Southeast Asian Fisheries Development Center

United Nations Environment Programme

Global Environment Facility

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

REPORT
THE SIXTH MEETING OF
THE REGIONAL SCIENTIFIC AND TECHNICAL COMMITTEE

SEAFDEC/TRAINING DEPARTMENT
4-6 JULY 2022

SEAFDEC/UNEP/GEF
Fisheries *Refugia*

AUGUST 2022

Cover Graphic:
Somboon Siriraksophon

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REPORT

1. OPENING THE MEETING

1) Project Coordination Unit of the SEAFDEC/UNEP/GEF Project on Establishing and Operation of a Regional System of Fisheries *Refugia* in the South China Sea and the Gulf of Thailand organized the Sixth Meeting of the Regional Scientific and Technical Committee (RSTC6) at SEAFDEC/Training Department (TD), Samutprakarn Thailand on 4-6 July 2022. The National Scientific and Technical Focal Point attended the meeting from six partner countries. The project's national focal points and the SEAFDEC/TD scientists also participated in the discussions. The list of the participants is in **Annex 1**.

1.1 WELCOME SPEECH FROM SEAFDEC/TD

2) Mr. Isara Chanrachkij provided a welcome remark on behalf of the SEAFDEC secretary general, Ms. Malinee Smithrithee. He welcomed all participants to the 6th Regional Scientific and Technical Committee Meeting for the SEAFDEC/UN Environment/GEF Project on Establishment and Operation of a Regional System of Fisheries *Refugia* in the South China Sea and the Gulf of Thailand. Eventually, the project could do a hybrid meeting. Also, he mentioned that it was a good sign that the project has used lessons learned from the Covid-19 pandemic. He recalled some members who visited the SEAFDEC/TD during the first PSC meeting in December 2018. This is the first time the fisheries *refugia* project has organized a meeting at the Training Department (TD) of SEAFDEC. He conveyed SG's apology to the meeting as she could not attend the meeting due to an urgent appointment. However, she ensured the Project Coordination Unit (PCU) and the TD staff took good care of the participants during their stay at TD. He mentioned that since Thailand officially opened the country without requiring a Covid-19 test and quarantine starting on 1 July, he encouraged all participants to stay safe and wear masks during the meeting due to many barnstorming sections to discuss how to meet the project objectives and outcomes. Finally, he looked forward to the fruitful results of the RSTC6 meeting.

1.2 OPENING REMARKS BY DOF/THAILAND

3) Ms. Praulai Nootmorn, National Scientific and Technical Focal Point and National Focal point for Thailand, provided the opening remark on behalf of the Department of Fisheries/Thailand, the co-host of the meeting. She was pleased to meet all participants face to face. She apologized that the RSTC6 venue was finally at SEAFDEC Training Department after discussing with the PCU due to the logistics and existence of the Covid-19 situation. Regarding this, the organizer team will do their best to accommodate participants during the three days meeting in TD. On the progress works, she expressed her appreciation for all countries' efforts since 2017; many achievements are from the joint effort at national and regional levels. Therefore, she has confidence that the project will be completed successfully by the end of this year. She also stated that the Department of Fisheries/Thailand considers the importance of the fisheries *refugia* approach as a tool for the sustainable development of the Fisheries. DOF/Thailand will continue applying fisheries *refugia* to protect critical economic species even after the end of the project. She expressed her appreciation to all for participating in this meeting. She also looked forward to fruitful discussions from this meeting. Then, she declared the meeting open.

2. ELECTION OF OFFICERS FOR THE MEETING ORGANIZATION AND ADOPTION OF AGENDA

2.1 DESIGNATION OF OFFICERS

4) Mr. Somboon Siriraksophon, Project Director, as a secretariat of the RSCT6, introduced the meeting to the elected chairpersons and vice-chairpersons in the past RSTC meetings. He also informed the meeting that the election of a new RSTC chair and vice chairperson would only be among the RSTC members. The RSTC members were, therefore, invited to nominate a new Chairperson and Vice-Chairperson. After deliberation, Mr. Jamil bin Musel, alternate National Scientific and Technical Focal Point for Malaysia, and Ms. Astri Suryandari, National Scientific and Technical Focal Point for Indonesia, were elected as Chairperson and Vice-Chairperson, respectively. However, there was a brainstorming session on day one in which Mr. Somboon Siriraksophon led the discussion.

2.2 ORGANIZATION OF WORK

5) Mr. Somboon Siriraksophon informed the meeting about the details of the hybrid meeting and logistic arrangement and other general information for the smooth operation of the RSTC6 meeting with the highest safety from the Covid-19.

2.3 ADOPTION OF THE AGENDA

6) Mr. Somboon Siriraksophon introduced the meeting agenda in detail, referring to the target objectives and outputs of the RSTC6. After consideration, the committee adopted the agenda as **Annex 2** of this report.

3. BRIEF PROGRESS REPORT OF THE PROJECT DIRECTOR

7) Mr. Somboon Siriraksophon highlighted the progress of establishing the fisheries *refugia* in six participating countries based on the country's report as of 30 June 2022. He summarized that 12 of 15 fisheries *refugia* sites of about 810,649 hectares are expected to be adopted by 2022. Among these, three fisheries *refugia* are agreed upon among stakeholders and approved by the government, including two in Cambodia at Kep Province for blue swimming crab and Koh Kong Province for indo-pacific mackerel, and another one in Surat Thani provinces Thailand for blue swimming crab. In addition, eight fisheries *refugia* are receiving the perception and agreement from the stakeholder and will be adopted by the responsible agencies. These include one in Cambodia at Kampot Province for the juvenile grouper, one in Thailand at Trat Province for indo-pacific mackerel, two in Malaysia at Tanjung Leman, Johor State for spiny lobster, and at Miri, Sarawak State for tiger prawn, three in the Philippines at Bolinao for siganids, at Masinloc for one-stripe fusilier, and Coron for redbelly yellowtail fusilier, and one in Indonesia at West Kalimantan for white prawn. Indonesia has another fisheries *refugia* site for squid at Bangka Belitung, which is underway to identify the fisheries *refugia* boundaries. While, due to delayed initiatives of the project, Viet Nam reduced the project size with the expectation to implement two *refugia* sites by the end of 2022.

8) Ms. Astri Suryandari informed the meeting that Indonesia proposed a Fisheries *Refugia* for penaeid shrimps in West Kalimantan, about 414,807 ha, which cover three regencies: Kubu Raya, Ketapang, and North Kayong Regencies. In addition, during the second quarter, Indonesia proposed fisheries *refugia* for squids in the Bangka Regency of about 468,000 ha. The management at *refugia* sites would depend upon distances from the shoreline, as under 12 nautical miles will be managed by the provincial regulation. Also, the establishing process would take time to be adopted; however, it would be adopted by 2022.

9) Mr. Le Tran Nguyen Hung, National Focal Point for Viet Nam, apologized for the country-level slow process. However, they will do their best. He informed the meeting that the *refugia* sites have changed due to the proposed Con Dao Island being set as a Marine

Protected Area (MPA), while another site at Bach Long Vi Island is far from the land, and no fishermen are operating on the area. He then updated the meeting on two new *refugia* sites: at the coastal area of Lagi – Binh Thuan for Subcrenata ark clam and another one at the eastern coastal area of Phu Quoc – Kien Giang for Blue swimming crab. Also, D-Fish of Viet Nam will apply the existing Fisheries Laws and co-management, which is fundamental to establishing the fisheries *refugia* in both identified sites.

10) Concerning the proposed priority species at three *refugia* sites in the Philippines, Mr. Somboon Siriraksophon sought clarification on the updated status of the white-tipped scad in Coron and Frigate tuna and Fringe scale sardine in Masinloc. In response, Mr. Joeren S. Yleana, National Point for the Philippines, clarified that usually country proposes one species per site. Considering other species listed, as mentioned, the on-site committee identified that the project needs to have additional species with transboundary importance. Accordingly, the National Fisheries Research Development Institute (NFRDI) has analyzed reproductive biology to validate the other three species and understand the critical life stages before deciding on managing the species via the *refugia* approach. He also updated the status of the initial Executive Order for establishing three *refugia* which are already on the table of the Local Government Unit (LGU). Then, hopefully, by the third or early fourth quarter, we could submit the uphold *refugia* areas.

11) Mr. Ouk Vibol, National Point for Cambodia, pointed out that in the case of Cambodia, the approved map has to be stamped and sealed. He suggested making use of the approved map provided to the PCU.

12) For Malaysia, Mr. Salleh Udin Bin Jamon, National Scientific and Technical Focal Point for Malaysia informed the meeting after Malaysia proposed the adjustments of two *refugia* boundary areas after discussion with the experts and consultants. He announced that the fisheries *refugia* for spiny lobsters at Tanjung Leman, Johor, is changed from 140,000 ha to 171,549 ha in the exact location.

13) Additionally, Ms. Praulai Nootmorn corrected the duration of the closed season for the Indo-pacific mackerel in Trat province from January to February.

14) Mr. Somboon Siriraksophon, therefore, revised the *refugia* map based on the updated information from six countries as shown in **Annex 3**.

4. BRAINSTORMING SESSION ON THE RESULTS FRAMEWORK

4.1 COMPONENT 1: IDENTIFICATION AND MANAGEMENT OF FISHERIES AND CRITICAL HABITAT LINKAGES AT PRIORITY FISHERIES *REFUGIA*

15) Somboon Siriraksophon presented the required outcomes from Component 1 on Reduced stress on fish stocks and coastal habitats via improved national management of key anthropogenic threats to fisheries and critical habitat linkages. Regarding this, the PCU focused on the target outputs from six countries as follows:

A. ABOUT 50% REDUCTION IN FISHING PRESSURE

16) Mr. Somboon Siriraksophon informed the meeting of the results framework's objective No.1: effective management of critical threats to 14 fisheries *refugia* sites [269,500 ha], including ~50 percent reduction in fishing pressure within sites at times critical to the life-cycles of fished species of transboundary significance. He informed that the results on establishing 14 *refugia* sites targeting 269,500 ha are no longer an issue because the project could meet 15 *refugia* with about 1.36 million hectares committed by six countries as mentioned in Agenda 3. However, He raised the issue of about a 50 percent reduction in

fishing pressure within *refugia* sites. He then asked the country how they considered this issue when drafting the management measures to reflect a reduction in fishing pressure in each *refugia* site.

17) Ms. Praulai Nootmorn shared the lessons learned from Thailand by referencing the catch data from the *refugia* area. To manage the catching of Indo-pacific mackerel spawners during the fishing closure from January to February, the stakeholders agreed to ban pair trawlers and purse seiners in the area for two months while other small-scale gillnet vessels are allowed to catch. These management measures for Indo-pacific mackerel could 100% reduce commercial fishing gears in the *refugia* area of Trat Province. She also informed that in the case of blue swimming crab *refugia* around Koh Sed, Surat Thani Province, the measures are not to allow crab traps and crab gill net fishing to be operated in the *refugia* entire the whole year. This is because the *refugia* area is essential as nursery and spawning grounds where seagrass are habitat linkages. This is also the measure to reduce 100% fishing pressures from two gear types.

18) Mr. Somboon Siriraksophon also requested the meeting to consider whether the management measures for established *refugia* concerned the commercial fisheries rather than small-scale fisheries. The original project proposal assumed the impact on fisheries *refugia* and habitat linkages only on small-scale fishing pressure. However, the results from Thailand showed that not only small-scale alone but commercial fisheries affect the fisheries *refugia*.

19) Mr. Valeriano M. Borja, National Scientific and Technical Focal Point for the Philippines, mentioned that in the Philippines's case, the measures being proposed or being considered in the management plan are spatial-temporal closure, which would reflect the 100% reduction during specific periods where there are critical stages of the species being protected like in one of our sites in Masinloc. NFRDI also imposes size limitations in the *refugia* area. However, his opinion on measuring the 50% reduction in fishing pressure is hard to determine because NFRDI already set the baseline on size limitations.

20) Mr. Somboon Siriraksophon pointed out how to reflect the 50% reduction of fishing pressure even though the country baseline is a size limitation. Considering the size limitation baseline is linked to the selective mesh size net for targeting fish size. The size limitation implied the need to manage fishing mesh size or indirectly manage fishing vessels. The number of fishing vessels or % in reduction of fishing pressure follows size limitation measures, which can then be calculated.

21) Mr. Joeren S. Yleana emphasized that for small-scale features remarkably, the Philippines differs in terms of classification of their waters, 15 km from the shore is for the small scale that's for vessels using only not over than three gross tons in measurement, just around 30ft. There's no commercial feature allow.

22) Mr. Somboon Siriraksophon concluded that Philippine do not face issues on reduction of 50% fishing pressure at all.

23) Ms. Praulai Nootmorn sought clarification from the Philippines on monitoring whether caught fish is the right size.

24) Mr. Joeren S. Yleana mentioned that the Philippines do have random checks in the market, and so sometimes we also conduct information, education, and communication campaign (IEC).

25) Mr. Le Tran Nguyen Hung shared some experiences in managing and regulating size limitations. He mentioned some existing problems in world fisheries, particularly on fishing net mesh size and the catching of juvenile fish. He mentioned that every country has its

own fishery measures to regulate and control the fish size, but why on landing, there are so many juveniles. To solve that problem, awareness building, regulation, and penalties are very important. However, in Vietnam, the community is very important like the fisheries *refugia* approach; the community is involved in developing its own rules and regulations.

26) Mr. Somboon Siriraksophon added that changing attitude of the human to accept more conservation, right? He thought that is the solution that he observed many countries when they establish fisheries *refugia*, they also come up with that management measure to conserve the fish. He though for Philippines based on his conclusion he found that the gear limitation is linked to the link to the fish size limitation. So that the project still can know numbers of vehicles that have been regulated. Because the vassals who test someone's side, they have a specification like that. But the problem is how to apply the best practice to them. Modification of gear. since he works on gears, he found that this is the most important and the more difficulties to change the fishermen's attitude or change the gear specification. In Thailand, he thought this is quite clear. Thus, the project can know exactly how many vehicles from this area. So, the project tries to make link to the number of the vessels.

27) Mr. Salleh Udin Bin Jamon mentioned that when the project reduces the fishing pressure, the stock number is supposed to be increased. Also, the best way here to prepare the project can use the stock assessment before implementing the *refugia*, and after that, it can be compared to see the difference in the stock status before and after. Therefore, if the project gets more stock, it is good. However, for Fisheries *refugia*, the project only closed a few months to protect; it is necessary to note that getting 50 percent is very high. Also, some species migrate to different countries, which is hard to track.

28) Mr. Jamil Bin Musel added that Malaysia's practice in the tiger prawn *refugia* was simply because tiger prawns did not migrate far, this is one of the better solutions to calculate 50%, and we just prevent catching tiger prawns for stage four from August to October, which is three months only then Malaysia will collect from the previous years, maybe two or five years before the implement. Then Malaysia can calculate it how to reduce the 50% from the area. He further updated that DOF/Malaysia has negotiated with the stakeholder and local community of the establishment of tiger prawn *refugia* in 2021, the stakeholders and fishers agreed the proposed fishing closure for three months from August to October. In addition, the stakeholder agreed on the measures and regulations to remove all trawlers in the *refugia* area or ship out all trawler within 7 km to 14 km from the shoreline. Meaning that 100% trawlers are removed from the *refugia* area within 7 km from shoreline.

