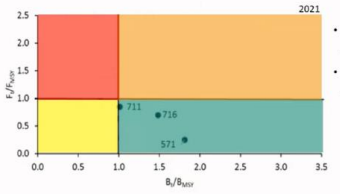

571
711
716
FMA 571
- Gillnet and purse seine
- Size 5-10 GT
- R. brachysoma and D. macarellus
FMA 711
- Gillnet and purse seine
- Size 5-10 GT
- R. brachysoma and D. macarellus
FMA 716
- Gillnet and purse seine
- Size 5-10 GT
- D. macarellus and D. kurroides


Historical catch & Statistic
2
Rastrelliger kanagurta
Decapterus spp.
Rastrelliger brachysoma
FMA 571
FMA 711
FMA 716
Catch (ton)
• Data was derived from Directorate General of Capture Fisheries, MMAF
• Declining trend for all catches at FMA 711
• Increasing annual catch for Decapterus spp. in all FMAs
• Since 2017, data collection was conducted under "one data" program


Stock status
3
Input/Sources
Fishery-Dependent Data
• Logbook/VMS
- Fishing ground, fishing behavior, fishing specification
• Port-based sampling
- Size composition (Length-weight)
- Genetic, gonad,
- Catch composition
- Effort
Fishery-Independent Data
• Observer program
• Hydroacoustic survey
National Committee for Fish Stock Assessment
Output/Results
Various Ministrial Decrees on the
- Stock status in 11 FMA
- Closed season in certain waters
- Size limitation for crustacean
- MPA for penaeid shrimp
NPOAs for tuna, shark & rays, sardine, and scads

Stock status

3



- Not subjected to overfished and overfishing
- Precautionary approach urgently needed for FMA 711

Gambar 2. Kobe plot Status stok SDI pelagis kecil
Figure 2. The stock status of aggregated small pelagic fishes in Kobe plot

Challenges

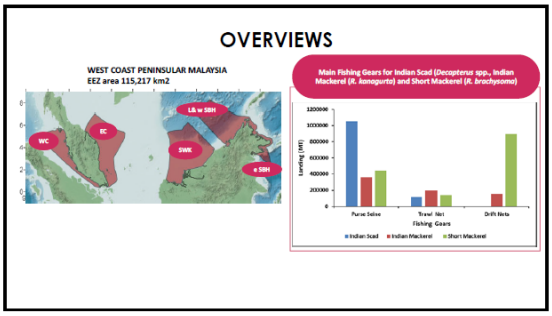
4

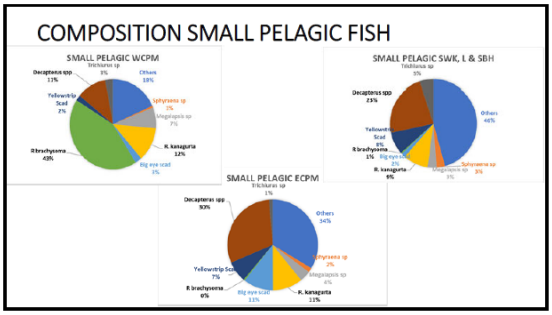
- Limited budget to cover whole archipelago waters
- Low sampling coverage (i.e. number of sampling site, deployment of enumerators & observers, specimen numbers, etc)
- Limited/partial data and information of biological aspect (i.e. reproductive biology, maturity, age and growth of small pelagic fish).
- Unrealistic data of catch and effort due to IUU Fishing.
- Species misidentification

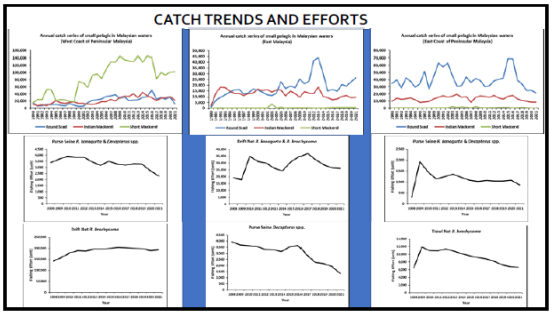
Suggestion & Conclusion

5

- Establish a standardized protocol sampling
- Strengthening data collection
  - Regional cooperation > experts from CSIRO, SEAFDEC, & BOBLME
  - Workshop for enumerators & observers
- Open contributors for reliable sources
  - Provide open platform for NGOs, universities, research institute (e-BRPL)







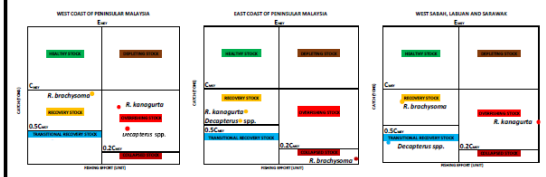
MATHEMATICAL MODEL

- Surplus Production Model (Fox and Schaefer Model)
- A Stock Production Model In cooperating Covariates (ASPIC)
- Monte Carlo C-MSY
- Length Base Production Model (LBSPR)
- FiSAT II

The classification of fish stock status and criterion applied.

