



**Establishment and Operation of a Regional System of Fisheries Refugia in  
the South China Sea and Gulf of Thailand**

**REPORT**

**TECHNICAL MEETING FOR THE ACADEMIC MANUSCRIPT OF  
SQUID FISHERIES REFUGIA  
BANGKA BELITUNG PROVINCE**

Pangkal Pinang,  
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**SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER  
TRAINING DEPARTMENT**



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**VENUE**

Meeting Hall, Department of Marine Affairs and Fisheries for Bangka Belitung Province, Pangkal Pinang City, Bangka Island.

**OBJECTIVE OF THE MEETING**

The purpose of the meeting was to deliver the study result and the prepared academic manuscript to the relevant stakeholder in Bangka Belitung Province. This meeting also gathered constructive input from the participant regarding the squid fisheries refugia implementation plan in Bangka Island.

**MEETING NOTES Meeting Agenda****1. Remarks from The Head of Research Institute for Fish Resource Enhancement/RIFRE as Indonesian National Focal Point (NFP) for Fisheries Refugia Project (Ir. Iswari Ratna Astuti)**

The Indonesian NFP acknowledges the presence of the secretary of ARHRD and secretary of the MAF Department for Bangka Belitung province as well as all the participants. This meeting was one of the squid fisheries refugia activities in Indonesia as part of the international programs by GEF/SEAFDEC. This program was established from 2019 to December 2022. The project was expected to build fisheries sustainability by providing scientific evidence as the basis for developing fisheries management. This meeting was attended by 34 participants representing relevant stakeholders. Special thanks were stated to all the stakeholders involved in the project.

**2. Welcome Speech from The Secretary of Marine Affairs and Fisheries (MAF) Department for Bangka Belitung Province. Provincial Government of Bangka Belitung (Drs. Wahyono).**

As the host of the meeting, MAF Department for Bangka Belitung Province appreciates all the attended participants. This meeting aimed to elaborate on the academic manuscript of squid fisheries refugia to support the implementation of the proposed recommendations. This meeting will present information from Mrs. Astri and Mrs. Amula and facilitate discussion regarding the project's result and implementation.

**3. Opening Speech from The Secretary of Marine and Fisheries Agency for Research and Human Resource Development (ARHRD), Ministry of Marine Affairs and Fisheries (Dr. Koesdiantoro)**

The ARHRD acknowledges the MAF Department for Bangka Belitung Province for the kind response in facilitating this event, he also acknowledges Dr. Tony Ruchimat as one of the initiators of the project and all the researchers involved. In IFMA 711, Bangka Belitung Squid is positioned in a very important for squid due to its potency as a nursery, spawning ground, and egg-laying ground. This condition should be a benefit for the local government and community to promote squid and become one of the economically important commodities. The Bangka squid has a unique taste and belonging a relatively inclined export trend (14,7% annually). Bangka Island, as one of the squid center in Indonesia, produce squid which was mostly imported to china, southeast Asia, and uni- emirates. With the 33 million USD international trading potency, squid might require all involved stakeholders to keep the sustainability of the squid especially because this commodity has not farmable.

The squid management shall be developed based on the study result as the scientific evidence to preserve the resource. Bangka squid may be claimed as the leading commodity and local icon in Bangka Belitung. The stock sustainability of the Bangka squid is the main concern of this project and is expected to produce overcome for the wealth of the fishermen and all stakeholders in Bangka Belitung. Sustainable fisheries management could be implemented by several approaches such as technical measure management, quota management, and indirect measurement instrument management (incentive program). The fisheries management mostly was implementing a technical measure management approach. This project may be proposed to the governor as a gift for the Bangka Belitung anniversary this year to promote fisheries resources, especially for squid. We expected active input from all the stakeholders to enrich the academic manuscript presented in this meeting.

#### **4. Presentation by Indonesian National Scientific and Technical Focal Point (Mrs.Astri Suryandari)**

The fisheries refugia project in Indonesia was implemented by focusing on the IFMA711 area due to several threats that existed in this area such as habitat degradation, overexploitation, and pollution. The terminology for “Fisheries Refugia” comes from the agreement made by UNEP which was defined as a marine spatial area dedicated to the protection of important species during their critical phase. The difference between the fisheries refugia area and the conservation area was the flexibility in which there is no “no-take zone” implemented. The critical phase concerned was the nursery and spawning phase of the species' life cycle. The essential habitat that become a concern in Fisheries Refugia was mangrove, seagrass, and coral reefs. For squid, the essential habitat was seagrass and the coral reef ecosystem. The fisheries refugia focused on recruitment overfishing and growth overfishing.