29) Mr. Salleh Udin Bin Jamon added on spiny lobster *refugia* that there is a fishing closure season from July to September, and no trawlers allow to operate in the area. Based on fisheries statistics and licensing system, only seven trawlers operated in the area. DOF/Malaysia regulates and does not give the license during the fishing closure period to protect the lobster spawner. Also, during the consultation, Malaysia also mentioned to the stakeholder to release the small size of lobsters outside the closing seasons. Also, the lobster with gravid eggs should be released back to the sea. Also, the releasees of the small size are applied for the whole year.

30) Mr. Somboon Siriraksophon sough clarifications from Malaysia on "how can DOF/Malaysia know that fishers released the small lobsters to nature"? any communication, social media or evidence to confirm fisher's good practices?

31) Mr. Salleh Udin Bin Jamon mentioned that was a good point. Maybe Malaysia can check at the lending site and the enforcement programs.

32) Mr. Somboon Siriraksophon suggested that Malaysia learn from DOF/Thailand as they use the social communication media, such as LINE, FACEBOOK, etc to communicate with fishers on releasing blue swimming crab with gravid eggs to nature from trawler. The essential things are the fisher's attitude toward marine resources conservation; behind this, the social media from mobile phones stimulate fishers to perform good fishing practice by releasing crabs with eggs to nature because the fisher is an actor in the short video-clip and share to the public during at sea or after back to home port. People, who saw video-clip, appreciated, and liked these excellent practices, while other fishers from other trawlers followed the same. From one to ten to a hundred and ten thousand crabs were released to nature in a year. This is one of the best practices from Thailand on changing fisher's attitudes on the protection of spawners, even outside the fisheries *refugia* area, that should be applied to other countries, including lobster fisheries in Malaysia.

33) In Cambodia, Mr. Leng Sy Vann confirmed 100% fishing pressure reduction during the closed season in the selected *refugia* area. For instance, at Kep fisheries *refugia* for blue swimming crab, and at Koh Kong for Indo-pacific mackerel, trawlers are prohibited from operating in the *refugia* area and the fisheries management area (FMA), while the project cooperates with Civil Social communities or Organizations and local government on deploying concrete blocks (as artificial reefs) to prevent trawlers and to enhance the fish shelter to protect spawner and fish larvae stages. He added the importance of public awareness to the stakeholders and communities at all levels to understand the fisheries *refugia* approach and their roles for sustainable management of fisheries at the site level. Strong support from the high ministerial level through proclamation and improved law and regulations could operate a regional system of fisheries *refugia* in long term.

34) Ms. Astri Suryandari, National Scientific and Technical Focal Point, informed the meeting that the reduction of fishing pressures in *refugia* sites is about less than 50%. Indonesia proposes fishing closure in West Kalimantan for penaeid shrimps *refugia* from October to December and Bangka Belitung for squid *refugia* from November to December. Currently, Indonesia has been working on management measures to regulate and manage the proposed fisheries *refugia*. One of the possible management measures applied in the *refugia* area to reduce the fishing pressure is to regulate the fish quota. Ms. Astri Suryandari also informed another good practice from the local community and fishers by stopping fishing one day a week. This is because most fishers are Muslim and do not go fishing every Friday. This Muslim practice could be considered good practice that supports the reduction of the fishing pressures; however, this is an optional one.

35) Mr. Hung Le Tran Nguyen shared his concerns regarding the management of fisheries that align with the fisheries *refugia* approach: firstly, decentralize the activities to the community level, secondly developing the management plan through the engagement of relevant stakeholders, and lastly, require regulations to coordinate inside the community. Throughout these three main activities, the fisher's awareness will be enhanced. However, there is a problem as the outside fishers enter the area. Thus, fishery regulations from the central government are needed. The meeting also noted that Viet Nam is in the process of drafting the management plan for two fisheries *refugia*.

36) The meeting also noted how vital the biomass assessment is in supporting the calculation of 50% fishing pressure reduction for long-term management proposed by Malaysia. Mr. Salleh Udin Bin Jamon and Mr. Jamil Bin Musel mentioned that the most crucial thing for biomass assessment or stock assessment is the historical data. However, other immediate solutions for resulting in this target objective are also accepted, as mentioned earlier by each country.

37) In conclusion, the meeting could solve the issue of a 50% reduction of fishing pressure at the *refugia* sites. Regarding this, many countries showed their management measures that could meet the project target indicator. Cambodia, Malaysia, the Philippines, and Thailand indicated a 100% reduction of fishing pressures in the *refugia* areas, while Cambodia also created fish shelters for spawner and fish larvae in the fisheries management area and *refugia* area.

B. FISHERIES MANAGEMENT PLAN

38) Mr. Somboon Siriraksophon requested each country to update the status of their management plan briefly. Also, the capitalized community exchange and the networking call as a site-based management board.

39) Mr. Ouk Vibol from Cambodia stated that Cambodia has three *refugia* sites officially endorsed by the Ministry of Agriculture Forestry and Fisheries (MAFF). Moreover, only one in Kep for blue swimming crab, the 5-year management plan, was endorsed by the Director General of FiA and the Governor of Kep Province. Another one for Indo-pacific mackerel in Koh Kong is in the final stage of the national consultation. For blood cockle Fisheries *refugia* in Sihanouk Ville, Cambodia does not have enough budget for drafting. Therefore, FiA requested the support budget from the project unspent budget from Viet Nam to develop the 5-year management plan. Besides, the *refugia* that has been developed so far, called Marine Management Plan, has been supported by the EU through EU Agriculture Program, and *refugia's* activities are supported in drafting the Marine Fisheries Management Plan. Also, Cambodia has a management plan for each *refugia* area and a national management plan to be applied to the whole country, which is in the final stage of consultation and hopefully will be finalized by Q3/2022.

40) For Thailand, Ms. Praulai Nootmorn stated that the Marine Fishery Management Plan for 2019-2022 was endorsed by the Department of Fisheries. Necessary management measures specified in the FMP (2019-2022) include the control of fishing effort through a total allowable effort (TAE) and licensing scheme and the use of incentives to remove excess capacity for fishing vessel, the introduction of area-based management for selected fisheries and introducing Fishery Improvement Projects (FIPs) for selected fisheries. This FMP includes progress in legislation on fisheries *refugia* in Thailand, covering two fisheries *refugia*. The FMP also guided a site-based management board setting-up and roles to look after and monitor the *refugia* areas. In addition, required capacity building or awareness-building programs to ensure that the board or fisher group understand their roles in monitoring and managing the *refugia* areas. Moreover, Ms. Praulai Nootmorn updated the meeting on setting of a knowledge centre for fisher groups in the *refugia* site. She also informed that a new FMP for 2022-2015 is on drafting which is finalized by the end of this year.

41) Mr. Jamil Bin Musel from Malaysia informed the meeting that in Malaysia there are seven Fisheries Management Areas (FMAs) which is under the Fisheries Management Plan (FMP), where target species will be enforced or regulated. The formula is for those species that caught more than 500 ton per year, those species is to be considered as one of the FMP endorsed by the Director-General of the Department of Fisheries. The management plan for two *refugia* were drafted called "inception report" for spiny lobster *refugia* and tiger prawn *refugia*. These reports are finalized soon after stakeholder consultation at both *refugia* sites starting in coming August 2022. These are essential documents involving the legal officer from the Department; hopefully, two *refugia* FMP to be endorsed by the Director-General by the end of this year.

42) Mr. Valeriano M. Borja stated that NFRDI submitted the drafted management plan for three *refugia* sites to the Site based management committee for review and endorsement.

Currently, NFRDI is waiting for feedback from the committee, and It is expected to be finalized by the third quarter. He also informed the management plan needs to be reviewed every five years.

43) Mr. Joeren S. Yleana added that all fisheries *refugia* sites in the Philippines are under the local community committee. So, the formulation and the implementation of the management plan are with them. BFAR and NFRDI's roles are monitoring and providing technical support to the community. But most importantly, in passing these management plans, especially in posting the measures, it is vital to make sure that all management plans are considered through a series of consultations.

44) Ms. Astri Suryandari informed that Indonesia had already drafted the management plans and recommendations documents from the stakeholders to be endorsed by the relevant agencies, including the Directorate General of Marine Spatial Planning, Directorate General of Capture Fisheries, and the provincial government of West Kalimantan, and Bangka Belitung. These agencies directly have the authority to manage marine space and resources. She pointed out again that three relevant agencies must endorse the Drafted management plans for two *refugia*, and later they will issue regulations for the legal of site management.

45) Mr. Somboon Siriraksophon sought clarification from Indonesia on whether Indonesia can complete the endorsement process of establishing two fisheries *refugia* by 2022?. In response to the question, Indonesia informed the meeting that the endorsement process might take more than one year to complete the process in practice.

46) For Viet Nam, Mr. Le Tran Nguyen Hung stated that Viet Nam is drafting the management plans for two fisheries *refugia*. In Viet Nam, the communities and local government at the provincial level are decentralized from the central government. Therefore, the management plan needed to be endorsed by them; in other words, the final benefit from the management plan should also refer to community and provincial government requirements for sustainable utilization of fisheries resources purposes.

47) Mr. Somboon Siriraksophon thanked all six countries for the updated status of the management plan documents for establishing fisheries *refugia*. He also noted that all country's efforts to complete establishing fisheries *refugia* by the end of 2022. However, He informed the meeting that before the project ended, the PCU would determine again whether the country's Certificate of Substantial Completion is required or not.

C. GEF SMALL GRANT PROGRAM

48) Mr. Somboon Siriraksophon informed the meeting that there is one expected outcome that the project did not do anything in terms of seeking funding from the small grant program. The expected outcome on a strengthened civil society community and organization participation and implementation to support the project through the GEF Small Grant Program. The PCU notes that no GEF SGP was applied to support the project implementation from SCOs, but it does not mean there is no engagement from the CSOs in the project implementation. Accordingly, the brainstorming session discussed this matter as follows:

49) Mr. Joeren S. Yleana stated that most of the time, in conducting the stakeholder consultation, the civics society community and organizations, including non-government organizations, will engage in the meeting.

50) In Thailand, the Sustainable Development Foundation (SDF) incorporated the project on the socioeconomic study in two *refugia* sites. Some grants from the project supported the survey and drafting of the study report conducted by SDF.

51) Mr. Jamil Bin Musel Malaysia agreed with the Philippines that Malaysia had imported the community concept called "MY KP" meaning that the community has a role in protecting and managing the *refugia* area. This civil society community from the site activities provided the necessary input or output to support the project.

52) Mr. Ouk Vibol mentioned that Cambodia has all relevant stakeholders involved in the project implementation. For instance, the community is involved in patrolling the area, and the local government works closely with the community, especially with the Fisheries cantonment.

53) Ms. Astri Suryandari informed that the project conducted the socioeconomic assessment through cooperation with the local society and community at two *refugia* sites. She was also impressed that at both *refugia* sites, there were many participations from communities in the fisheries *refugia* management and project implementation.

54) In conclusion, a strengthened civil society community and organization participation and implementation in the project was conducted in all countries supporting the project without application for the GEF Small Grant Program. The project could work well through the support and engagement of the CSO and communities at the site level.

4.2 COMPONENT 2: IMPROVING THE MANAGEMENT OF CRITICAL HABITATS FOR FISH STOCKS OF TRANSBOUNDARY SIGNIFICANCE

55) Mr. Somboon Siriraksophon introduced the primary outcomes requirement of project Component 2 is Increased institutional capacity in the 6 participating countries for the designation and operational management of fisheries *refugia* via the transformation of enabling environments and the generation of knowledge for planning. Regarding this, the PCU focused on the target outputs from six countries as follows:

A. 20 PERCENT INCREASE IN SMALL-SCALE FISHING VESSELS USING GOOD PRACTICES

56) Mr. Weerasak, the project technical coordinator from SAFDEC/Training Department, pointed out that the issues on fishing gear and practices designed to safeguard fish stock and critical habitat linkages have already passed this stage in Thailand. Thailand has already regulated crab trap fishing in the *refugia* sites by modifying the net mesh size for the crab trap and crab gill net. In addition, another best practice on releasing crab spawners into the sea.

57) The challenge is how can we know the fishers modify their fishing gear and practices to fishing in the regulated *refugia* area? Regarding this, Ms. Praulai Nootmorn clarified that Thailand linked the measures to the fishing license for commercial fisheries, such as limiting the size or number of fishing gears, e.g., length of gillnet and numbers of traps. To monitor the fisher's practices, enforcement programs are needed, including monitoring, control, and severances. At the Surat Thani *refugia* site, the local government, particularly the *refugia* site-based management board, works closely with fishers in the community called "Ranger" to monitor and protect the areas from illegal fishing. They work closely with the government officials in the community.

58) In Malaysia, Mr. Jamil Bin Musel shared his experiences in regulation and monitoring of the catch of Spiny Lobsters. Even though trawl fisheries are one of the critical threats to the spiny lobster's life cycles, mass size regulations are also tough to apply for manage of lobster *refugia*. However, fishing closure to protect spawners is one of the key measures

59) In Cambodia, Mr. Ouk Vibol stated that during the fishing closures for a few months in the fisheries *refugia*, some types of fishing gear that affected the critical target species are prohibited; but other gear types that do not harmful to the target species are still can

operate in the areas. However, it is hard to say the 20 percent increase of fishing vessels applied to best practices.

60) In Malaysia, considering the tiger prawn mainly caught by trawl fishing, Mr. Jamil Bin Musel strongly suggested that fishing closure is the most effective way to conserve, protect the spawners and enhance tiger prawn recruit stock. However, in the case of the spiny lobsters, it is good to catch by trap and the idea of releasing undersize and spawners back to nature. Malaysia will consider it in developing management plans and measures for stakeholders' acceptance.

61) Mr. Joeren S. Yleana mentioned similar approaches to Cambodia and other countries that rather than fishing closures with some management measures, it is hard to qualify the 20% increase fishing vessels target. He also updated the meeting that the management plans for three *refugia* in the Philippines are in approval processes through the relevant stakeholder and local governments. Regarding this, Mr. Valeriano M. Borja shared that it is better to limit the number of gears operations in the critical *refugia* rather than improve fishing gears and techniques for operation in the *refugia* area. For instance, in Coron Bay, by law, the local government approved only 20 bag-net boats to operate in the area. The approaches are more applicable to fishing license control.

62) Mr. Ouk Vibol added that during the closed season of Blood Cockle *refugia* in Sihanouk Ville, usually, people use the motorized vessel to harvest blood cockle. After applying the fishing closure in the blood cockle *refugia*, fishers are not allowed to gather blood cockle for a few months. In addition, fishers are not allowed to harvest with motorized vessels but only by hand during harvesting seasons.