Exploitation level	Fishing effort level	Status
Over-exploitation (C/Cmsy ≥ 1)	Underfishing (E/Emsy <1)	Healthy stock
Over-exploitation (C/Cmsy ≥ 1)	Overfishing (E/Emsy ≥1)	Depleting stock
Fully-exploitation (0.5 ≤ C/Cmsy < 1)	Underfishing (E/Emsy <1)	Recovery stock
Fully-exploitation (0.5 ≤ C/Cmsy < 1)	Overfishing (E/Emsy ≥1)	Overfishing stock
Moderate exploited (0.2 ≤ C/Cmsy < 0.5)	Overfishing (E/Emsy ≥1)	Overfishing stock
Moderate exploited (C/Cmsy < 0.5)	Overfishing (E/Emsy < 1)	Transitional Recovery stock
Moderate exploited (C/Cmsy ≤ 0.2)	Overfishing (E/Emsy ≥ 1)	Collapsed stock

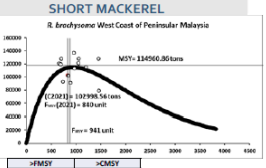
SUMMARY THE STOCK STATUS OF THREE PELAGIC FISHES IN MALAYSIA



- The stock status for *R. brachysoma*, *R. kanagurta and Decapterus sp* based on data from 2008-2021
- In this study, SPM have used the catch data of each species and fishing effort used in term of the fishing no of vessels

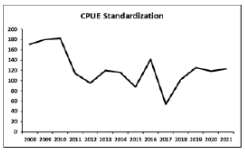
WEST COAST OF PENINSULAR MALAYSIA

SHORT MACKEREL



>FMSY	>CMSY
2011	2008
2012	2009
2013	2010
2014	2011
2015	2012
2016	2013
2017	2015
	2016

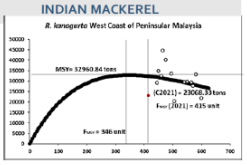
RECOVERY STOCK

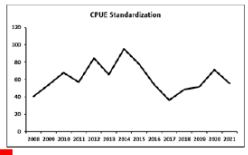


SHORT MACKEREL (CPUE)

WEST COAST OF PENINSULAR MALAYSIA

INDIAN MACKEREL





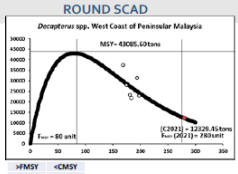
>FMSY	>CMSY
ALL YEARS	2010
	2011
	2012
	2014
	2015

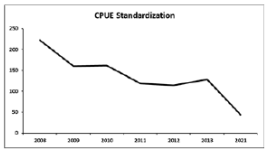
OVERFISHING STOCK

INDIAN MACKEREL (CPUE)

WEST COAST OF PENINSULAR MALAYSIA

ROUND SCAD





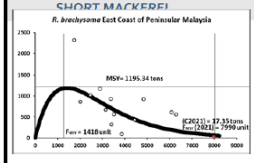
>FMSY	<CMSY
2008	2008
2009	2009
2010	2010
2011	2011
2012	2012
2013	2013
2021	2021

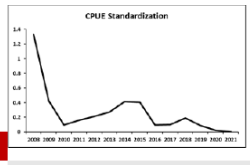
OVERFISHING STOCK

ROUND SCAD (CPUE)

EAST COAST OF PENINSULAR MALAYSIA

SHORT MACKEREL





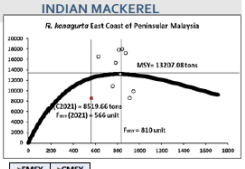
>FMSY	>CMSY
ALL YEARS	2008

COLLAPSED STOCK

SHORT MACKEREL (CPUE)

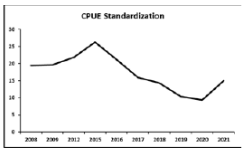
EAST COAST OF PENINSULAR MALAYSIA

INDIAN MACKEREL



>FMSY	>CMSY
2009	2008
2012	2009
2016	2012
2017	2015
2019	2016
2020	

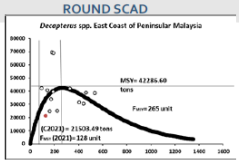
RECOVERY STOCK

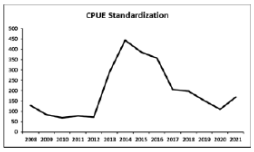


INDIAN MACKEREL (CPUE)

EAST COAST OF PENINSULAR MALAYSIA

ROUND SCAD





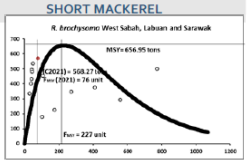
>FMSY	>CMSY
2008	2015
2009	2016
2010	
2011	
2012	

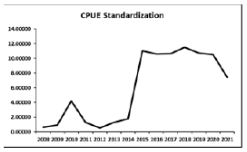
RECOVERY STOCK

INDIAN SCAD (CPUE)

WEST SABAH, LABUAN AND SARAWAK

SHORT MACKEREL





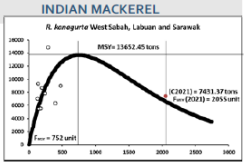
>FMSY	=CMSY
2008	
2009	ALL YEARS
2011	
2012	

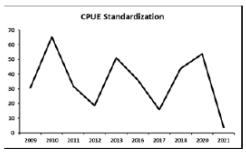
RECOVERY STOCK

SHORT MACKEREL (CPUE)

WEST SABAH, LABUAN AND SARAWAK

INDIAN MACKEREL





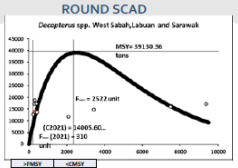
>FMSY	>CMSY
2021	2013

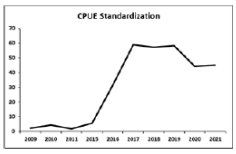
OVERFISHING STOCK

INDIAN MACKEREL (CPUE)

WEST SABAH, LABUAN AND SARAWAK

ROUND SCAD





>FMSY	=CMSY
2009	2009
2010	2010
2011	2011
	2015
	2016
	2017
	2018
	2019
	2020
	2021

TRANSITIONAL RECOVERY STOCK

INDIAN SCAD (CPUE)