Several steps implemented in fisheries refugia followed several options in management such as the specification gear allowed, open-close system, and rehabilitation of the habitat. Fisheries refugia have been established in several countries like Australia for squid and Cambodia for skipjack tuna. Indonesia, through MMAF, has built cooperation with SEAFDEC to enroll this project in the source funding provided by GEF/UNEP. There was 6 country involved in this project. Indonesia was involved in this project in June 2019 and will be ended in December 2022. The goal of the project was to implement this concept in squid fisheries management for Bangka Belitung Province. Indonesia had chosen 2 locations for implementation of the fisheries refugia concept, i.e., penaeid shrimp in west Kalimantan and squid in Bangka Belitung. This project expected input from all stakeholders. The scientific data acquisition had been conducted in 2020 and 2021. The Indonesian fisheries refugia were also provided with all necessary information in the developed website, the dissemination activity was also conducted by involving local government and stakeholders. Today we acknowledge PPN sungai liat staff for their active participation during the sample collection. Several meeting was also had been conducted with the local government and PT. Timah in order to collect essential information from a different point of view.

#### **5. Presentation by the Principle Investigator for Squid Fisheries Refugia Study (Dr.Amula Nurfriani)**

The presentation will expect input from all participants to strengthen the fisheries refugia concept. Bangka Belitung was selected as a priority in implementing fisheries refugia due to the squid

was a priority commodity in IFMA 711. Squid has a strategic position because of the first volume and export in the small pelagic species category in Bangka Belitung. IFMA 711 was categorized as overexploited fisheries area. Recently, there was initiated for marine tourism area of Tuang in Bangka Belitung which is also in line with the squid fisheries management efforts. Several threats were identified in squid fisheries management, i.e., sedimentation due to the tin mining activities which affect the degradation of critical habitat for squid (seagrass and coral reef), and non-selective fishing gear (trawl and lift net). Squid has a very short lifetime (1-2 years) where male squid will die soon after reproduction while female squid will die soon after laying their eggs. This, this one life cycle was very important to be concerned with in preserving the squid. This condition was investigated to get accurate information by using the scientific approach.

The social economy issue has come from there being no alternative livelihood for the local fishermen who will be using a small fishing area of Tuang (more than 1000 fishermen during the peak fishing season) as well as the resistance from the fishermen who will not agree on the fishing prohibition. The proposed model for squid refugia was based on the scientific study result followed by a distribution map and essential habitat, delineation of fisheries refugia area, and recommendation option. Squid in Bangka was belonging stock connectivity in WPP 711. Current fisheries activity in Bangka Belitung has various vessels operating from small vessel/artisanal to large vessels (15-20 GT) and lift nets (stationary or vessel-equipped lift net).

The fishing ground is distributed across IFMA 711 along the Bangka island by the operation of a lift net which will be operational before November and December, squid fishing, and trap. The study found that the fishing season was known from April to June and Oct to November. 20% of the squid captured in this fishing season was mature adult squid. The squid habitat condition with the good condition will support the squid eggs laying. The squid fishing fishermen were dominated by productive fishermen experienced in using artisanal vessels for 5 years. The Bangka island possessed the local wisdom in Tuang that allowed only small vessels and squid jigging as the gear in squid fishing. From the study result, there were identified two areas as the nursery ground and spawning ground in five clusters which were mostly indicated by the existence of seagrass and coral reef ecosystem. The squid also required a specific substrate (sand- rubble) and associated with seagrass, coral reefs, and water turbidity condition ideal for the squid feeding ground and nursery ground. The potency area for refugia calculated was more than 1 million Ha covering most of Bangka Island waters. From this 1 million Ha there were selected priority areas for squid fisheries refugia as the spawning ground and the nursery ground. The spawning area from 1 million ha potency was specified to a 150 ha priority area. Several recommendations proposed in this academic manuscript, i.e., the open-close season during the peak of spawning season or prohibition of mature or broody squid, prohibition of juvenile squid fishing by regulating allowed lift net operation, implementation of egg-laying and nursery habitat protection, environmental rehabilitation, prohibition of destructive gears, and promoting alternative livelihood for fishermen during closed-season, and optimize the local wisdom.

#### **Discussion (Led by Dr. Tony Ruchimat, Marine and Fisheries Polytechnic)**

Allowed capture fisheries in IFMA 711 area are now low than 80%. This condition was due to the exploitation rate is getting higher. This fisheries refugia project aimed to create management measures for squid sustainability. Fisheries refugia are different from fish preservation. This project was initiated in 2017 and implemented in 2019. This project funded by the cooperation between the Indonesian government and SEAFDEC/GEF. The speaker's presentation will talk about the project's history and

progress as well as the academic manuscript that would develop a similar mindset among participants to promote local government regulation in squid fisheries management.