63) Ms. Astri informed that Indonesia is still discussing the management measures related to fishing gear type and mesh size to apply to the west Kalimantan *refugia* site. For Banka Belitung, using the non-collective gears, which look like a trap but are small in size in the mangrove area, is a crucial threat to the juvenile stages of squid. Also, Indonesia proposed to discuss with the experts and stakeholders the relocation of the fishing area, limitation of Fishing gear and applying for a fishing license.

64) Mr. Jamil Bin Musel questioned how conservation of priority target species if they migrate outside the areas.

65) Mr. Somboon Siriraksophon said all the countries might face this issue, particularly if the selected target species are highly pelagic migration fish. In such a case, regional or sub-regional cooperation is needed to manage this transboundary fish stock like the Indo-pacific mackerel.

66) Ms. Astri Suryandari informed the meeting that Indonesia would apply the quota policy regulations this year to support and manage the fishing management area for small-scale fisheries (vessels under 30GT) up to a maximum of 12 nm from shore.

67) In Viet Nam, Mr. Hung mentioned that the activities on policy and legal are in progress. He mentioned that the new master plan that includes 73 fisheries *refugia* would be adopted by the government this year, while the project's management plan is in the drafting process. The management plans as primary legal documents are to support the local government in managing fisheries *refugia* at the provincial level.

B. CROSS-SECTORIAL AGREEMENT ON NATIONAL GUIDELINES

68) The meeting updated the status on the National Guideline development by country to support the long-term implementation of fisheries *refugia*. The results as of 30 June 2022 are as follows:

- Cambodia is finalizing the draft national guidelines.
- Indonesia drafted the guidelines and now seeking approval from the lead agency; the meeting also noted that it might take time for approval;
- Malaysia is drafting the guidelines;
- The Philippines is in the final process of documenting it as institutional guidelines;
- Thailand is in the final approach for adoption;
- No updated information from Viet Nam.

C. OTHER OUTPUTS RELATED TO IMPROVING THE MANAGEMENT OF CRITICAL HABITATS FOR FISH STOCKS OF TRANSBOUNDARY SIGNIFICANCE

69) Mr. Somboon Siriraksophon informed the meeting of other outputs required under component two, such as 1) status and trends in fish stock, 2) Online National and Regional websites, 3) GIS Mapping, 4) Fisheries and habitat data collection programs, and 5) demonstration of best fishing methods and practices.

70) Mr. Somboon Siriraksophon introduced the Marine Capture Fisheries Database and Dashboard for consideration by the committee. He pointed out that there are no issues on the national status and trends of a fish stock linked to the national statistics of fisheries in each country. However, to support the fish stock analysis of transboundary species in which more than one country is concerned in the management, the Project Coordination Unit decided to use the FAO fisheries statistical data for developing the regional marine capture fisheries database in Southeast Asia due to their continuous data availability. The PCU developed both the capture fisheries database and the dashboard and linked them to the fisheries *refugia* websites. The database is expected to support the ASEAN Member States in understanding the status and trends of transboundary fish stock or shared stocks for further appropriate management.

71) Concerning the national web portal, the meeting updated the progress on this issue as follows:

- Indonesia, Thailand, and the Philippines completed the national web portal under the national lead agency websites. Currently, these web portals are linked to the *refugia* website.
- Malaysia updated the *refugia* activities and database system under the relevant agency, Marine Park websites. Malaysia did not separate the web portal for *refugia* taking into account the long-term maintenance.
- Cambodia and Viet Nam are considering updating their national *refugia* information and data through the regional *refugia* website managed by PCU.

72) Concerning the Regional Mapping of fisheries *refugia*, including the GIS data and information, Mr. Somboon Siriraksophon is compiling the coordination of 15 *refugia* areas from six countries; it is expected that after the meeting, the PCU could have all GIS data and information for further updating to the Google Map software or another similar platform. If there were no changes on the *refugia* locations as reported, the PCU could complete these outputs by September 2022.

73) In addition to the regional *refugia* website, Mr. Somboon Siriraksophon informed that the website is improved quarterly by the PCU. All updated technical reports from national and regional programs are updated. In addition, the website includes the country's page with aims to promote the country's achievements and data collected at pilot sites.

74) Concerning the fishing practices demonstration at project sites, unfortunately, the PCU has prepared this activity by the end of 2019, but due to the Covid-19 pandemic until the 1st quarter of 2022, there is no demonstration. .

4.3 COMPONENT 3: INFORMATION MANAGEMENT AND DISSEMINATION

75) Somboon Siriraksophon presented the required outcomes from Component 3 on strengthened knowledge management and information sharing and access for enhanced uptake of good practice in integrating fisheries management and biodiversity conservation in the design and implementation of fisheries and environmental management systems, including Marine Spatial Planning. Regarding these, he summarized the required outputs as follows:

76) Concerning the enhanced uptake of best practices in integrating fisheries management and biodiversity conservation, the main output is related to the regional catalogue of the best practices in which the PCU will compile the existing best practices based on the results from 6 countries. The PCU expects to complete this task by September 2022.

77) Concerning the improved community acceptance of area-based approaches, the main outputs are the published and online awareness materials. All countries are requested to update the materials on the websites or national web portals. But for those countries that do not have a web portal, they can share with the PCU for uploading to the country page under the regional website—regarding this, sharing the awareness materials in pdf, picture format, or video recording data.

78) Concerning the knowledge generated and experiences from establishing and operating fisheries *refugia*, this output relates to the online web portal in which the meeting had discussed and updated. In addition, the project also required six published GEF IW Experience Notes. The PCU provides the Experience Note Template, as shown in **Annex 4**. Regarding this, the timeline for submission of the Experience Note is by the end of September 2022. The PCU plans to discuss the country experience note at the Seventh Meeting of the RSTC in October 2022 before sharing them with the GEF IW-Learn for publication online.

4.4 COMPONENT 4: NATIONAL AND REGIONAL COOPERATION AND COORDINATION

79) Mr. Somboon Siriraksophon presented the required outcomes from Component 4 on cost-effective and efficient coordination of national and regional cooperation for integrated fisheries and environmental management. Regarding these, Mr. Somboon Siriraksophon summarized the key outputs as follows:

80) Concerning the Strengthened cross-sectorial coordination, National scientific and technical expertise and knowledge harnessed, and Community-led planning of fisheries *refugia* management, the PCU has compiled the lists of the National Fisheries *Refugia* Committee (NFRC), National Scientific and Technical Committee (NSTC) and Site-based Management Board (SMB), respectively as shown in **Annex 5.** Regarding this, all countries can check and make corrections to the name and logos suggested by Mr. Ouk Vibol and resubmit to PCU for further publishing on the *refugia* website by the end of September 2022.

81) In addition, the PCU needs to document the TORs of each committee. Some countries officially submitted to the PCU, but some appeared in the quarterly technical reports. Accordingly, to ensure that there are no missing documents, the PCU requests the partner agencies to submit the TORs to PCU by the end of September 2022.

5. NATIONAL RESULTS FRAMEWORK

82) Mr. Jamil Bin Musel, the chairperson, welcomed all participants to the second-day meeting by introducing the agenda to be discussed today. He started with agenda five on national results frameworks in which the partner countries will update their progress works aligned with result frameworks.

5.1 CAMBODIA

83) Mr. Leng Sy Vann, National Scientific and Technical Focal Point for Cambodia, presented the progress report of Cambodia as of 30 June 2022. His presentation divided it into four main points, including 1) fisheries *refugia* project site; 2) establishment and management of fisheries *refugia*; 3) fisheries *refugia* management and coordination structure; 4) legal framework and strategy plan for fisheries *refugia* management. There are four *refugia* sites, including Koh Kong province for Indo pacific mackerel, Kampot province for juveniles Groupers, Kep province for blue swimming crab and Anchovy, and Sihanouk Ville for blood cockle.

84) Concerning the establishment of fisheries *refugia*, the first site is Marine Fisheries Management Area, including Fisheries *Refugia* at Koh Po, Kep province. The target species are blue swimming crab and anchovy. This site covers 11,307 ha covering 417 ha for blue swimming crab fisheries *refugia* area. Also, it was endorsed on 12 April 2018. Moreover, Site Based Management Board for the marine fisheries management area includes provincial hall administration, fisheries administration, involved provincial departments, provincial police, provincial military police, maritime police No. 430, ocean open committee, involved district and commune authorities, development partners, private sector, and community fisheries. For management measures of the Marine Fisheries Management Area, including blue swimming crab fisheries *refugia* in Kep, there is a closed season for blue swimming crab from May to July, so all fishing that targets crabs do not allow. On the other hand, Anchovy fishing is not permitted to operate in the area. In addition, 345 concrete blocks were employed in the MFMA and *refugia* sites to protect marine habitat and prevent illegal trawling. The awareness building was made using local and community social media.

85) For Indo-pacific mackerel *refugia* at Peam Krasob, Koh Kong Province, covers 1,283 ha endorsed on 16 September 2019. The Site Based Management Board for the Marine Fisheries Management Area includes Provincial Hall Administration, Fisheries Administration, Involved Provincial Departments, Provincial Police, Provincial Military Police, Maritime Police No. 269, Ocean Open Committee, Involved District and Commune Authorities, Development Partners, Private Sector, and Community Fisheries. Based on the proclamation, all kinds of fishing gears are not arrowed from December to March. There is patrolling, crack down on illegal fishing, and stand by at the *refugia* site. Also, 50 concrete blocks were deployed on the seabed to prevent trawlers. Also, Cambodia prohibited trawlers in the fisheries *refugia* sites.

86) For grouper fisheries *refugia* at Preak Thnoat, Kampot Province, covering 8,904 ha where 890 ha is for juvenile grouper fisheries *refugia* area. Moreover, Site Based Management Board for the Marine Fisheries Management Area includes Provincial Hall Administration, Fisheries Administration, Involved Provincial Departments, Provincial Police, Provincial Military Police, Maritime Police No. 241, Involved District and Commune Authorities, Development Partners, Private Sector, and Community Fisheries. As this site has not yet been approved, the closed season has not yet been applied. However, FiAC, with the collaboration of WEA disseminated and educated people about the closed season of juvenile grouper fisheries *refugia* area. Also, 50 concrete blocks were employed to protect and improve marine habitat.

87) For blood cockle (*Anadam granosa*) fisheries *refugia* at Prek Sangke village, Tek Khlar commune, Prey Nob district, Preah Sihanouk province, covers 116 ha, and it was adopted on 20 August 2020. The key stakeholders are provincial hall administration, fisheries administration, involved provincial departments, provincial police, provincial military police, prey nob district, commune authorities, and community fisheries. For the management measure, a closed season starts from June to October, and all fishing gear is not allowed. However, they enable collecting blood cockle by hand during the open season.

88) Concerning the legal framework and strategic management plans, Mr. Leng Sy Vann informed the meeting that there are three proclamations on the establishment of management of fisheries *refugia* area in Kep, Koh Kong, and Preh Sihanouk provinces. Also, Cambodia published three fisheries *refugia* profiles in Kep, Kampot, and Koh Kong. In addition, five year-Action Plan for Marine Fisheries Management Area with BSC *refugia* at Koh Po and Koh Tonsay Archipelago, Kep province, was officially adopted. The National guideline for fisheries *refugia* management is being finalized. Furthermore, National Action Plan for fisheries *refugia* management is needed to consult and discuss more with the provincial and national stakeholders to complete this document.

89) The concept of fisheries *refugia* has been integrated into the National Plan of Action for Combating IUU Fishing, a 10-year strategy plan for fisheries conservation, the Marine Management Plan for FiA, and the amendment of a new fisheries law. Currently, Cambodia is engaging the concept of fisheries *refugia* in the five years provincial investment plan. The presentation is enclosed in **Annex 6**.

5.2 INDONESIA

90) Ms. Astri Suryandari, National Scientific and Technical Focal Point for Indonesia presented the progress report. In Indonesia, there are two sites, including West Kalimantan for Indian write shrimps with an area of 414,807 ha and Bangka Belitung for Mitre Squids with an area of 468,828.32 ha. The closed season for West Kalimantan and Bangka Belitung is November - December, and October – November, respectively.

91) Concerning the identification of fisheries *refugia* in both pilot sites, based on the research study conducted in 2015 by MMAF, the management zone for Indian white prawns was recommended. In addition, through the collaboration with the Local University in Banka Belitung, which has conducted the squid survey and studies, the results identified the management zone for squid or *refugia*. Using previous research studies, Indonesia proposed two *refugia* sites: one in West Kalimantan for prawns and another in Bangka Belitung for squid. As of June 2022, the two *refugia* sites are under finalized and endorsed by the relevant agencies.

92) She further informed the meeting that many stakeholders engaged in the project implementation, including local government, fishing communities, and academic institutes. The project also engaged the private sector from the mining company, the key stakeholder in Banka Belitung. Bangka Belitung is well known as an important location for mining in Indonesia.

93) Concerning the management plan for two *refugia* sites, these documents were drafted and submitted for approval by three relevant agencies: Directorate-General of Marine Spatial Planning, Directorate-General of Capture Fisheries, and the local government of West Kalimantan and Bangka Belitung.

94) Concerning the national review and regulation reform, these are in progress and expected to complete and published during the third quarter of 2022. MMAF is being revised the policy and strategic management plan called FMA 711. In addition, MMAF has formulated the draft regulation of the Quota Based Fishing Policy, which divides the FMA into zones.

This policy is in line with fisheries *refugia's* rehabilitation of aquatic resources and critical habitats in a specific area; in this stage, MMAF plans to apply the quota policy to the FMA 711 *refugia* for Squid and Shrimp. The above-mentioned describes the fisheries *refugia* approach in Indonesia. Since there are many FMA zonings for conservation and protection of fish stocks and habitats, therefore, fisheries *refugia* concept would be adopted under the Indonesian FMA. The FMA Management Institutions will manage each FMA stipulated in 2021.

95) The national guideline on establishing and operating fisheries *refugia* has been carried out and finalized for approval by a relevant agency.

96) National reports on policy, legal and institutional aspects of *refugia* establishment and management have been developed through the multi-stakeholder meeting, and quarterly progressed to the PCU.

97) Concerning the National action plan, the meeting notes that the national action plan would be subsequently approved after relevant agencies endorsed the *refugia* management plans.

98) For the online database, Indonesia has already identified the fisheries *refugia* basis data consisting of ecology, biology, and socio-economic studies. In this stage, Indonesia still needs more time to analyze and process data until it is ready to be uploaded to the website.

99) The main threats to fish stock and habitat linkages Indonesia has faced are using non-selective fishing gears in both nursery *refugia* sites. Therefore, Indonesia proposed fishing closures and reallocated the non-selective fishing gear outside the *refugia* areas. Also, in Bangka Belitung, as there are mining activities in the same management area, communication with the mining department is needed to avoid conflict. The presentation is enclosed in **Annex 7**.