SUMMARY STATISTICS FOR FOX MODEL AND ALLOWABLE BIOLOGICAL CATCH OF SMALL PELAGIC FISHES

Area	Species	C_{2021}	E_{2021}	R^2	E_{MSY}	MSY	HFC rules 2.1 ABC	HFC rules 2.1 ABE
West Coast of Peninsular Malaysia	*R.kanagurta*	23,068	415	0.40	346	32,961	19,049	344
	R.brachysoma	102,999	840	0.76	941	114,961	101,980	830
	Decapterus spp.	12,329	280	0.88	80	43,086	3,429	78
East Coast of Peninsular Malaysia	*R.kanagurta*	8,520	566	0.20	811	13,207	8,177	543
	R.brachysoma	17	7,990	0.66	1,418	1,195	12	513
	Decapterus spp.	21,503	128	0.71	265	42,287	18,189	107
West Sabah, Labuan & Sarawak	*R.kanagurta*	7,431	2055	0.83	752	13,652	4046	1118
	R.brachysoma	568	76	0.73	227	657	471	62
	Decapterus spp.	14,006	310	0.83	2,522	39,130	11,452	253

STOCK ASSESSMENT IN THE PAST

- 2013-2015- Acoustic survey in Malaysian waters
- Objective –
  - To estimated pelagic fish density, distributions, total biomass and potential yield
  - To provide information on the current status of pelagic fish resources

Table 75: Summary of small pelagic resources status in survey areas. Potential yields were derived using cadima's equation with 'constant values' of 0.2

Item(s)	Unit	West coast PM	East coast of PM	Sarawak	West coast of Sabah	East coast of Sabah
Area	km^2	31,579	117,802	130,827	63,252	28,086
Average Density (D)	$MTkm^{-2}$	7.45	3.44	3.46	4.92	5.33
Total biomass (Q) (Bo)	MT	235,264	405,331	521,109	311,101	154,490
Natural mortality (M)	$year^{-1}$	1.84	2.03	2.03	1.89	2.31
Current yield (Y)	MT	130,313	186,507	46,777	55,134	35,915
Potential yield - MSY	MT	112,664	202,666	78,192	47,408	43,188
Exploitation Rate	E	0.221	0.187	0.042	0.055	0.068
Surplus/Deficit	MT	-17,529	12,999	32,415	12,344	17,273
Dominant species		*Rastrelliger kanagurta*	*Decapterus macrosoma*	*Decapterus macrosoma*	*Decapterus macrosoma*	*Rastrelliger kanagurta*
Body weight (BW)	g	72.6	74	42.33	61.61	82.75
Additional Reduction effect	unit	-44	32	81	30	43

Small Pelagic Management

- The fisheries management measures involving small pelagic fish are based on the existing Fisheries Act 1985
  - Limitation of fishing effort through fishing zonation and licensing scheme
  - Tightens renew license requirement
  - Control on size and power of fishing vessels
  - Monitoring, Control and Surveillance Programme
- Incoming management measures
  - Specification of fishing gear- Purse seine, Drift net and Trawl net
  - Ban on lamp usage in the coastal area
  - Ban on underwater lamp during fishing

PROBLEM AND CONSTRAINTS

- Constraints on obtaining funding to conduct acoustic surveys
- The inability of Malaysian Fisheries Department research vessels to conduct surveys
- The FQ80 instrument on board the KK SENAGIN II research vessel has suffered damage
- Absence of skilled officers in conducting acoustic surveys

RECOMMENDATION

1	2	3	4
To manage the fish from overfishing or collapses, fishing efforts and catch should be mainted or reduced to obtain a maximum sustainable yield	To promoting the development of sustainable fishing grounds, lowering the number of fishing vessels may yield an improvement of the overfished or collapse stock	Variation in catch depends not only on efforts but also on environmental factors.	It is important to monitor the fish stock status on regular basis

THANK YOU

Annex 11

Contents

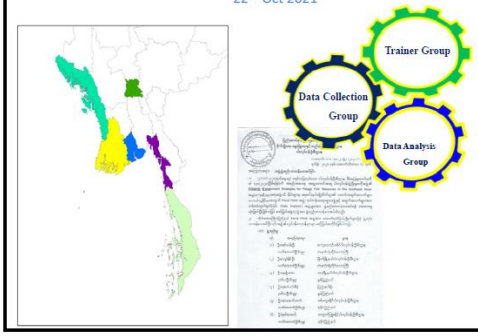
- Proposal writing
- Proposed work plan
- Current activities to collect pelagic fish data

Proposal

- PROPOSED WORK PLAN TO COLLECT PELAGIC FISH DATA TO DG ON 27TH SEP. 2021
- 22 PELAGIC FISH SPECIES
- LENGTH-WEIGHT DATA
- GONAD STAGE
- CATCH AND EFFORT DATA

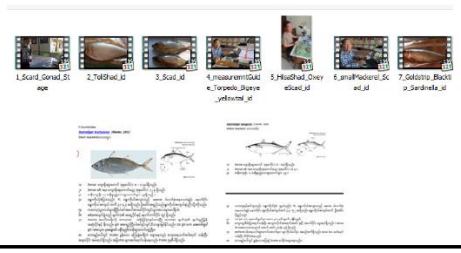
Working Group

22nd Oct 2021



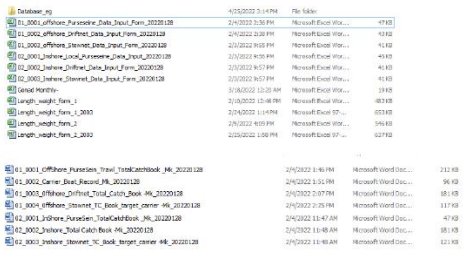
Trainer Group

- Create Species Identification Card
- Create Identification and Gonad state development Video for each species