*Question/inputs by Mrs. Yuyun. Marine Spatial Plan Staff, Department of Marine Affairs and Fisheries for Bangka Belitung province*

- The document still needs some revision regarding the season and the area of Tuing conservation area.
- The recommendation regarding the alternative livelihood was difficult to implement because the squid fishing method implemented in Bangka Belitung was more eco- friendly than in other areas.
- The open-closed season is more implementable for certain areas selected as refugia areas.
- Is there any retention time after reproduction to be allowed to catch before male or female squid die

Response by Dr. Amula

- All the recommendation proposed today has designed to be implementable in Bangka Belitung as the role model.
- Approximately 20% of artisanal fishermen were very depending on the squid resource. Thus, shifting the fishing target during the closed season may be followed by supporting the fishermen to use the recommended fishing gear to catch non-squid commodities and to move the squid fishing gear outside the refugia area.
- The close-fishing season duration might be developed based on the agreement among all stakeholders involved from the five months of the recommended closed season.
- The Fisheries refugia area below 4 miles was under the authorization of the local government of Bangka Belitung while more than 12 miles was under the authorization of the national government. We need input from Mr. Aris (Directorate General of Capture Fisheries, MMAF) and Mr. Mahdan (Directorate General of Marine Spatial Planning) regarding these challenges to bring fisheries refugia also implementable in national waters jurisdiction.

Response by Mr. Aris (Directorate General of Capture Fisheries, MMAF)

- IFMA 714 close season for yellowfin tuna has implemented. Thus if a vessel through VMS recorded to fish in this IFMA 714 area there would be legal consequences
- Public consultation is also important to conduct to gather industrial sectors involved to avoid resistance from the community prior to regulation implementation.
- The recommendation from fisheries refugia is acceptable, but needs to be followed up by further discussion.

Response by Mr. Mahdan (Directorate General of Marine Spatial Planning, MMAF)

- Regarding the proposed recommendation, several recommendations were implementable, especially conducting additional national conservation areas, limitation gear allowed, and closed season.
- This recommendation may be used as the scientific basis to promote a new regulation and the regulation that needs to revisit.
- Location more than 12 miles is free-mining activity and not overlapping with the existing national spatial management planning.
- Most of the priority areas were in national authority and some area was in local government authority.

*Questions/Inputs from Mr. Arman, Head of Bangka District Fisheries Department*

- In Bangka District, only 5000 fishermen recorded, the mining activity below 12 miles is still operational along Bangka. The overlapping interest shall be a concern in this recommendation implementation.
- The monitoring of the refugia area is not well elaborated.
- If the closed fishing season is implemented, what is the alternative livelihood for the fishermen impacted by this regulation?

Response from Dr. Amula

- The implementation of the fisheries refugia concept will concern the overlapped interest. This may be a compromise to find an agreement.
- To open the tin mining activity may put their concern on the impact of mining flush system not to be affected negatively to the egg-laying habitat.
- Regarding Mrs. Yuyun question, the male squid will die soon after reproduction, while the female will stay alive until 21 days from egg laying to egg hatching.

Response from Mr. Danu Wijaya (Fisheries Refugia Research Team)

- Squid will keep alive from phase I to Phase 5 takes 6 month

Response from Mrs. Reny Puspasari (National Research and Innovation Agency)

- Compromization in implementing fisheries refugia is important to do to other important activities established in Bangka Island like Fishermen activity and Tin mining activity.
- Is there any alternative livelihood for Bangka Fishermen existed, and is there any non-squid fishing gear owned by fishermen?

Response from Dr. Tony Ruchimat

- The win-win solution is important to us to create squid sustainability in Bangka by learning from the Lemuru fish case which now is extremely declining due to no efforts conducted to ensure sustained recruitment.

*Questions/Input from PT. TIMAH (Tin mining Industry)*

- Recently, tin mining production significantly declined.
- PT. TIMAH is very supporting the ecological and fisheries resource sustainability
- PT. TIMAH through CSR programs has conducted mangrove planting activities to show its commitment to promoting fisheries sustainability.
- PT. TIMAH and Bangka Belitung University had been developed the “squid attractor” (a physical construction to promote squid egg-laying protection) to ensure sustained squid recruitment.

Response from Dr. Tony Ruchimat

- This academic manuscript will provide basic scientific consideration.
- Nevertheless, prior to regulation implementation, there will be multiple steps in the legal forum before the regulation implementation.

*Questions/inputs from Triyono Aris Kurnia (Capture fisheries staff, Department of Marine Affairs and Fisheries for Bangka Belitung province)*

- There is no recommendation to limit non-artisanal fishermen using large vessels.
- The small vessel using a 5 GT vessel may acquire more than 5 tonnes of squid, while larger vessels catch larger amounts of squids. The squid jigging fishermen mostly acquired only 2-5 Kg per day. Thus, there should be a recommendation for a moratorium on large vessel fishermen. This year, around rebo waters only acquires a small number of baby squids that should be concerned to promote this recommendation implementation.