100) Mr. Joeren S. Yleana shared a similar approach to fisheries management by areas in the Philippines; he mentioned that the Philippines is divided into 12 Fisheries Management Areas (FMA). Fisheries *refugia* are considered as a subset under the FMA. Therefore, the FMA policy or plans would implicate the management plan for fisheries *refugia*. In addition, an FMA committee member generally engages in fisheries *refugia* decision-making.

101) Ms. Astri Suryandari implied that the fisheries *refugia* approach is a part of the Indonesian Fisheries Management Areas. Even though it is a new concept, the Minister of MMFA is welcome. As she earlier introduced, the Quota policy for FMAs is in line with the fisheries *refugia* concept; Indonesia, therefore, is willing to implement the fisheries *refugia* areas not only in two identified sites but also in other FMAs that's what we have in the near future.

102) Mr. Ouk Vibol pointed out that the critical process before applying fisheries *refugia* to the community is the stakeholders' engagement and acceptance of the fisheries *refugia* setting. He also shared his experience on several issues faced during the setup of the fisheries *refugia*, such as the required fishery law reform to include the fisheries *refugia* concept as a fisheries management tool. He, therefore, asked whether Indonesia faced the same issues.

103) Ms. Astri Suryandari shared her experiences that Indonesia found the face-to-face issue with the stakeholders, particularly the local communities. However, the communities accepted the fisheries *refugia* definition that they should "no take zone". At the Bangka Belitung, she mentioned that the community is willing to have a *refugia* establishment in the area because the community can engage in the area management. However, some communities in the West Kalimantan, Bangalore, do not want to have *refugia* because they already have a conservation zone. This is a challenge for the lead agency to communicate further through local government and community consultation.

5.3 MALAYSIA

104) Mr. Sallehudin bin Jamon, National Scientific and Technical Focal Point for Malaysia, presented the development of a refugium management plan to the meeting. Progress report based on the achievements of two *refugia* Sites in Malaysia: one located in Tanjung Leman, East Johor, for spiny lobster (Panulirus polyphagus); and the second one at Kuala Baram, Sarawak, for Tiger Prawn.

105) For spiny lobster, a carnivorous predator feeding distributes in the shallow water and offshore depending on the life cycle stage.

106) There has been a declining trend of Lobsters since 2000 due to habitat degradation, illegal fishing activities, and overfishing, which are the key drivers determining the lobster population in the area. Malaysia has considered implementing a lobster *refugia* to deal with this declining resource.

107) For the management steering framework for establishing and operating fisheries *refugia*, Malaysia conducted 35 series of technical and stakeholder consultations. For instance, the key strategies that formed the framework for the lobster *refugia* management plan at Tanjung Leman, Johor, consisted of the following strategies: 1) elaborate biology and reproduction cycle of target species, 2) outline potential migration patterns, 3) identify the area of potential settlement of the critical stages, 4) identify target groups for public awareness and dissemination of information, 5) identify strategic period for closure, 6) identify information gaps and methods for data collection.

108) Concerning the delineation of the lobster *refugia*, based on the surveys data analysis, Malaysia proposed *refugia* according to the following justifications:

- Since the nursery area in Zone A is also a significant fishing ground for traditional fishers, at the initial stage, the gazette is the only spawning ground as *refugia* which locate in Zone C. Next step will be followed by *refugia* in Zone B and Zone A after some progress of *refugia* in Zone C.
- This strategy is to prevent social conflict with traditional fishers in zone A, and at the same time, the Department of Fisheries Malaysia has more time for public awareness campaign activities for Zone C.
- Fisheries *refugia* are focused on the spawning ground located in zone C. This area covers the southern part of Pulau Aur, in Johor waters, where there is a high concentration of mud spiny lobsters compared to other sites.
- The proposed new coordinates of the *refugia* area are appropriate for management and monitoring purposes during enforcement activity by the DOFM officers and easy to remember by fishing vessel skippers.

109) Malaysia plans to enhance the spiny lobster stock by deploying artificial reefs in the *refugia* area. The purpose of artificial reefs is not only for shelters but to deter the operation of bottom trawlers within the *refugia*.

110) The aim of the-off- harvesting season establishment is to protect the resources during the significant spawning period. Thus, any activity of harvesting spiny lobster within specific periods is prohibited, which has already started in 2021 (July to September). Another management measure is that spiny lobster shall not be harvested, possessed, purchased, or sold during the closure period.

111) The main problem affecting Malaysia's sustainability of spiny lobsters is the capture of undersized lobsters, which the market accepts. Therefore, the Department of Fisheries

plans to revise the harvesting size and technology through literature related to the body size at sexual maturity of spiny lobster and fishing gear in the Malaysia coastal water area.

112) The *refugia* management plan is formulated through the 6 critical strategies mentioned above. The lobster *refugia* plan is a dynamic document that should be updated regularly. Also, the management plan will provide cards and key performance indicators for the efficiency of the management in their respect of importance. So, the key performance indicator will be used as a benchmark for the efficiency of the management plan, which will be reviewed from time to time. Lastly, the frequency of the review shall be based on the plan's efficiency and change in the government's policy.

113) Mr. Sallehudin bin Jamon continued presenting the management plan for tiger prawn *refugia* at Kuala Baran Miri Sarawak on behalf of Mr. Jamil Bin Musel. He introdured the distribution of tiger prawn. Ecologically, penaeid shrimps have to go through two significant ecosystems: the offshore and the coastal inshore environments, to complete their life cycle. Mature penaeids breed in deep water while post-larval and juvenile stages inhabit inland marshes, estuaries, brackish water, and mangrove areas, then they migrate back to the sea for maturation and breeding.

114) Critical threats to the tiger prawn population are the extensive farm that requires wild spawners, overexploitation, destructive fishing gear, and deforestation of mangrove habitats.

115) The management steering framework for tiger prawn *refugia* is the same as for the spiny lobster.

116) Through the stakeholder consultations, the results are as follows:

- All stakeholders agreed with the proposal of the tiger prawn *refugia* establishment.
- Fishing closure for tiger prawn *refugia* will start from August to October. This regulation will be included as an additional clause in the vessel license and fishing equipment for fishing vessels' zone C7.
- This regulation is applied to all trawlers at Zone C7. All fishing activities by the trawlers must operate beyond 12 nautical miles from the shoreline.
- The implementation of the regulation starts in 2021 voluntarily. In 2023, the Department of Fisheries will fully enforce these regulations.

117) For key components and strategies of tiger prawn *refugia* establishment, there are 7 strategies based on 5 components. The strategies are 1) to determine the migration pattern of tiger prawn from larvae to adulthood; 2) to determine the ovarian maturation stages; 3) to determine the length of tiger prawn at maturity; 4) to propose off-season for tiger prawn; 5) to identify information gaps, insufficient data, and method; 6) to facilitate and validate the proposed management with stakeholders, and 7) financial model for a compelling mix of finance solution.

118) For the designated area for *refugia*, DOFM adjusted the *refugia* area off Kuala Baram (red-dash lines) to cover the nursery area of the tiger prawn post-larva and juvenile in the five rivers Sg. Pasu, Sg Lutong, Sg. Miri, Sg. Bakam Sg. Sibuti. The revised *refugia* area covers 55,600 ha.

119) Concerning the population preservation and restoration effort, DOFM preserves mangrove buffer zones of 50 to 100 m facing open seas and 20 to 50 m along riverbanks to protect the nursery area of the tiger prawn post larvae and juvenile.

120) For the stock enhancement program, prawn fries produced from Kuala Baram spawners in the hatchery are released back into these rivers and should be carried out at least twice a

year to increase prawn stock in the *refugia* area as well as the surrounding sea. Moreover, stock assessment and biological survey for post-larvae and juveniles prawn in the area before and after the release program should also be carried out. In addition, DOFM will carry out the stock assessment for the tiger prawn resource in the *refugia* area once a year to ascertain the success of the demarcation of the site in preserving the stock.

121) Regarding the protection of spawners and seasonal closure, numerous studies have shown that environmental factors can, directly and indirectly, affect prawn's life cycles in many ways. In the worst-case scenario, a change in the environment can cause prawn recruitment to collapse. In Kuala Baram, all sizes of P. monodon and all maturation stages, from immature juveniles to mature adults and berried females, are harvested. This scenario is hazardous because it will cause the collapse of a population in the near future. Based on research on ovarian maturation stage findings, implement closure or other protective measures from August until October to ensure that females are protected during such a high reproductive output period.

122) For the Revision of harvest methods and gears, fishing gears and trawling areas have a total of 112 fishers operating drift net, hook & line, trammel net, and trawl net (twin out-rigger) are being used at the coastal waters up to 15NM offshore in Miri. Also, the number of licenses by zone, including C12-30; C10-1; C7-24, and the rest (57 boats) are traditional operators from zone B and A. With the new regulation of shifting the trawling area to 8NM and above, the areas of less than 5 NM are considered protected from trawling activities where the stations of high concentration of tiger shrimp spawners are in the range of 4.47 – 5.76 NM. In terms of Harvest strategy, the primary strategy would be to introduce measures that would reduce fishing capacity by 50% through limited access and the use of rights-based approaches in small-scale fisheries.

123) For identification and engagement with stakeholders, most of the fishers involved in the harvest of tiger prawn are small-scale fishers that operate along the coastal zones and utilize traditional gears, although some fishermen use trawlers and purse seine in deeper off coastal zones of more than five nautical miles. Also, establishing *refugia* requires the combined effort from various stakeholders. Public participation and the active involvement of community players are critical to ensure the successful implementation and sustainability of any *refugia* management plan. Moreover, the latest stakeholders' engagement with other relevant stakeholders, including Miri Port Authority, Sarawak Fishing Vessel Association, Department of Marine Fisheries, Sarawak, Sarawak Forestry Corporation, Miri Fishermen Association, Department of Irrigation and Drainage Branch Miri, and Sarawak Rivers Board was held on 23rd September 2021 and 21st October 2021. Based on the report, all stakeholders understand the importance of establishing tiger prawn *refugia* to safeguard the wild tiger prawn populations at Kuala Baram, Miri, Sarawak.

124) In inclusion, the establishment of tiger prawn *refugia* requires careful and detailed representation of essential aspects such as their life cycle, following the determination of their weight-length relationship, environmental conditions, and their harvesting methods and gears. The involvements of specific parties, the stakeholders, and the government bodies are important for management and financial sustainability throughout the entire *refugia* plan. According to acquired preliminary data and visual anthropogenic impact, more conservation efforts are required to ensure that the tiger prawn population in the *refugia* area is not affected. Furthermore, financial sustainability research is necessary for the long-term establishment of tiger prawn *refugia*. The presentation is enclosed in **Annex 8**.

125) Somboon sought clarification on the secured trust funds for the management of fisheries *refugia*, who is the responsible agency to manage trust funds, and where the sources of funds come from.

126) Regarding the funds, Mr. Jamil Bin Musel added that after the project ends in December, Malaysia will have national projects for sustaining the area. However, before this project, Malaysia also protects the species by using national contributions to preserve the sites. He pointed out the importance of prawn stock and habitat linkages, which is also suitable for aquaculture. However, a final discussion will be held in August regarding all concerns.

127) Mr. Jamil Bin Musel also updated that DOFM has prepared a special fund to deploy artificial reefs in the *refugia* areas. The designed artificial reefs depend on the area.

128) Mr. Joeren S. Yleana shared his experience on the perspective of biology, it's really hard to manage the lobster, considering that's what the Phyllosoma stage takes around less than a year for them to set out. It's called the Puerullus stages. And we have similar difficulties in the Philippines. That's why some biologists suggest that it's even better to collect the juvenile for aquaculture rather than prevent them from the wild because the survival is very low. So the reason why he pointed out this is that Malaysia will help a lot in regards to enhancing the resource or the stock, not just in the country, but also maybe if parents will drive them to other areas, so it will become of regional importance also to other countries where they set up. Because at very early juvenile states around 10 months before. That's why there's no hatchery of lobsters all around the world. So it's really hard to manage that. That's why in the Philippines, we allow the collection of Perulai, as long as we don't export it. So that's a new regulation the Philippines has. In addition, the Philippines do not allow the collection of gravid lobsters only make sure we have all property and we check the markets for the size.

5.4 PHILIPPINES

129) Mr. Valeriano M. Borja, National Scientific and Technical Focal Point for the Philippines, updated the progressed work from January to June 2022. The Philippines has been doing reproductive biology and validating the data on the priority species in the Philippines for two sites in Bolinao, Pangasinan, and Masinloc, Zambales. In Coron, the Philippines faced difficulty traveling there because of some travel restrictions by air. But the NFRDI team at sites was able to do some monitoring.

130) Regarding reproductive biology, NFRDI continued data collection at sites for other target species to support the Stock Assessment group. The NFRDI team also conducted a site management Committee meeting in Bolinao, Pangasinan, in March and June.

131) Concerning World Ocean Day (Month of June), the NFRDI produced the IEC materials such as life jackets, raincoats, and rush guards to the relevant fishers and local government units who support the enforcement programs in three *refugia* sites.

132) Concerning national guidelines on establishing and operating fisheries *refugia*, the Philippines completed the guidelines for published and submitted them to the PCU. Also, three reports are under review before submitting to the journal.

133) Furthermore, the Philippines are drafting the National Action Plan for managing priority fisheries *refugia*, including the capacity-building program on law enforcement.

134) For the *refugia* boundary delineation, there are some changes as suggested by the three pilot sites. Thus, it will be finalized soon.

135) The Philippines also informed the meeting that the fisheries *refugia* concept was accepted by the other national programs funded by the USAID.

136) At the end of his presentation, He showed a short video on promoting fisheries *refugia* in the local language. This video is shared with the PCU for reference. The presentation is enclosed in **Annex 9**.

5.5 THAILAND

137) Ms. Praulai Nootmorn, National Scientific and Technical Focal Point for Thailand, presented the country report to the meeting. Thailand has two (2) *refugia* sites: Trat province for 154,600 ha Indo-pacific mackerel *refugia* and Surat Thani for 900 ha blue swimming crab *refugia*.

138) She referred to the Notification of the Ministry of Agriculture and Cooperatives regarding Prescribing Fishing Gears, Fishing Methods, Fishing Areas, and Conditions Prohibited from Fishing in some Parts of the Fishing Ground in Trat Province B.E. 2565 (2022). The fishing closure period in Trat province is from 1 January to 29 February each year. During the closure period, the motorized Purse seiners and motorized Pair trawlers are not allowed to operate in the area. Also,

139) For the Surat Thani *refugia*, she referred to the Notification of Surat Thani Provincial Fisheries Committee regarding the Prohibition of Some Fishing Gears Fishing in the Fishing Ground within the Coastal Seas around the Area of KohSed, Phum Riang Subdistrict, Chaiya District, Surat Thani Province B.E. 2565 (2022). The *refugia* area is closed for an entire year. Crab traps and crab gill nets of a mesh size less than 3 inches are not allowed to operate in the area.