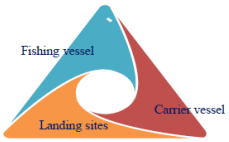
Trainer Group

- Create Data input sheet and data collection book for each fishing gears



Training

- Trainer to data collection group
- Create a online training Pelagic fish identification, data collection and gonad state in (2-2-2022) to (5-2-2022)
- Discuss challenges and opportunities to get reliable data



Problem :

(1) Direct export to neighbouring countries (eg. Tanintharyi – Thailand, and Rakhine – Bengladish)

(2) Use carrier vessel

Start Data collection

March 2022
- Length-weight data
- Daily catch and effort data in 50-100 for each region
- Gonad development in Yangon
- Landing site survey, Interview with fishermen

Fishing boat(Size, Shape, Material, Propulsion power, Machine, Instrument)
How to keep fish after catch until landing
Measure size and species of catch

- **But 2022 (April, May and June) are closed season**
- **July and August are reining season**
- **We can start in September but there are a lot of challenges especially Budget and safety for staff**

Training to Data Analysis Group

No.	Subject	Time used (hr)	Date
1	R and R studio	9 hrs	March, 16, 23 and 30
2	Statistical Formula and Analysis	3 hrs	April, 6
3	Data Preparation and Input and Mauu Bar	3 hrs	April, 20
4	FiSAT - K Scan and Growth	3 hrs	April, 27
5	FiSAT- Mortality Parameter	3 hrs	May, 4
6	FiSAT- Gear Selectively, Provability of Capture and Virtual Population Analysis	3 hrs	May, 11
7	FiSAT - (Thumpson and Bell Model , YPR)	6 hrs	May, 18
8	Bio-economic model	15	May, 25 June 1, 8, 15 and 22
9	CPUE standardization, ASPIC, Kobe Plot	---	TBC
10	Gonad analysis	---	TBC
11	GIS and RS	---	TBC

Challenges

- **So many challenges**
- **A lot of challenges especially Budget and safety for local staff**
- **Although we are interested in this data collection ,fish market owners are not interested in and lack of knowledge recording the information of each type of fish species. The entire Jetty record system must be fixed**
- **Some problem fish carrier vessel go directly from Taninthayi to Ranong and from Rakhine to Bengladish from the sea, and we cannot get accurate information.**
- **Some fishermen change the fishing gear according to the weather condition of premonsoon season and post monsoon season. Fishing operation is effected .**
- **It is the first year of fieldwork and they have no experience in data collection.**
- **In the Coastal Region, the need to carry out regular data collection and registration activities with supporting equipment (Motor Cycle, Tablet, Internet) may also encounter technical difficulties.**
- **If the pelagic species information is available, it can be obtained.**

THANK YOU SO MUCH FOR YOUR ATTENTION

2nd Core Expert Meeting of Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region

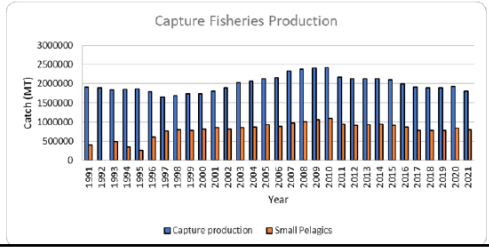
Decapterus spp. In the Philippines

September 28-29, 2022 (via online)
SEAFDEC MFRDMD

National Fisheries Research & Development Institute (NFRDI) and Bureau of Fisheries and Aquatic Resources (BFAR)
Francisco SB. Torres Jr, Grace DV Lopez and Joeren Yleana
Senior Science Research Specialist, Supervising Aquaculturist

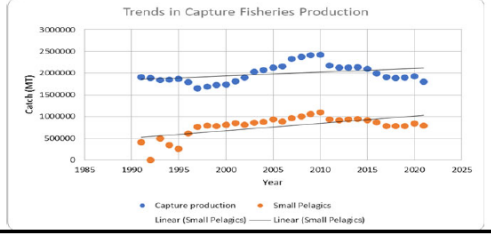
Overview

The total capture fisheries production in the Philippines is ~2.61 million metric tons in 2010 and declined to ~2.07 million metric tons in 2020 (PSA 2020).

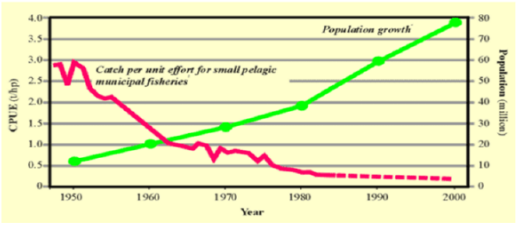


Catches of small pelagics

Small pelagic species comprised about 39% of the total capture fisheries production. In 1991, total small pelagic production is 408,130 MT and has increased to 849,780 MT in 2001 but has declined to 792,331 MT in 2021.