Response from Dr. Tony Ruchimat

- We do agree that the small vessels fishermen/ artisanal fishing is important as the main impacted fishermen to concern.
- The fisheries refugia project teams provide a recommendation to be followed up as the materials to develop regulation by the national or local authority

Response from Mr. Aris

- Related to the regulation implementation for close season, should be implemented to all priority areas by considering squid in this area as a single stock
- Allocation of squid stock should be distributed to each operational vessel
- Technical measure implemented in fisheries refugia is promoting temporary fishing prohibition. But, the area of refugia should be compromised by considering the social economic impact.



**LIST OF PARTICIPANTS**

No.	Name	Gender	Institution/Position
1	Dr. Kusdiantoro	M	Secretary of Marine and Fisheries Agency for Research and Human Resource Development
2	Dr. Toni Ruchimat	M	Marine and Fisheries Polytechnic
3	Aris Budi	M	Directorate General of Capture Fisheries, MMAF
4	Ronny	M	Marine and Fisheries Agency for Research and Human Resource Development
5	Nurhayati	F	Marine and Fisheries Agency for Research and Human Resource Development
6	Purwanti	F	PPN sungai liat
7	Rianto Y	M	PPN sungai liat
8	Sukamto	M	PPN Sungai Liat
9	Hendri K	M	Bearau of legal and international cooperation, Marine and Fisheries Agency for Research and Human Resource Development
10	Herman	M	Fishermen community "KUB Napoleon"
11	Sugianto	M	Fishermen community "KUB KNLSB"
12	Arda	M	Fishermen community "KUB Harapan"
13	Subeki	M	Department of Marine Affairs and Fisheries for Bangka Belitung Province
14	Yuniara Ristiany	F	Department of Marine Affairs and Fisheries for Bangka Belitung Province
15	Mutiah Sahi	F	Department of Marine Affairs and Fisheries for Bangka Belitung Province
16	Aurela hayati	F	Department of Marine Affairs and Fisheries for Bangka Belitung Province
17	Vellya	F	Department of Marine Affairs and Fisheries for Bangka Belitung Province
18	Susy S	F	Department of Marine Affairs and Fisheries for Bangka Belitung Province
19	M. albab	M	Department of Marine Affairs and Fisheries for Bangka Belitung Province
20	Priyo P Putranto	M	Department of Marine Affairs and Fisheries for Bangka Belitung Province
21	Danu Wijaya	M	Research Institute for Fisheries Enhancement
22	Triono A	M	Fisheries Department for Bangka Tengah District
23	Nilawati	F	Department of Marine Affairs and Fisheries for Bangka Belitung Province
24	M. Wahyu Budianto	M	Department of Marine Affairs and Fisheries for Bangka Belitung Province

25	Hutriadi	M	Department of Environment and Forestry for Bangka Belitung Province
26	Hasti Wahyuni	F	Department of Marine Affairs and Fisheries for Bangka Belitung Province
27	Muhammad Aruf	M	Directorate General of Marine and Fisheries Resources Surveillance
28	Adie wijaya P	M	Directorate General of Marine and Fisheries Resources Surveillance
29	Ebbi W	M	PT. Timah
30	ODE A.D	M	PT. Timah
31	M. Zainuri	M	Department of Marine Affairs and Fisheries
32	Agus W	M	Department of Marine Affairs and Fisheries
33	Leo Gustomi	M	Department of Marine Affairs and Fisheries
34	Yanuar Catur P	M	Department of Marine Affairs and Fisheries
35	Yuyun TW	F	Department of Marine Affairs and Fisheries
36	Yeyen	F	Department of Marine Affairs and Fisheries
37	Fhores Fherado	M	Department of Marine Affairs and Fisheries for Bangka Belitung Province
38	Esrawaty	F	Department of Fisheries for Bangka District
39	Arman	M	Department of Fisheries for Bangka District
40	Yusuf	M	Department of Fisheries for Bangka District
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43	Dr. Reny Puspasari	F	National Research and Innovation Agency
44	Dr. Khairul Amri	M	National Research and Innovation Agency
45	Mahdan	M	Directorate General of Marine Spatial Planning
46	Iswari Ratna	F	Research Institute for Fisheries Enhancement
47	Dr. Amula Nurfiarini	F	Research Institute for Fisheries Enhancement
48	Astri Suryandari	F	Research Institute for Fisheries Enhancement

**MEETING DOCUMENTATION**