140) In addition, the site-based management committee to look after and manage fisheries *refugia* was set in Surat Thani province, while the committee in Trat province is underway by Q3/2022.

141) Ms. Praulai Nootmorn also shared the television documentary film at the meeting; the film link is shared with the PCU for reference. The presentation is enclosed in **Annex 10**.

5.6 VIET NAM

142) Mr. Le Tran Nguyen Hung, National Focal Point for Viet Nam informed the meeting that Viet Nam is trying their best to have an umbrella framework of fisheries *refugia* under the national law. In Viet Nam, the fisheries protection areas or fisheries *refugia* are planned at the national level. The key frameworks are to decentralize to the local government and community levels. In the national master plan, 73 marine fisheries protection zones or *refugia* are planned for 2021-2030, with a total area of about 1,416,547 hectares, equivalent to about 1.5% of the natural size of Vietnam's sea area. Therefore, when the master plan is ready, it will be decentralized to the community through the co-management approach, including *refugia* approaches. The systems will engage multisectoral stakeholders in implementation.

143) He also proposed two of the 73 *refugia* sites: at the Coastal area of Lagi – Binh Thuan, for the Subcrenata ark, 73,900 ha, and at the Eastern coastal area of Phu Quoc – Kien Giang for Blue swimming crab, 32,860 ha. The presentation is enclosed in **Annex 11**.

144) Mr. Somboon asked Viet Nam to share the list of 73 Fisheries Protected Areas with the PCU for reference. In response, Mr. Le Tran Nguyen Hung noted and will share accordingly.

6. THREATS AND BEST PRACTICE FISHING GEARS AND METHODS

145) Mr. Somboon Siriraksophon presented the Threats and Best Practices Fishing Gears and Methods for consideration at the meeting. He referred to the initial stage of the project implementation; the country worked locally with multi-stakeholders at project priority *refugia* sites on causal chain analysis. Later, the PCU compiled all CCA to understand the situation of threats to the critical fisheries' resources and their habitats. In addition, how

the country comes up with management actions to solve and reduce threats at each *refugia* site.

146) Somboon summarized the critical threats faced by the country, based on the country's inputs, are overfishing, illegal fishing, use of non-selective gear, and loss of habitats (such as habitat destruction, deforestation, coastal development, water pollution, and destructive fishing gear).

147) Accordingly, the proposed management actions by five countries are summarized as follows:

- Establishment of a conservation area
- Resource enhancement, Crab bank,
- Strengthening law enforcement, MCS
- Fisheries law, policy improvement
- Rehabilitation, Replanting flooded forest
- Strengthening transboundary cooperation
- Effective management measures, size regulation, mesh size regulation
- moratorium on permits for offshore tin mining activities
- Empower community
- Strengthening Information dissemination

148) Mr. Somboon Siriraksophon also introduced the fishing management options, compiled from Mr. Weerasak Yingyuad the FAO technical guidelines for responsible fisheries, compiled by for reference to all country.

149) With regard to the gear modifications, Mr. Isara SEAFDEC mentioned in the chat that gear modification needs to be supported by legal and accepted by the relevant stakeholders. However, the experiment and socioeconomic study need to prove all fishing gear modifications.

150) The presentation and working papers are in The presentation is enclosed in **Annex 12**.

7. MARINE CAPTURE FISHERIES DATABASE AND DASHBOARD

151) Somboon informed the meeting that Marine Capture Fisheries database is one of the project's target outputs, which aims to support the country in analyzing the stock status and trends of some economically important species. The original project frameworks addressed a burden issue to establishing the fisheries *refugia* because of the lack of fish database in the past to understand the stock status and trends.

152) To fill the data analysis gaps, the Project Coordination Unit developed the Marine Capture Fisheries Database using the FAO capture data from 1950 to the present (2019). The PCU selected FAO data due to their continuous availability, which is vital to present the fish stock status and trends.

153) He also demonstrated the dashboard created together with the fisheries database. All these databases and dashboards are linked to the *refugia* website. The working paper is enclosed in **Annex 13** of the report.

8. FISHERIES *REFUGIA* MAPPING ON GOOGLE EARTH

154) Somboon informed the meeting on the development of the fisheries *refugia* GIS mapping on the google earth application, which the PCU has linked to the *refugia* website since 2020. However, as of 30 June 2022, many GIS data from six countries are updated. Accordingly,

after the RSTC6, the PCU will update the GIS mapping again. The PCU expects to complete all GIP mapping by September 2022. The working paper is enclosed in **Annex 14** of the report.

9. GENDER MAINSTREAMING IN MANAGING FISHERIES *REFUGIA*

155) Mr. Somboon Siriraksophon introduced the working paper on gender mainstreaming in managing fisheries *refugia*, referred to the **Annex 15**.

156) In his presentation, he referred to the Project objectives, which comprise four components, on establishing a regional system of fisheries management areas (fisheries *refugia*) in the South China Sea and Gulf of Thailand. Specifically, Component 1 encompasses five expected outcomes, one of which is to bring about "Empowered fishing communities, particularly artisanal fishermen and women involved in inshore gleaning and processing, for enforcement of agreed management rules at 15 priority *refugia* sites in the South China Sea and Gulf of Thailand." This outcome has been realized by mainstreaming gender not only in the Project development but also in the implementation, having been pursued through capacity-building activities at the community level with the specific objective of enhancing the capabilities of target community members, mainly artisanal fishermen and women, while participating in *refugia* management at the 15 fisheries *refugia* sites. Having empowered the fishing communities at the 15 sites, the project has catalyzed community action for fisheries refugia management and strengthened the participation of civil society and community organizations in fisheries refugia management. Indeed, such feat, which had been attained mainly through gender mainstreaming and promoting gender dimension in the Project execution, has resulted in the improved role of women in fisheries management and balanced benefits obtained by the fishermen and fisherwomen in the established refugia sites. In addition, bringing about gender equality and gender equity contributed to the pool of projects in the Southeast Asian region where gender had been successfully mainstreamed not only in the project development but also in the implementation, monitoring and evaluation.

157) The PCU divided 225 activities from six countries into three groups. The sex ratio (in percent) between women and men is calculated as the number of women per hundred men engaged in the project activities by year and entire Project from 2017-2021. The overall results of sex ratio show that for the development and implementation of management plans for the individual *refugia* sites, local officials and fishing community members were involved in increasing the proportion of target community members, about 38 percent of women participating in *refugia* project

158) Mr. Joeren S. Yleana has general comments that, of course, every country has its inclusive standards, ensuring that women are involved in decision-making during consultation processes. Like in the Philippines, we have institutional standards regarding gender equality, which is at least 65% for males and 35% for females. But again, in particular, in some real men's projects, it's hard to achieve that ratio. The critical point is to ensure that every time we do our consultation or engineering process, women should involve at all levels.

159) Ms. Jariya Sornkliang, Project Manager of Gender Dimension in the Value Chain of Small-scale Fisheries & Aquaculture in Southeast Asia, provided her opinion that the number alone may not be enough for gender equity; it is necessary to know the role of women is also needed. In addition, she suggested for thought that when establishing the *refugia*, how the impact on communities, in other words, women and men, particularly their livelihood and income.

160) Mr. Jamil Bin Musel shared his views on how important to mainstream the gender aspect in the project implementation. However, he considers balancing males and females in the fishing industry challenges.

10. THE FOURTH BUDGET REVISION AS OF 31 MARCH 2022

161) Mr. Somboon Siriraksophon presented the fourth budget revision as of 31 March 2022; he referred to the results of the Project Steering Committee at its Seventh Ad-hoc Meeting held on 27 May 2022. At the PSC7 Ad-hoc meeting, the unspent budget requested from Cambodia and Thailand with the proposed budget revision was adopted. The PSC7 also agreed to include the requested budget revision from other countries and partners that should be addressed at the RSTC6 and completed the process before the end of July 2022. Malaysia and SEAFDEC/PCU revised budget as of 31 March 2022 to be included in the PSC7 Ad-hoc Report. Accordingly, the Project Coordination Unit compiles all revised budgets from countries and partners for consideration at the RSTC6, whereas all National Focal Points and National Scientific and Technical focal points are attended; the working paper is enclosed in **Annex 16.**

11. REGIONAL TRAINING WORKSHOP ON LARVAL FISH IDENTIFICATION

162) Mr. Somboon Siriraksophon updated the progress work to prepare for the Regional Training Workshop on Larval fish identification, scheduled for November 2022. The Training Workshop will be organized in collaboration with the Research and Development Division of the Training Department of SEAFDEC

163) The meeting noted that the Regional Training Workshop is planned for two Phases: 1) Larval Fishing Identification Course held on 17-27 November 2022 funded by SEAFDEC/UNEP/GEF project, and 2) Determine Spawning and Nursing Ground Based on Survey Results Course held on 28 November to 3 December 2022 funded by the SEAFDEC/Japanese Trust Fund.

164) The invited participants are from the ASEAN Member States, including six *refugia* countries and four non-*refugia* countries.

165) The meeting also noted the suggestion from Malaysia to include the SEAFDEC/MFRDMD participation in the Training Workshop either as trainer or instructor. Regarding this, the PCU will further discuss with relevant persons and RRD/TD to finalize the list of participants. The working paper is enclosed in **Annex 17.**

12. ARRANGEMENT IN ADVANCE FOR CLOSURE OF THE PROJECT ACTIVITIES AND MEMORANDUM OF AGREEMENT

166) Mr. Somboon Siriraksophon, the project director presented the arrangement for the closure of the project activities and the memorandum of agreement for consideration and information to all six partner countries. He mentioned that the project was initially planned for 48 months, from January 2017 until December 2020; this period excluded the inception phase in 2016. But the Project duration was extended until 31 December 2022 due to the Covid-19 pandemic and delayed implementation by countries.

167) Regarding this, he strongly suggested to all partner agencies that all activities at the national level, and hence expenditures, are planned to be completed by 31st December 2022. Each partner agency is therefore required to submit the following documents to the PCU by 31 January 2023:

- A progress final report on establishing fisheries *refugia* as of 31 December 2022;
- An expenditure report encompassing all expenditures between the time of the last accepted expenditure report and the last quarter of 31 December 2022; and
- An inventory report of all non-expendable equipment purchased under the agreement.

168) In addition, a terminal audit report covering all expenditures should be submitted to the PCU no later than 31 March 2023. Once these documents mentioned above have been received and accepted by the PCU and SEAFDEC, a letter will be issued by SEAFDEC formally closing the agreement and stating that the equipment purchased now remains the property of the lead agency (This issue will further be confirmed at the PSC8 Meeting).

169) if everything proceeds according to the agreed schedules, then all progress and expenditure reports, and inventories of non-expendable equipment, would be received by the PCU no later than 31 January 2023. Allowing for checking and some corrections.

170) Finally, all MoUs between SEAFDEC and partner agencies could be closed by 31 March 2023 upon receipt of the final audit report.

13. WAYS FORWARD

171) Mr. Somboon Siriraksophon informed the partner agencies of the tasks or inputs that need to submit or updated to the PCU as follows:

No.	Country's Outputs /Tasks	Due date/	Remarks
1	Awareness Materials uploaded to National Web Portal, * In case, country did not create national Web Portal, Country are requested to share them to PCU for Regional Website	30 Sept. 22	• PDF, JPG format • Youtube, MP4
2	Develop the GEF IW Experience Note	30 Sept. 22	• **Annex 04**
3	Confirm the List and logos of agencies and stakeholders of the NFRC, NTSC, and Site-based Management Board (SMB)	30 Sept. 22	• **Annex 05**
4	Submit the TORs of NFRC, NSTC, and SMB	30 Sept. 22	• PDF format

14. DATE AND PLACE OF THE 7TH MEETING OF THE REGIONAL SCIENTIFIC & TECHNICAL COMMITTEE

172) Mr. Jamil Bin Musel opened the floor for nomination of the RSCT7 Meeting venue, regarding this Mr. Somboon Siriraksophon informed the tentative schedule for the next meeting will be held on 4-6 October 2022.

173) Mr. Alza Rendian, Cooperation Analyst of the Bureau of Public Relations and Foreign Cooperation, Ministry of Marine Affairs and Fisheries (MMAF) Indonesia, was encouraged to host the RSTC7 in Indonesia. However, he needs to have an internal consultation with the Head office before making the decision for hosting the RSTC7. Regarding this, Indonesia will response back to the PCU within August 2022 or earliest as possible.

174) Before moving to the last agenda, Mr. Jamil Bin Musel welcomed the team from *Implementing the Strategic Action Programme for the South China Sea and Gulf of Thailand*" (SCS SAP Project) led by Mr. Dan Bodunescu, SCS SAP Interim Project Manager, and his team: Mr. Reynaldo F. Molina**,** Project Management Support Specialist; Dr. Vo Si Tuan, Scientific Officer; and Ms.Pakawan Talawat**,** Programme Management Specialist.

175) Mr. Reynaldo F. Molina takes the opportunity to inform the meeting that the SCS SAP Project will organize the first RSTC Meeting in Bangkok during the first week of September 2022. Regarding this, the fisheries *refugia* Scientific and Technical Committee would be invited to the meeting, considering both projects are linked together between habitats conservation and fisheries resources enhancement.

176) In addition, Ms. Praulai Nootmorn Nootmorn informed the meeting that this is her last chance to meet all participants due to her promotion, the Department of Fisheries will nominate Dr. Pavarot Noranarttragoon, Senior professional fisheries biologist of the Department of Fisheries Thailand, to replace her as a national focal point and national scientific and technical focal point for Thailand. Mr. Jamil Bin Musel, on behalf of the RSTC6 committee, welcomed him to the *refugia* project.

15. CLOSING REMARKS

177) Mr. Isara Chanrachkij expressed his appreciation to the RSTC6 members and other participants for their valuable contribution over the last three days. He acknowledged that many issues and challenges were raised and discussed, which reflexed the project target outputs and outcomes relied upon the results framework.

178) Mr. Isara Chanrachkij also deepest thanks to the Project Coordination Unit and SEAFDEC/TD staff for their priceless contributions and for running a smooth event. Finally, he wished all participants a safe journey back home and declared the closure of the RSTC6 Meeting at 12:15 PM.