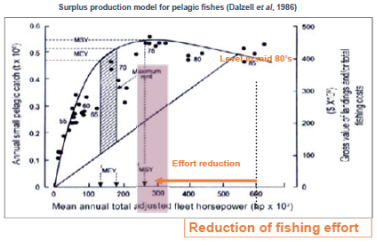


Catch of small pelagics in municipal fisheries vs population



Stock assessment in the past

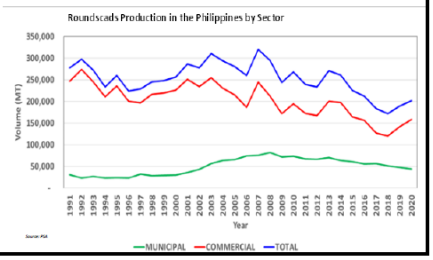
Surplus production model for pelagic fishes (Dalzell *et al*, 1986)

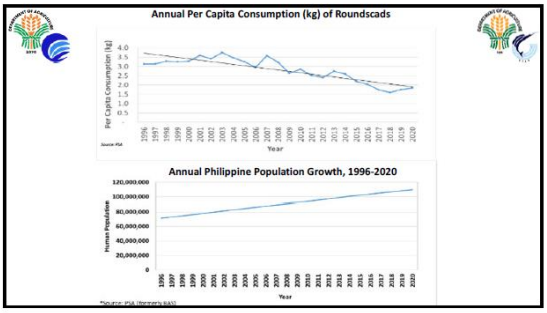


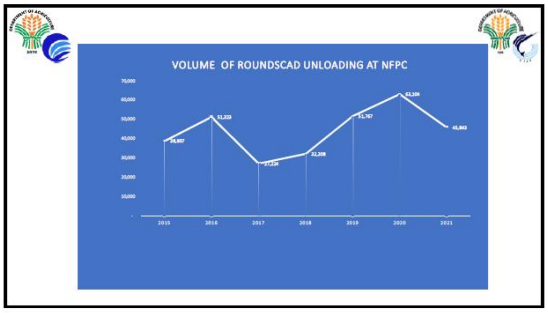
Reduction of fishing effort

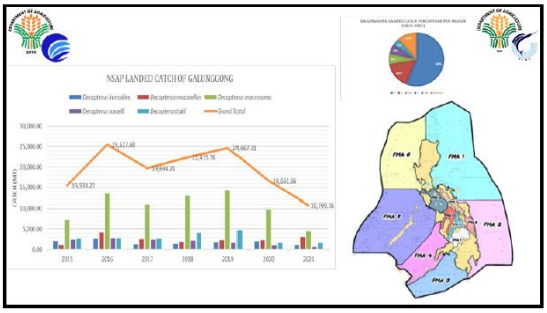
Small pelagics management

Decapterus species comprised about 33% of the total capture of small pelagics. In 1991, roundscad production is 246,960 MT and has increased to 286,204 MT in 2001 but has declined to 181,516 MT in 2021. Overall rate of decline is 0.44% annually equivalent to a loss of 369 MT or a total of 11,000 MT in 30 years.









Small pelagic fishes include the Mackerels (*Rastrelliger*), Big-eye scads (*Selar*), Round herrings, Sardines (Clupidae), Anchovies (Engraulidae) and Fusilliers (Caesionidae), and Roundscads (*Decapterus* spp.) which is considered to be the most important. Historical production of roundscads from 1982 to 1991 amounts to 13.2% to the total marine production with an average of 188,609 MT/yr (BFAR and BAS). For commercial fisheries it contributes ~50.18% to the annual landings for the same years (Calvelo, 1992).

Roundscads are caught all year round in traditional fishing grounds by commercial and municipal fishermen. Commercial fishing gears are purse seine, bagnet, trawl and ring net, while municipal fishery usually uses gill net. The most important fishing grounds are West Sulu Sea, Visayan Sea, Moro Gulf, East Sulu Sea, South Sulu Sea, Lamon Bay, Cuyo Pass, Tayabas Bay, Batangas Coast and Bohol Sea. The Sulu Sea area is practically the richest fishing grounds for roundscads, which accounted for 60% of the total roundscads production from the years 1980 to 1987 (Calvelo, 1992).

Roundscads are caught throughout the year but highest production was during summer months of March, April and May. A protracted spawning season of *Decapterus macrosoma* and *Decapterus russelli* in Palawan waters and Manila Bay approach was observed to be during the months of November up to March by Tiews et al., 1970.

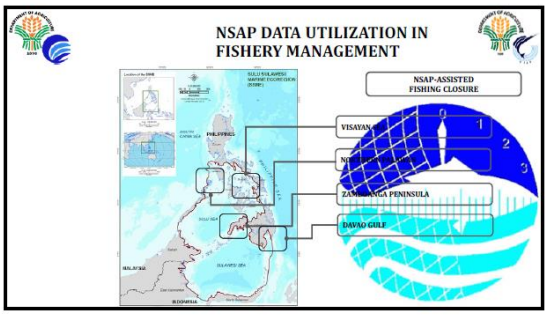
There are seven species of the genus *Decapterus* reported to occur in the Philippines: 1) *Decapterus macrosoma,* shortfin scad; 2) *Decapterus russelli,* Indian scad; 3) *Decapterus maruadsi,* Japanese scad 4) *Decapterus macarellus,* Mackerel scad; 5) *Decapterus kurroides,* Redtail scad; 6) *Decapterus tabl,* Roughear scad and the recently described species of *Decapterus* was also reported to occur in Panay Island, 7) *Decapterus smithvanizi, slender red scad* (Delloro, et al., 2021).

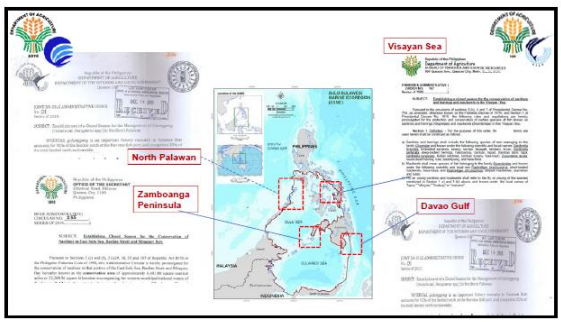
Problems and Constraints

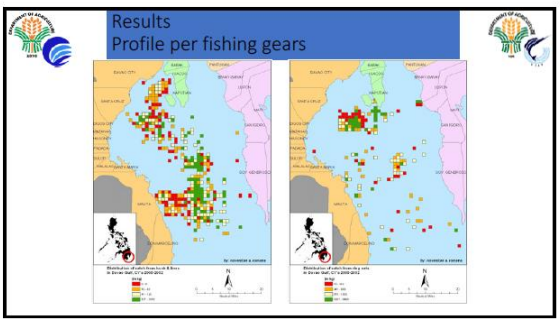
PHILIPPINE FISHERY IMPORT, 2022

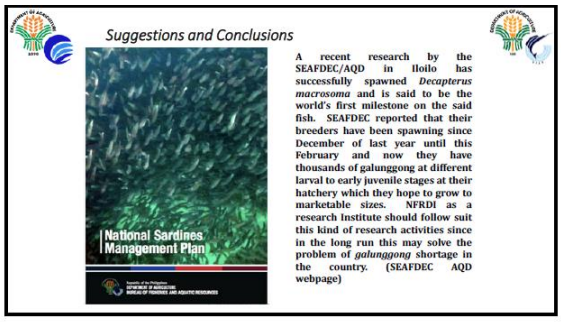
(References: BFAR FIQD)

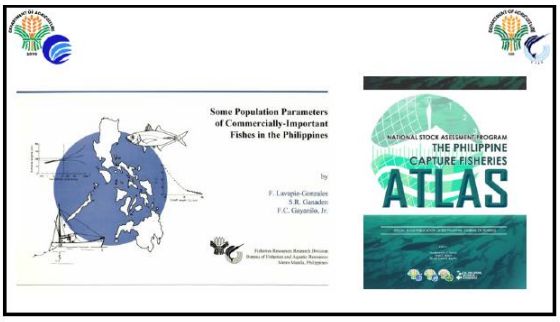
COMMODITY	Country of Origin	Value (USD)	Volume (MT)	1ST QUARTER
Bonito	China	1,188,758.00	964.96	CNI 60,00 MT
Mackerel	China	2,866,803.48	3,329.37	
Moonfish	China	1,253,525.00	1,261.71	
Round Scad	China	2,048,268.00	2,223.55	
Round Scad	Vietnam	1,107,270.00	889.99	
Yellowstripe Scad	Vietnam	70,000.00	55.50	
Yellowtail	Vietnam	59,450.00	80.42	
	Total	8,594,074.48	8,805.49	




Visayan Sea
North Palawan
Zamboanga Peninsula
Davao Gulf


Results
Profile per fishing gears


Suggestions and Conclusions
National Sardines Management Plan
A recent research by the SEAFDEC/AQD in Iloilo has successfully spawned Decapterus macrosoma and is said to be the world's first milestone on the said fish. SEAFDEC reported that their breeders have been spawning since December of last year until this February and now they have thousands of galunggong at different larval to early juvenile stages at their hatchery which they hope to grow to marketable sizes. NFRDI as a research Institute should follow suit this kind of research activities since in the long run this may solve the problem of galunggong shortage in the country. (SEAFDEC AQD webpage)


Some Population Parameters of Commercially-Important Fishes in the Philippines
NATIONAL STOCK ASSESSMENT PROGRAM
THE PHILIPPINE CAPTURE FISHERIES
ATLAS


NSAP Interactive ATLAS
www.nsap.nfrdi.da.gov.ph


THANK YOU!

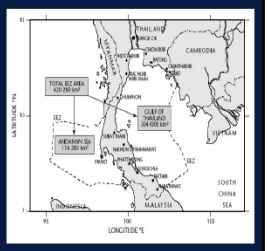
Small Pelagic Fish Fisheries in Thailand

Pavarot Noranarttragoon
Weerapol Thitipongtrakul
Marine Fisheries Research and Development Division,
Department of Fisheries

29 September 2022

Overviews

- Two coastlines
- Annual catch 1.3-1.5 million tons
- Pelagic fish catch accounts for ~40% of the total catch
- Short mackerel (*Rastrelliger brachysoma*) Indian mackerel (*R. kanagurta*) and scads (*Decapterus* spp.) contributes 30% of pelagic fish catch
- Mackerels and scads can be caught by various fishing gears, e.g., purse seine, gill nets, trawls, handline, etc.



Outline

1. Overview
2. Catch trend and relevant statistics
3. Stock status
4. Small pelagic fish management
5. Problems
6. Recommendations

Fishing fleet

Categorized to 2 fleets based on size, engine power and fishing gear

Artisanal vessels refers to
- ✓vessels less than 10 gross ton (GT)
- ✓equipped with an engine which is less than 280 horse-power
- ✓usually use gillnets, traps, handline, longline or other low efficiency gears

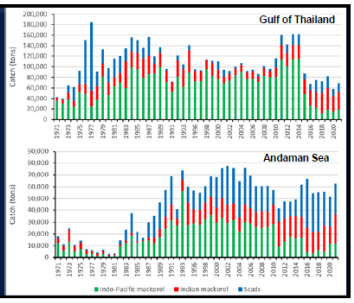
Commercial vessels refers to
- ✓vessels from 10 GT and larger
- ✓vessels using trawls, purse seine, anchovy purse seine, dredges, and light luring vessels are also defined as commercial vessel regardless the vessel size

Number of fishing vessels by category in Thai waters in 2021 (as of 1st April 2021)