ANNEX 1: LIST OF PARTICIPANTS

Country	Name	Position/Email Address
Cambodia	Mr. Leng Sy Vann	National Scientific and Technical Focal Point for Cambodia E-Mail: lengsyvann@gmail.com
Cambodia	Mr. Ouk Vibol	National Focal Point for Cambodia Email: ouk.vibol@online.com.kh
Indonesia	Ms. Astri Suryandari	National Scientific and Technical Focal Point for Indonesia Email: suryandari.astri@gmail.com
Indonesia	Ms. Iswari Ratna Astuti	National Focal Point for Indonesia Email: iswariastuti@yahoo.com
Indonesia	Mrs. Yayan Hikmayani	Observer Email: hendrikur16@gmail.com
Indonesia	Mr. Hendri Kurniawan	Observer Email: hendrikur16@gmail.com
Indonesia	Mr. Alza Rendian	Observer Email: alzarendian@gmail.com
Malaysia	Mr. Salleh Udin Bin Jamon	National Scientific and Technical Focal Point for Malaysia Email: Sallehudin_jamon@dof.gov.my
Malaysia	Mr. Jamil Bin Musel	Alternate National Scientific and Technical Focal Point for Malaysia Email: jamilmusel@dof.gov.my
Philippines	Mr. Valeriano M. Borja	National Scientific and Technical Focal Point for the Philippines Email: valborja1029@gmail.com
Philippines	Mr. Joeren S. Yleana	National Focal Point for the Philippines Email: joerenyleana@yahoo.com
Thailand	Mrs. Praulai Nootmorn	National Scientific and Technical Focal Point for Thailand Email: nootmorn@yahoo.com
Thailand	Mr.Tanut Srikum	Observer Email: srikum.2558@gmail.com
Thailand	Dr. Pavarot Noranarttragoon	New National Scientific and Technical Focal Point for Thailand (affective 15 July 2022) Email: pavarotn@gmail.com
Thailand	Ms. Rattana Munprasit	Observer Email: m_ratana@yahoo.com
Viet Nam	Mrs. Pham Thi Thuy Linh	National Scientific and Technical Focal Point for Viet Nam Email: linhptt83@gmail.com
Viet Nam	Mr. Le Tran Nguyen Hung	National Focal Point for Viet Nam Email: hungltn70@gmail.com
SEAFDEC/TD	Mr. Isara Chanrachkij	Project Planning and Management Division Head Email: isara@seafdec.org
SEAFDEC/TD	Mr. Sukchai Arnupapboon	Acting Research and Development Division Head Email: sukchai@seafdec.org
SEAFDEC/TD	Mr. Rakkiet Punsri	Fishery Oceanographer Email: rakkiet@seafdec.org
SEAFDEC/TD	Ms. Jariya Sornkliang	Gender Expert, (Socio-economic) Email: jariya@seafdec.org
SEAFDEC/TD	Dr. Nopporn Manajit	Senior Researcher Email: nopporn@seafdec.org
SEAFDEC/TD	Mr. Weerasak Yingyuad	Project Technical Coordinator Email: weerasak@seafdec.org
PCU	Dr. Somboon Siriraksophon	Project Director

		Email: somboon@seafdec.org
PCU	Ms. Chanikan Vibulsuk	Project Technical-Administration Officer Email: chanikan.vibulsuk@gmail.com
PCU	Ms. Nujsara Somjit	Finance Officer Email: nuchsarasomjit@gmail.com
PCU	Mrs. Nathacha Sornvaree	Administrative Officer Email: nathacha@seafdec.org

ANNEX 2: AGENDA AND TIMETABLE

DATE/TIME	AGENDA	REMARKS
4 JULY	**DAY 1**	
08:30-08:45	1. OPENING OF THE MEETING	
	1.1 WELCOME ADDRESS BY SEAFDEC	
	1.1 OPENING REMARKS BY DOF/THAILAND	
08:45-09:10	2. ORGANIZATION OF THE MEETING AND ADOPTION OF AGENDA	
	2.1 DESIGNATION OF OFFICERS	
	2.2 ORGANIZATION OF WORK	
	2.3 ADOPTION OF THE AGENDA	
09:10-09:40	3. BRIEF PROGRESS REPORT OF THE PROJECT DIRECTOR (WP01)	
09:40-10:10	GROUP PHOTO AND REFRESHMENT	
10:10-12:00	4. DISCUSSIONS ON RESULTS FRAMEWORK (WP02A)	
	OBJECTIVE 1: EFFECTIVE MANAGEMENT OF KEY THREATS TO 14 FISHERIES REFUGIA SITES [269,500 HA], INCLUDING ~50 PERCENT REDUCTION IN FISHING PRESSURE WITHIN SITES AT TIMES CRITICAL TO THE LIFE-CYCLES OF FISHED SPECIES OF TRANSBOUNDARY SIGNIFICANCE	Moderator: PCU/PD - Brainstorming - Country inputs
12:00-13:30	LUNCH BREAK	
13:30-15:00	OBJECTIVE 2: NATIONAL AND REGIONAL POLICY, LEGAL AND PLANNING FRAMEWORKS FOR DEMARCATING BOUNDARIES AND MANAGING FISHERIES REFUGIA, RESULTING IN, INTER ALIA, A 20 PERCENT INCREASE IN SMALL-SCALE FISHING VESSELS USING FISHING GEAR AND PRACTICES DESIGNED TO SAFEGUARD FISH STOCK AND CRITICAL HABITAT LINKAGES AT PRIORITY SITES	Moderator: PCU/PD - Brainstorming - Country inputs
15:00-15:20	REFRESHMENT	
15:20-16:10	OBJECTIVE 3: NATIONAL AND REGIONAL SYSTEMS FOR KNOWLEDGE MANAGEMENT AND SHARING, INCLUDING THE DEVELOPMENT OF INDICATOR SETS AND STANDARDIZED STATISTICS TO GUIDE THE REPLICATION, SCALING-UP AND MAINSTREAMING OF GOOD PRACTICES IN THE USE OF FISHERIES REFUGIA AS A SPATIAL PLANNING TOOL.	Moderator: PCU/PD - Brainstorming - Country inputs
16:10-16:50	OBJECTIVE 4: EFFECTIVE MULTI-LATERAL AND INTERGOVERN-MENTAL COMMUNICATION AND JOINT DECISION-MAKING, INCLUDING THE USE OF A CONSENSUAL KNOWLEDGEBASE IN PLANNING ECOLOGICALLY AND COST-EFFECTIVE MANAGEMENT ACTIONS	Moderator: PCU/PD - Brainstorming - Country inputs
16:50	END OF DAY 1	
5 JULY	**DAY 2**	
09:00-10:30	5. NATIONAL RESULTS FRAMEWORK (WP02B)	Moderator: RSTC6 Chair
	5.1 CAMBODIA	Country presentation

	5.2 INDONESIA	
	5.3 MALAYSIA	
	5.4 PHILIPPINES	
	5.5 THAILAND	
	5.6 VIET NAM	
10:30-10:50	REFRESHMENT	
10:50-12:00	6. THREATS AND BEST PRACTICE FISHING GEARS AND METHODS (WP03)	Moderator by PD - Brainstorming - Country inputs
12:00-13:30	LUNCH BREAK	
13:30-14:00	7. MARINE CAPTURE FISHERIES DATABASE AND DASHBOARD (WP04)	Moderator: RSTC6 Chair Presenter: PCU/PD
14:00-14:20	8. FISHERIES REFUGIA MAPPING ON GOOGLE EARTH (WP05)	Moderator: RSTC6 Chair Presenter: PCU/PD
14:20-15:00	9. GENDER MAINSTREAMING IN MANAGING FISHERIES REFUGIA (WP06)	Moderator: RSTC6 Chair Presenter: PCU/PD
15:00-15:30	REFRESHMENT	
16:00	Leave SEAFDEC/TD to ICON SIAM (temporary stop at Hotel)	
18:30-21:30	DINNER RECEPTION ON ALANGKA CRUISE	
22:30	ARRIVE AT HOTEL	
6 JULY	**DAY 3**	
09:00-10:30	10. PROPOSED BUDGET REVISION AS OF 30 MARCH 2022 (WP07)	Moderator: RSTC6 Chair Presenter: PCU/PD
10:30-10:50	REFRESHMENT	
10:50-11:10	11. UPDATE ON REGIONAL TRAINING WORKSHOP (WP08)	Moderator: RSTC6 Chair Presenter: Country-PCU
11:10-12:00	12. OTHER MATTERS (WP09) • PROCEDURES AND TIMETABLE FOR CLOSURE OF PROJECT ACTIVITIES • FINAL AUDIT REPORT AND TIMELINE • INVENTORY REPORT OF ALL NON-EXPENDABLE EQUIPMENT • FINAL COUNTRY REPORT • OTHERS	Moderator: RSTC6 Chair Presenter: PCU/PD
12:00-14:00	LUNCH BREAK	
14:00-14:30	13. WAYS FORWARD	Moderator: RSTC6 Chair presenter: PCU/PD

14:30-14:45	14. DATE AND PLACE OF THE 7TH MEETING OF THE REGIONAL SCIENTIFIC & TECHNICAL COMMITTEE	Moderator: RSTC6 Chair
14:45-15:00	15. CLOSING REMARKS BY SEAFDEC	
	END OF DAY 3	

ANNEX 3: A PROGRESS BRIEF AS OF 30 JUNE 2022

Establishment of Fisheries Refugia in the South China Sea and the Gulf of Thailand

No. in map	Fisheries *refugia* Site	Target Species	Area (ha)	Status
1	Marine Fisheries Management including Refugia at Koh Po & Koh Tonsay Archipelago, Kep, Cambodia	Blue swimming crab (*Portunus pelagicus*)	11,307	Approved
2	Prek Thnaot, Kampot, Cambodia	Groupers	284	Final process
3	Prek Sangke, Village, Tek Thlar Commune, Prey Nub District, Preah Sihanouk, Cambodia	Blood Cockle (*Anadam granosa*)	116	Approved
4	Peam Krasob, Koh Kong, Cambodia	Indo-pacific mackerel (*Rastrelliger brachysoma*)	1,283	Approved
5	Off Trat, Thailand	Indo-pacific mackerel (*Rastrelliger brachysoma*)	154,600	Approved
6	Eastern coastal area of Phu Quoc – Kien Giang, Viet Nam	Blue swimming crab (*Portunus pelagicus*)	32,860	Ongoing
7	Around Koh Sed, Surat Thani, Thailand	Blue swimming crab (*Portunus pelagicus*)	900	Approved
8	Tanjung Leman, Johor, Malaysia	Spiny lobster (*Panulirus polyphagus*)	171,549	Final process
9	Off Tuing Village, Bangka Regency, Indonesia	Squid (*Uroteuthis chinensis*)	468,828	Final process
10	Kubu Raya (Padang Tikar), Ketapang (Delta Pawan) and North Kayong (Dusun Besar)/West Kalimantan, Indonesia	Penaeid shrimp (*Penaeus merguiensis*)	414,807	Final process
11	Kuala Baram, Miri, Sarawak, Malaysia	Black tiger prawn (*Penaeus monodon*)	55,600	Final process
12	Off Coron Islands, Palawan, Philippines	Redbelly yellowtail fusilier	1,242	Final process
		White-tipped scad (Option)	-	Ongoing
13	Masinloc coastal area, Zambales, Philippines	One-stripe fusilier	624	Final process
		Frigate tuna (Option)	-	Ongoing
		Fringe scale sardine (Option)	-	Ongoing
14	Bolinao coastal area, Pangasinan, Philippines	Siganids	263	Final process
15	Coastal area of Lagi – Binh Thuan, Viet Nam	Subcrenata ark clam (*Anadara subcrenata*)	73,900	Ongoing
		TOTAL AREA	**1,356,637**	


SEAFDEC
UN environment
gef 30 years
PROGRESS ON ESTABLISHMENT
OF FISHERIES REFUGIA
AS OF 30 JUNE 2022
SCS
SAP
11,307 ha
284 ha
154,600 ha
900 ha
1,283 ha
116 ha
140,023 ha
468,828 ha
414,807 ha
55,600 ha
32,860 ha
73,900 ha
1,242 ha
624 ha
263 ha
@Project Coordination Unit
- FR #1, 3, 4, 5, and 7 were approved;
- FR # 2, and from 8 to 14 are in final process;
- FR # 6, and 15 are ongoing.

ANNEX 4: INTERNATIONAL WATERS EXPERIENCE NOTES

INTERNATIONAL WATERS EXPERIENCE NOTES

http://www.iwlearn.net/experience

Guidance on the Production of GEF IW Experience Notes (IWEN)

WHAT IS A GEF IW EXPERIENCE NOTE?

An Experience Note is a three-to-six page case study of a given project experience or innovation. Experiences include successful practices, approaches, strategies, lessons, and methodologies, that emerge in the context of transboundary water management (TWM). It includes a brief project description, the issue faced, a description of how it was addressed (including challenges faced), the results of the intervention, how the intervention can be replicated by other projects and finally what is significant about it. References to related materials are also included. The existing catalogue of IW Experience Notes can be reviewed at: http://www.iwlearn.net/experience.

OBJECTIVE

Experience Notes are intended to facilitate the community of GEF IW projects and partners improve (TWM) through the replication of its own practical experiences & results.

JUSTIFICATION

The importance of Experience Notes lies in the fact that they offer greater detail and reference to given project activities than the average conference presentation and are simultaneously shorter & more accessible than more technical documents (evaluations, implementation reports, et.al.). The iwlearn.net website includes many presentations from projects. The issue is however, that although Powerpoint presentations have improved dramatically in quality, without the accompanying audio of the speaker, the actual slides themselves do not offer much in terms of conveying their actual content. IW Experience Notes offer a solution, being in a sense, the "written version" of a presentation.

PROCESS

Projects and partners should prepare an experience note for submission using the template and guidance as outlined in the following pages. The draft note should be sent Refugia PCU via somboon@seafdsec.org. After an initial review and conversion to the publication template, the note will be reviewed and subsequently posted to www.iwlearn.net/experience (the note will also occasionally be disseminated in print form at key events).

TEMPLATE

[[Title indicating issue addressed and region - Maximum two lines]]

A striking, but relevant photograph capturing the experience described in the note

Abstract: A short abstract which captures the seminal point from each section of the heading list (i.e. one sentence each on the project, the issue, how it's addressed, two sentences on results, replication and significance…space permitting)

[[Author or Editor(s)
[[author/editor(s) email contact]]
[[Project or Institutional Affiliation]]

[[Copy Title from Previous Page]]

PROJECT DESCRIPTION

Briefly summarize the project's objectives, expected outcomes and timeframe (from the project document or elsewhere).

In a second paragraph, if the IWEN pertains to a specific project activity, please describe that activity as well.

THE EXPERIENCE

Issue

Provide a short paragraph describing the transboundary waters management issue[s] this project addressed. *For example, the X stress is affecting X ecosystem in the following way, with the following consequence. The project proposed to mitigate the problem by…X.*

Addressing the Issue

Provide multiple paragraphs on the specific actions undertaken by the project to address the issue. These might be sequential or simultaneous interventions.

RESULTS AND LEARNING

Summarize the impacts of this experience on the issues, the project and its partners. What was learned from this experience? Moreover, please attempt to include technical information and references to your project's indicators where possible. For example, *as a result of the X intervention, discharge of X into X was reduced by X%. The outcome of this activity is that the affected-population will realize X benefits. This intervention demonstrates that given an investment of $X can leverage $X of cost-savings.*

REPLICATION

What implementation challenges should others expect to encounter when replicating this experience? Highlight specific conditions needed for others to replicate or benefit from this experience. *For example, the strategy pursued in this case only works given the following (climatic, socioeconomic, political) conditions…*

SIGNIFICANCE

Why is this experience significant to GEF IW projects and to transboundary water resources management? For example, *this experience represents the first time a GEF IW project has done X*.

REFERENCES

How can someone interested in using or adapting this experience get more information? Please provide relevant website(s), documentation and contact information. If you have further materials otherwise unavailable, GEF IW:LEARN is happy to post them to iwlearn.net

KEYWORDS

What 2-5 keywords could be used to help others search and find this experience note? Please provide at least one of each of the following:

- South China Sea
- Fisheries Refugia
- Ecosystem Approach

ANNEX 5: STRUCTURE OF NATIONAL COORDINATION OF FISHERIES REFUGIA PROJECT

(UPDATED MAY 2020)

A. CAMBODIA

1) NATIONAL FISHERIES REFUGIA COMMITTEE

NO.	AGENCY NAME	NAME OF INSTITUTION	TYPE	LOGO
1	FISHERIES ADMINISTRATION	MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES	GOV	
2	NAVY	*MINISTRY* OF NATIONAL DEFENCE	GOV	
3	PROVINCIAL MILITARY POLICE	*MINISTRY* OF NATIONAL DEFENSE	GOV	
4	PROVINCIAL DEPARTMENT OF AGRICULTURE, FORESTRY, AND FISHERIES	MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES	GOV	
5	PROVINCIAL TOURISM DEPARTMENT	*MINISTRY OF TOURISM*	GOV	
6	PROVINCIAL ENVIRONMENTAL DEPARTMENT	*MINISTRY OF ENVIRONMENT*	GOV	
7	PROVINCIAL PUBLIC WORK AND TRANSPORTATION DEPARTMENT	*MINISTRY OF PUBLIC WORKS AND TRANSPORT*	GOV	
8	PROVINCIAL LAND MANAGEMENT, URBAN AND CONSTRUCTION DEPARTMENT	*MINISTRY OF LAND MANAGEMENT, URBAN PLANNING AND CONSTRUCTION*	GOV	
9	PROVINCIAL INDUSTRY, MINES AND ENERGY	*MINISTRY OF MINES AND ENERGY*	GOV	
10	KAMPOT PROVINCIAL ADMINISTRATION	*MINISTRY OF INTERIOR*	GOV	
11	KEP PROVINCIAL ADMINISTRATION	*MINISTRY OF INTERIOR*	GOV	
12	KOH KONG PROVINCIAL ADMINISTRATION	*MINISTRY OF INTERIOR*	GOV	

2) NATIONAL SCIENTIFIC AND TECHNICAL COMMITTEE

NO.	AGENCY NAME	NAME OF MINISTRY	TYPE	LOGO

1	FISHERIES ADMINISTRATION	MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES	GOV	

3) SITE-BASED MANAGEMENT BOARDS

NO.	AGENCY NAME	NAME OF INSTITUTION	TYPE	LOGO
1	DEPARTMENT OF FISHERIES CONSERVATION/FIA	MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES (CAMBODIA)	GOV	
2	DEPARTMENT OF AGRICULTURE, FORESTRY, AND FISHERIES	MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES (CAMBODIA)	GOV	
3	PROVINCIAL POLICE	MINISTRY OF INTERIOR	GOV	
4	PROVINCIAL MILITARY POLICE	*MINISTRY* OF NATIONAL DEFENSE	GOV	
5	MARITIME POLICE NO.430	MINISTRY OF INTERIOR	GOV	
6	DEPARTMENT OF LAND AND CONSTRUCTION	*MINISTRY OF LAND MANAGEMENT, URBAN PLANNING AND CONSTRUCTION*	GOV	
7	DEPARTMENT OF ECONOMY AND FINANCE	*MINISTRY OF ECONOMY AND FINANCE*	GOV	
8	DEPARTMENT OF PLANNING	*MINISTRY OF PLANNING*	GOV	
9	DEPARTMENT OF ENVIRONMENT	*MINISTRY OF ENVIRONMENT*	GOV	
10	DEPARTMENT OF TOURISM	*MINISTRY OF TOURISM*	GOV	
11	DEPARTMENT OF PUBLIC WORKS AND TRANSPORTS	*MINISTRY OF PUBLIC WORKS AND TRANSPORT*	GOV	
12	KAMPOT PROVINCIAL ADMINISTRATION	MINISTRY OF INTERIOR	GOV	
13	BOKO CITY ADMINISTRATION	KAMPOT PROVINCIAL ADMINISTRATION	GOV	
14	KEP DISTRICT ADMINISTRATION	KEP PROVINCIAL ADMINIDTRATION	GOV	
15	DAMNAK CHORNG ORE DISTRICT ADMINISTRATION	KEP PROVINCIAL ADMINISTRATION	GOV	

16	INTER DIVISION/KEP PROVINCIAL ADMINISTRATION	KEP PROVINCIAL ADMINISTRATION	GOV	
17	KOH KONG PROVINCIAL ADMINISTRATION	KOH KONG PROVINCIAL ADMINISTRATION	GOV	
18	INVOLVED DISTRICT ADMINISTRATION (Sre Ambil , Mondol Sema, and Koh Kong Districts)	KOH KONG PROVINCIAL ADMINISTRATION	GOV	
19	INVOLVED LOCAL AUTHORITIES IN KAMPOT PROVINCE	KAMPOT PROVINCIAL ADMINISTRATION	GOV	
20	INVOLVED LOCAL AUTHORITIES IN KEP PROVINCE	KEP PROVINCIAL ADMINISTRATION	GOV	
21	INVOLVED LOCAL AUTHORITIES IN KOH KONG PROVINCE	KOH KONG PROVINCIAL ADMINIDTRATION	GOV	
22	MARINE CONSERVATION IN CAMBODIA (MCC)	MARINE CONSERVATION IN CAMBODIA (MCC)	LOCAL NGO	
23	FAUNA AND FLORAL INTERNATIONAL	FAUNA AND FLORAL INTERNATIONAL IN CAMBODIA	INTERNATIONAL ORGANIZATION	
24	WILDLIFE CONSERVATION SOCIETY (WCS)	WILDLIFE CONSERVATION SOCIETY (WCS) IN CAMBODIA	INTERNATIONAL ORGANIZATION	
25	WILD EARTH ALLIES (WEA)	WILD EARTH ALLIES (WEA) IN CAMBODIA	LOCAL NGO	
26	KOH TONSAY TOURISM ASSOCIATION	KOH TONSAY TOURISM ASSOCIATION, KEP PROVINCE	PRIVATE SECTOR	

STRUCTURE OF NATIONAL COORDINATION
OF
FISHERIES REFUGIA PROJECT
(UPDATED JULY 2022)

B. INDONESIA

1) NATIONAL FISHERIES REFUGIA COMMITTEE

NO.	AGENCY NAME	NAME OF MINISTRY	TYPE	LOGO
1	AGENCY FOR MARINE AND FISHERIES RESEARCH AND HUMAN RESOURCES	MINISTRY OF MARINE AFFAIRS AND FISHERIES (MMAF)	GOV	
2	DIRECTORATE GENERAL OF CAPTURE FISHERIES	MINISTRY OF MARINE AFFAIRS AND FISHERIES (MMAF)	GOV	
3	DIRECTORATE GENERAL OF MARINE SPATIAL MANAGEMENT-MMAF;	MINISTRY OF MARINE AFFAIRS AND FISHERIES (MMAF)	GOV	
4	DIRECTORATE GENERAL OF MARINE AND FISHERIES RESOURCES SURVEILLANCE	MINISTRY OF MARINE AFFAIRS AND FISHERIES (MMAF)	GOV	
5	BUREAU OF PUBLIC RELATION AND INTERNATIONAL COPERATION, SECRETARY GENERAL	MINISTRY OF MARINE AFFAIRS AND FISHERIES (MMAF)	GOV	
6	BUREAU OF LAW AND ORGANIZATION, SECRETARY GENERAL	MINISTRY OF MARINE AFFAIRS AND FISHERIES (MMAF)	GOV	
7	BUREAU OF PLANNING, SECRETARY GENERAL	MINISTRY OF MARINE AFFAIRS AND FISHERIES (MMAF)	GOV	

2) NATIONAL SCIENTIFIC AND TECHNICAL COMMITTEE

NO.	AGENCY NAME	NAME OF MINISTRY	TYPE	LOGO
1	RESEARCH CENTER FOR FISHERIES.	MINISTRY OF MARINE AFFAIRS AND FISHERIES (MMAF)	GOV	
2	RESEARCH INSTITUTE FOR FISH RESOURCE ENHANCEMENT	MINISTRY OF MARINE AFFAIRS AND FISHERIES (MMAF)	GOV	

3	NATIONAL RESEARCH AND INNOVATION AGENCY	NATIONAL RESEARCH AND INNOVATION AGENCY	ACADEMY	
4	TANJUNGPURA UNIVERSITY		ACADEMY	
5	PONTIANAK POLYTECHNIC		ACADEMY	
6	BANGKA BELITUNG UNIVERSITY		ACADEMY	

3) SITE-BASED MANAGEMENT BOARDS

NO.	AGENCY NAME	NAME OF MINISTRY	TYPE	LOGO
1	COASTAL AND MARINE RESOURCES MANAGEMENT OFFICE OF PONTIANAK	MINISTRY OF MARINE AFFAIRS AND FISHERIES	GOV	
2	MARINE AND FISHERIES AGENCY OF BANGKA BELITUNG PROVINCE	FISHERIES PROVINCIAL SERVICE OF BANGKA BELITUNG	GOV	
3	REGIONAL PLANNING AGENCY (BAPPEDA) OF BANGKA BELITUNG PROVINCE	LOCAL GOVERNMENT	GOV	
4	FISHERIES AGENCY OF BANGKA DISTRICT	LOCAL GOVERNMENT	GOV	
5	MARINE AND FISHERIES AGENCY OF WEST KALIMANTAN PROVINCE	LOCAL GOVERNMENT	GOV	
6	FISHERIES AGENCY OF KUBU RAYA DISTRICT	LOCAL GOVERNMENT	GOV	

7	FISHERIES AGENCY OF KAYONG UTARA DISTRICT	LOCAL GOVERNMENT	GOV	
8	TANJUNGPURA UNIVERSITY	-	ACADEMY	
9	PONTIANAK POLYTECHNIC	-	ACADEMY	
10	BANGKA BELITUNG UNIVERSITY	-	ACADEMY	

STRUCTURE OF NATIONAL COORDINATION

OF

FISHERIES REFUGIA PROJECT

(UPDATED MAY 2020)

C. MALAYSIA

1) NATIONAL FISHERIES REFUGIA COMMITTEE

NO.	AGENCY NAME	NAME OF MINISTRY	TYPE	LOGO
1	DEPARTMENT OF FISHERIES	MINISTRY OF AGRICULTURE AND FOOD INDUSTRY	GOV	
2	BIODIVERSITY DIVISION	MINISTRY OF ENERGY AND NATURAL RESOURCES	GOV	
3	STATE PLANNING UNIT SARAWAK	STATE GOVERNMENT	GOV	
4	JOHOR STATE ECONOMY DEVELOPMENT UNIT (UPEN JOHOR)	STATE GOVERNMENT	GOV	
5	FISHERIES RESEARCH INSTITUTE	MINISTRY OF AGRICULTURE AND FOOD INDUSTRY	GOV	

6	MALAYSIA MARITIME ENFORCEMENT AGENCY (MMEA)	MINISTRY OF HOME AFFAIRS	GOV	

2) NATIONAL SCIENTIFIC AND TECHNICAL COMMITTEE

NO.	AGENCY NAME	NAME OF MINISTRY	TYPE	LOGO
1	FISHERIES RESEARCH INSTITUTE	MINISTRY OF AGRICULTURE AND FOOD INDUSTRY	GOV	
2	DEPARTMENT OF MARINE PARK MALAYSIA	MINISTRY OF AGRICULTURE AND FOOD INDUSTRY	GOV	
3	STATE FISHERIES OFFICE	MINISTRY OF AGRICULTURE AND FOOD INDUSTRY	LOCAL GOV.	
4	UNIVERSITI MALAYSIA TERENGGANU UMT	-	ACADEMY	
5	UNIVERSITI MALAYSIA SARAWAK UNIMAS	-	ACADEMY	
6	UNIVERSITI MALAYSIA SABAH UMS	-	ACADEMY	
7	UNIVERSITI KEBANGSAAN MALAYSIA UKM	-	ACADEMY	
8	SARAWAK FORESTRY DEPARTMENT	MINISTRY OF ENERGY AND NATURAL RESOURCES	GOV	
9	WORLD WIDE FUND FOR NATURE (WWF)	MALAYSIAN NATURE SOCIETY	NGO	
10	JOHOR PARK	MINISTRY OF ENERGY AND NATURAL RESOURCES	GOV	

3) SITE-BASED MANAGEMENT BOARDS

NO.	AGENCY NAME	NAME OF MINISTRY	TYPE	LOGO
1	FISHERIES DISTRICT OFFICE	MINISTRY OF AGRICULTURE AND FOOD INDUSTRY	GOV	
2	LOCAL FISHERMAN ASSOCIATION	-	LOCAL COMMUNITY	
3	DISTRICT FISHERIES DEVELOPMENT AUTHORITY	MINISTRY OF AGRICULTURE AND FOOD INDUSTRY	GOV	
4	LOCAL ENFORCEMENT AUTHORITY TRAWLER ASSOCIATION	-	PRIVATE SECTOR	
5	SARAWAK FISHING VESSEL ASSOCIATION MIRI	-	PRIVATE SECTOR	
6	DISTRICT FISHERMEN ASSOCIATION	-	FISHERIES COMMUNITY	
7	DISTRICT FISHERIES DEVELOPMENT AUTHORITY	MINISTRY OF AGRICULTURE AND FOOD INDUSTRY	LOCAL GOVERNMENT	
8	STATE DISTRICT OFFICE	MINISTRY OF AGRICULTURE AND FOOD INDUSTRY	GOV	
9	MALAYSIA MARITIME ENFORCEMENT AGENCY (MMEA)	MINISTRY OF HOME AFFAIRS	GOV	
10	PETROLEUM NASIONAL (PETRONAS)	-	PRIVATE SECTOR	PETRONAS
11	FISHERIES COMMUNITY LEADER	-	LOCAL COMMUNITY	

STRUCTURE OF NATIONAL COORDINATION
OF
FISHERIES REFUGIA PROJECT
(UPDATED MAY 2020)

D. PHILIPPINES

1) NATIONAL FISHERIES REFUGIA COMMITTEE IN PHILIPPINES

NO.	AGENCY NAME	NAME OF MINISTRY	TYPE	LOGO
1	DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES (DENR)	DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES	GOV	