Type of fishing gear	Category of vessel						
	Artisanal	Commercial					
		Small	Medium	Large	Extra-large	Total	
	< 10 GT	< 10 GT	10=< 30 GT	30=< 60 GT	60=< 150 GT	> 150 GT	
Total high efficiency		188	2,554	1,694	2,340	82	6,858
Pair trawl		2	2	105	1,010	5	1,124
Otter board trawl		104	456	744	492	16	1,812
Beam trawl		9	152	194	79	-	434
Purse seine		8	33	150	566	45	802
Anchovy purse seine		2	60	19	77	16	175
Anchovy falling net		-	154	283	115	-	552
Anchovy lift net		-	10	20	-	-	30
Light luring vessel		62	1,687	179	1	-	1,929
Total low efficiency	51,237	60	2,021	1,001	161	6	3,249
Total	51,237	248	4575	2695	2501	88	10,107

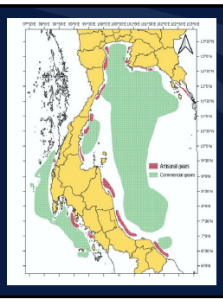
Catch statistics

- Majority of the catches are from the GOT with dominants by short mackerel, but small in the ADS
- In the GOT, maximum catch reached 160,000-180,000 tons but current catch is less than a half of recorded maximum catch
- In the ADS, catch is more stable ranging from 40,000-75,000 tons
- Short mackerel is decreasing in Thai waters in recent years but more severe in the GoT
- Scads is dominant in the ADS

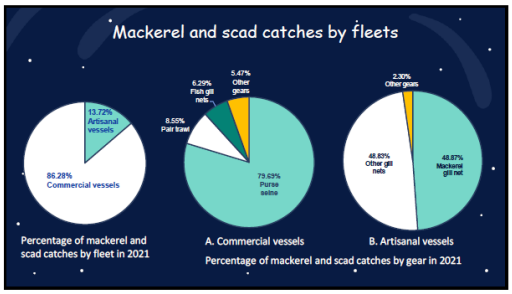


Fishing ground

- Artisanal vessels fished in shallow water or near shore areas with low efficient gears, i.e., gill nets
- Commercial vessels fished in deeper area outside coastal area and distribute in the whole Thai waters



Mackerel and scad catches by fleets



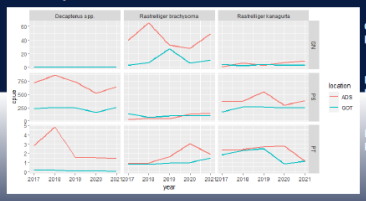
Percentage of mackerel and scad catches by fleet in 2021

A. Commercial vessels

B. Artisanal vessels

Percentage of mackerel and scad catches by gear in 2021

Catch per unit effort



Gill net CPUE: kg/day

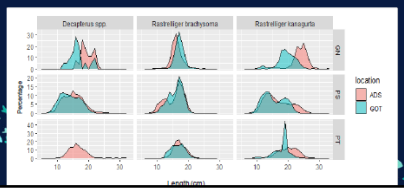
Purse seine CPUE:

Pair trawl CPUE: kg/hour

- Basically, the CPUE of 3 selected species in the ADS was higher than in the GoT.
- The CPUE of scads in the ADS from PS and PT was higher than short mackerel and Indian mackerel.
- For short mackerel, the CPUEs of PS were quite stable both in the GoT and ADS.

Size distribution

- The size of scads (*Decapterus* spp.) and Indian mackerel (*R. kanagurta*) in the ADS were bigger than in the GoT.
- Scads and Indian mackerel caught by gill net were bigger than other gears
- The size of short mackerel seems not much different between gears and areas



Biological parameters

Species	L_∞ (TL)	K	t_0	Z	M	F	Lm (cm)	LW equation (mixed sex)	Spawning peak (month)	Study year	Study area
R. brachysoma							M 17.25 / F 17.55	W = 0.00681^{1,2,3,4}	Feb-May, Aug-Oct	2003-2005	Upper GOT
							M 16.45 / F 17.95	W = 0.00747^{1,2,3,4}	Feb-May, Jul-Oct	2003-2005	Upper to Central western GOT
							M 16.01 / F 16.84	W = 0.02607^{1,2,3,4}	Dec-Feb, May-Aug	2003-2005	Southern GOT
							M 16.09 / F 15.33	W = 0.01427^{1,2,3,4}	Nov-May, Jul-Sep	2003-2005	ADS
								W = 0.00000512^{1,2,3,4} (female)		2003-2005	ADS
R. kanagurta	20.95	1.8	0	5.03	2.37	2.65	M 16.60 / F 16.74	w= 0.00907^{1,2,3,4}	Mar-May, Nov-Dec	2003-2005	Upper GOT
							M 20.07 / F 17.12	w= 0.00727^{1,2,3,4}	Feb-May, Jul-Oct	2003-2005	Upper to Central western GOT
							M 19.51 / F 20.10	w=0.4127^{1,2,3,4}	Jan-Apr, Jul-Nov	2003-2005	Southern GOT
							M 17.83 / F 18.92	w= 0.01457^{1,2,3,4}	Nov-May, Jul-Sep	2003-2005	ADS
	26.98	1.6	0.003	5.32	2.56	2.76				2007	GOT
	31.75	0.955	-0.0066	8.1783	1.3944	6.7839				2007	ADS
Decapterus maruadsi							M 14.31 / F 13.19	w= 0.006713.178	Jan-Mar, May-Jul	2007	GOT
	27.75	1.01		6.31	2.05	4.26				2007	GOT

Stock status

- Length-Based Thompson and Bell conducted in 2018
- In 2017, short mackerel in Thai waters were fished under MSY both in the GoT and ADS
- Indian mackerel in the GoT was fished around MSY and, in the ADS, fished over MSY

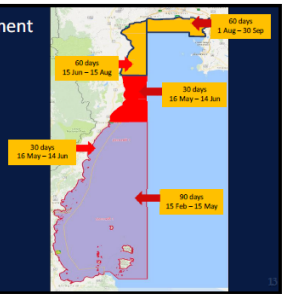
Area	Species	Catch at MSY (tons)	Catch in 2017 (tons)	F-factor	Status
Gulf of Thailand	*R. brachysoma*	26,228	23,849	3.0	$F_{2017} < F_{MSY}$
	R. kanagurta	5,759	4,804	1.1	$F_{2017} < F_{MSY}$
Andaman Sea	*R. brachysoma*	31,869	31,854	2.0	$F_{2017} < F_{MSY}$
	R. kanagurta	23,353	22,183	0.6	$F_{2017} > F_{MSY}$

Small pelagic fish management

- Royal Ordinance on Fisheries 2015
- Fisheries resources in Thai waters are managed commensurate with the maximum sustainable yield (MSY)
- The fisheries resources are classified into three groups for management purpose,
  - Demersal fauna (marine fish that live near seafloor and invertebrate)
  - Pelagic fish (marine fish which live in water column)
  - Anchovies (referred to only anchovy species)
- **Mackerels and scads are managed under pelagic fish group**
- MSY assessment is conducted and TAC is determined based on MSY
- TAC is allocated to fishing vessels
- Number of fishing days is limited for high efficiency fishing gear, e.g. purse seine 240 days/year in the Gulf of Thailand and 255 days/year in the Andaman Sea

Small pelagic fish management

- Purse seine is prohibited in the coastal zone of 3 nautical miles
- Purse seine with mesh size smaller than 2.5 cm is prohibited for night time fishing
- Closed season
  - 3 areas in the GoT
  - 1 area in the ADS (1 Apr – 30 Jun)
- Fishing Logbook
- Vessel monitoring system (VMS) for ≥30 GT vessels



Recommendation

The catch of short mackerel in the Gulf of Thailand sharply decreased during the past 7 years. The catch in 2018 was only one tenth of the recorded maximum catch, although the catch slightly increased in the next few years. The short mackerel is also known as transboundary species. Some scientific evidences revealed that it migrates across the Thailand-Malaysia and -Cambodia boundary. Therefore, the management of short mackerel needs strong collaboration in order to rebuild and conserve short mackerel in the Gulf of Thailand.

Problems and constraints

Marine fisheries in Thailand are characterized by multi-species and multi-gear fisheries similar to other tropical multi-species fisheries. Although determining single species reference points is feasible, management of a certain species is complicated particularly for small pelagic fish. Therefore, all pelagic fishes are grouped and MSY for pelagic fish group is used as the reference point.

Thank you

General Comments

- Write "PROVISIONAL" if the results are "provisional results".
- Confirm the data quality very carefully. CPUE cannot jump up or drop down so quickly. If the data is not good, do not use them.
- Conduct stock assessment for one stock. If several countries catch the same stock, be careful. The stock's decline can be because of the overfishing of the neighbour countries.
- If you use several methods, confirm whether the results are consistent or not. If they are not consistent, explain why, and select the best result.

Stock assessment methods 1

- If good fishing effort data is not available, CPUE (total catch /total effort) is not reliable. Try to collect logbooks from sampled vessel.
- Fox model can be useful for understanding the potential of the stock. A long-term good CPUE data is required.
- ABC method can be useful if you do not have long-term CPUE data. If you have good CPUE data in recent years, ABC rule 2.1 is applicable. If you have good recent catch data, ABC2.2 can be useful. If recent catch or CPUE is not available, do not use ABC rule.

Stock assessment methods 2

- If the catch and CPUE data are not reliable, you can use other method such as YPR or Length-based method.
- YPR requires reliable growth curve, natural mortality, and length composition for estimating F cur(fishing mortality) and tc (age at first capture).
- Length-based method needs only the current length frequency, length at maturity, and M/K (a population parameter). The recommendation is difficult to conduct if the gear targets multi-species.

Invite assistance

- Stock assessment is not easy.
- Data preparation, validation and cleaning needs experiences.
- If you have any difficulties, please invite assistance form experienced person.

Annex 15

CLOSING REMARKS

Dr Masahito Hirota
Deputy Chief of SEAFDEC/MFRDMD

The Second Core Expert Meeting on Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region

SEAFDEC/MFRDMD, Kuala Terengganu, Malaysia
29 August 2022

Dr Worawit Wanchana, Policy and Program Coordinator, Mr Sukchai Arnupapboon and Ms Thanyalak Suasi from SEAFDEC/TD/SEC, Dr Rumeaida Mat Piah from University Malaysia Terengganu, Dr Matsuishi Takashi Fritz from Hokkaido University, and Dr Katoh Masaya from FRA Japan.

Ladies and Gentlemen, Good afternoon.

Thank you very much for the active participation from eight SEAFDEC Member Countries. Because of the long-term Covid-19 pandemic, we've set a video meeting today. Here, we would like to apologise for the inconvenience of this form. Activities for "Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region" are supported by the JTFVII Phase II. We are now at the halfway point of the road map for 5years project. Toward the final goal, today's discussion will surely give us an excellent meaning for the further progress of this project. From these outputs, we will provide scientific advice for the sustainable management of pelagic resources in this region. I hope we will work closely and continuously together to achieve its goal. Now, I declare the meeting closed.

Thank you very much.