2	BUREAU OF FISHERIES AND AQUATIC RESOURCES	DEPARTMENT OF AGRICULTURE	GOV	
3	NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY (NEDA)	NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY (NEDA)	GOV	
4	DEPARTMENT OF SCIENCE AND TECHNOLOGY (DOST)	DEPARTMENT OF SCIENCE AND TECHNOLOGY (DOST)	GOV	
5	DEPARTMENT OF INTERIOR AND LOCAL GOVERNMENT (DILG)	DEPARTMENT OF INTERIOR AND LOCAL GOVERNMENT (DILG	GOV	
6	PALAWAN COUNCIL FOR SUSTAINABLE DEVELOPMENT (PCSD)	PALAWAN, GOVERNMENT OF PHILIPPINES	GOV	

2) NATIONAL SCIENTIFIC AND TECHNICAL COMMITTEE IN PHILIPPINES

NO.	AGENCY NAME	NAME OF MINISTRY	TYPE	LOGO
1	NATIONAL FISHERIES RESEARCH AND DEVELOPMENT INSTITUTE (NFRDI)	DEPARTMENT OF AGRICULTURE	GOV	
2	BIODIVERSITY MANAGEMENT BUREAU (BMB)	DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES	GOV	
3	MARINE SCIENCE INSTITUTE	-	ACADEMY	
4	UNIVERSITY OF THE PHILIPPINES VISAYAS	-	ACADEMY	
5	MINDANAO STATE UNIVERSITY	-	ACADEMY	
6	WESTERN PHILIPPINES UNIVERSITY	-	ACADEMY	
7	PANGASINAN STATE UNIVERSITY	-	ACADEMY	

8	BUREAU OF FISHERIES AND AQUATIC RESOURCES	DEPARTMENT OF AGRICULTURE	GOV	
9	PHILIPPINE COUNCIL FOR AGRICULTURE, AQUATIC AND NATURAL RESOURCES RESEARCH AND DEVELOPMENT (PCAARRD)	DEPARTMENT OF SCIENCE AND TECHNOLOGY (DOST)	GOV	
10	PHILIPPINE COAST GUARD (PCG)	DEPARTMENT OF TRANSPORTATION	GOV	
11	OFFICE OF THE PROVINCIAL AGRICULTURIST (OPA)/	PANGASINAN PROVINCE	LOCAL GOVERNMENT	
11	OFFICE OF THE PROVINCIAL AGRICULTURIST (OPA)/	CORON, PALAWAN PROVINCE	LOCAL GOVERNMENT	
11	OFFICE OF THE PROVINCIAL AGRICULTURIST (OPA)/	MASINLOC, ZAMBALES PROVINCE	LOCAL GOVERNMENT	

3) SITE-BASED MANAGEMENT BOARD IN PHILIPPINES

NO.	AGENCY NAME	NAME OF MINISTRY	TYPE	LOGO
1	MARINE SCIENCE INSTITUTE	-	ACADEMY	
2	UNIVERSITY OF THE PHILIPPINES VISAYAS	-	ACADEMY	
3	MINDANAO STATE UNIVERSITY	-	ACADEMY	
4	WESTERN PHILIPPINES UNIVERSITY	-	ACADEMY	
5	PANGASINAN STATE UNIVERSITY	-	ACADEMY	

6	BUREAU OF FISHERIES AND AQUATIC RESOURCES	DEPARTMENT OF AGRICULTURE	GOV	
7	COMMUNITY ENVIRONMENT AND NATURAL RESOURCES (CENRO)	LOCAL COMMUNITY	LOCAL COMMUNITY	
8	PHILIPPINE COAST GUARD (PCG)	DEPARTMENT OF TRANSPORTATION	GOV	
9	OFFICE OF THE PROVINCIAL AGRICULTURIST (OPA)/	PANGASINAN PROVINCE	LOCAL GOVERNMENT	
10	OFFICE OF THE PROVINCIAL AGRICULTURIST (OPA)/	CORON, PALAWAN PROVINCE	LOCAL GOVERNMENT	
11	OFFICE OF THE PROVINCIAL AGRICULTURIST (OPA)/	MASINLOC, ZAMBALES PROVINCE	LOCAL GOVERNMENT	
12	*FISHERIES AND AQUATIC RESOURCES MANAGEMENT COUNCIL (FARMC)*	LOCAL GOVERNMENT	LOCAL GOVERNMENT	
13	ASSOCIATION OF RESORT OWNERS AND TOURISM ESTABLISHMENTS	-	PRIVATE SECTOR	
14	PEOPLE'S ORGANIZATION	-	NGO	

STRUCTURE OF NATIONAL COORDINATION
OF
FISHERIES REFUGIA PROJECT
(UPDATED JULY 2022)

E. THAILAND
1) NATIONAL FISHERIES REFUGIA COMMITTEE IN THAILAND

NO.	AGENCY NAME	NAME OF MINISTRY	TYPE	LOGO
1	DEPARTMENT OF FISHERIES	MINISTRY OF AGRICULTURE AND COOPERATIVES	GOV	

2	SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER (SEAFDEC)	-	INTER-GOVENMENTAL ORGANIZATION	
3	KASETSART UNIVERSITY (KU)	-	ACADEMY	
4	DEPARTMENT OF MARINE AND COASTAL RESOURCES (DMCR)	MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT	GOV	

2) NATIONAL SCIENTIFIC AND TECHNICAL COMMITTEE IN THAILAND

NO.	AGENCY NAME	NAME OF MINISTRY	TYPE	LOGO
1	DEPARTMENT OF FISHERIES	MINISTRY OF AGRICULTURE AND COOPERATIVES	GOV	
2	DEPARTMENT OF MARINE AND COASTAL RESOURCES (DMCR)	MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT	GOV	
3	BURAPHA UNIVERSITY, CHANTHABURI CAMPUS (BUU)	-	ACADEMY	
4	WALAILAK UNIVERSITY (WU)	-	ACADEMY	
5	MAEJO UNIVERSITY AT CHUMPHON MJU	-	ACADEMY	
6	THE GEO-INFORMATICS AND SPACE TECHNOLOGY DEVELOPMENT AGENCY (GISTDA)	MINISTRY OF SCIENCE AND TECHNOLOGY	PUBLIC ORGANIZATION	

7	SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER (SEAFDEC)	-	INTER-GOVENMENTAL ORGANIZATION	

3) SITE-BASED MANAGEMENT BOARD IN THAILAND

NO.	AGENCY NAME	NAME OF MINISTRY	TYPE	LOGO
1	DEPARTMENT OF FISHERIES (TRAT AND SURAT THANI)	MINISTRY OF AGRICULTURE AND COOPERATIVES	GOV	
2	DEPARTMENT OF MARINE AND COASTAL RESOURCES (DMCR)	MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT	GOV	
3	DEPARTMENT OF NATIONAL PARKS , WILDLIFE AND PLANT CONSERVATION	MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT	GOV	
4	RAMBHAI BARNI RAJABHAT UNIVERSITY RBRU	-	ACADEMY	
5	BURAPHA UNIVERSITY, CHANTHABURI CAMPUS (BUU)	-	ACADEMY	
6	SUSTAINABLE DEVELOPMENT FOUNDATION (SDF)	-	NGO	
7	FISHERIES ASSOCIATION OF TRAT	MINISTRY OF AGRICULTURE AND COOPERATIVES	GOV	
8	THE TRAWL ASSOCIATION OF SURAT THANI	-	PRIVATE SECTOR	

9	WALAILAK UNIVERSITY (WU)	-	ACADEMY	
10	FISHING COMMUNITY	-	PRIVATE SECTOR	
11	REPRESENTATIVES FROM MNRE	MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT (MNRE)	GOV	
12	FISHERIES ASSOCIATION OF SURAT THANI		PRIVATE SECTOR	
13	PURSE SEINE ASSOCIATION OF TRAT		PRIVATE SECTOR	

ANNEX 6 : PROGRESS WORKS BY CAMBODIA

1. Fisheries Refugia Project Site

2. ESTABLISHMENT AND MANAGEMENT OF FISHERIES REFUGIA

2.1 BACKGROUND OF FISHERIES REFUGIA IN KEP PROVINCE

- Site Name: Marine Fisheries Management Area including Fisheries Refugia at Koh Po, Kep province
- Target Species: Blue Swimming Crab and Anchovy
- Total size: 11307ha
- Endorsed Date: 12 April 2018

- **SITE BASED MANAGEMENT BOARD FOR THE MARINE FISHERIES MAANAGEMENT AREA INCLUDING BSC REFUGIA**
  - Provincial Management committee (chaired by provincial governor and with various government agencies participations)
  - Provincial Technical Working Group (chaired by provincial deputy governor and with various government agencies, NGOs, private sectors and community participation

MANAGEMENT MEASURE OF MARINE FISHERIES MANAGEMENT AREA INCLUDING BSC REFUGIA IN KEP PROVINCE

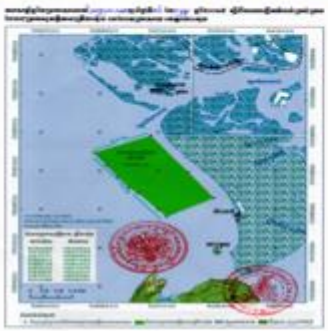
Closed season of BSC starting from May to July, all kinds of fishing gears targeted catching crabs and negatively impact are prohibited

No closing season for Anchovy but only small-scale fishing gears are allowed.

Deploying 345 concrete blocks into MFMA and refugia site in order to protect marine habitat and improve marine habitat and prevent illegal fishing activities

Disseminate a noticed letter during closed season of BSC starting from May to July through local media, facebook of provincial hall administration, and meeting with fishermen

2.2 BACKGROUND OF FISHERIES REFUGIA IN KOH KONG PROVINCE



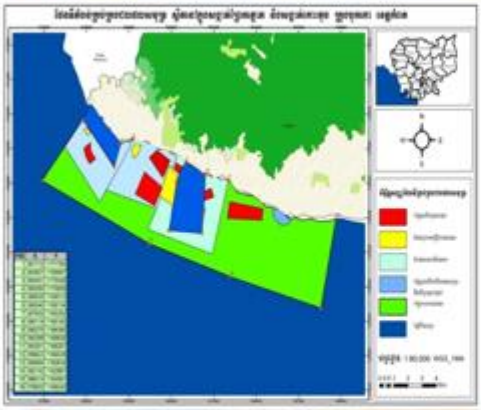
- Site Name: Mackerel Fisheries Refugia at Peam Krasob, Koh Kong Province
- Target Species: Short Mackerel
- Refugia Site Size: 1283ha
- Endorsed Date: 16 September 2019

- **SITE BASED MANAGEMENT BOARD FOR THE MARINE FISHERIES MAANAGEMENT AREA INCLUDING BSC REFUGIA**
  - Provincial Management committee (chaired by provincial governor and with various government agencies participations)
  - Provincial Technical Working Group (chaired by provincial deputy governor and with various government agencies, NGOs, private sectors and community participation

MANAGEMENT MEASURE OF SHORT MAKEREL REFUGIA IN KOH KONG PROVINCE

- Closed season of short mackerel starting from December to March and during that time, all kinds of fishing gears targeted short mackerel and negatively impact to mackerel are prohibited
- Patrolling, crack down illegal fishing, and stand by at the refugia site,
- Deploying 50 concrete blocks into fisheries refugia site in order to prevent illegal fishing at refugia site and to improve artificial habitats
- Disseminating a noticed letter on closed season of short mackerel starting from December to March

2.3 BACKGROUND OF FISHERIES REFUGIA IN KMAPOT PROVINCE



- Site Name: Marine Fisheries Management Area including Grouper Fisheries Refugia at Preak Thnoat, Kampot Province
- Target Species: Grouper
- Estimated MFMA and Refugia Site Size: 8904ha including 284ha for juvenile grouper fisheries refugia area
- Endorsed Date: Not approved yet, on final discussion at provincial level especially outer boundary and zoning

MANAGEMENT MEASURE OF MARINE FISHERIES MANAGEMENT AREA INCLUDING JUVENILE GROUPER REFUGIA IN KAMPOT PROVINCE

- Deploying 50 concrete blocks into fisheries refugia site in order to prevent trawler from fishing at refugia site and to serve as the artificial habitats for some key fish species and endangered species as well,
- Prohibit trawlers and gear with small mesh size within MFMA and refugia site,
- Even though the refugia site has not been endorsed but some activities have been carried out including patrolling and dissemination.

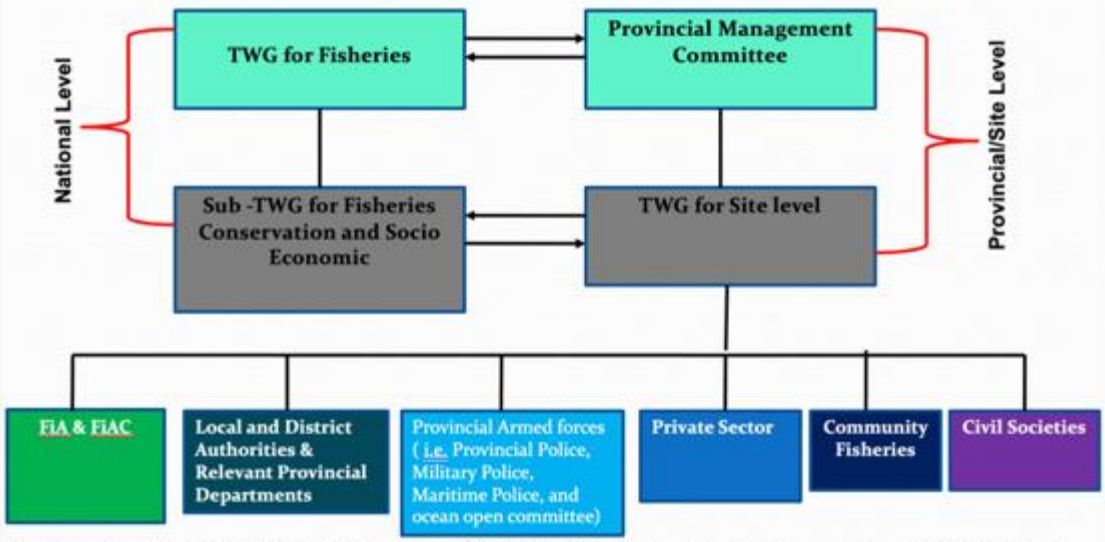
2.4 BACKGROUND OF FISHERIES REFUGIA IN PREAH SIHANOUK PROVINCE

- Site Name: Blood Cockle Fisheries Refugia at Prek Sangke village, Tek Khlar commune, Prey Nob district, Preah Sihanouk province
- Target Species: Blood cockle (*Anadam granosa*)
- Refugia Site Size: 116ha
- Endorsed Date: 20 August 2020
- SITE BASED MANAGEMENT BOARD will be established
- Management plan will be formulated

MANAGEMENT MEASURE OF BLOOD COCKLE REFUGIA IN PREAH SIHANOUK PROVINCE

- Closed season of blood cockle fishing starting from June to October
- All kind of fishing gears targeted blood cockle are prohibited during closing season
- Only hand collection is allowed during open season
- Allow to collect blood cockle by hand during open season
- So far, 50 concrete blocks were deployed
- Demarcate the boundary of blood cockle refugia site

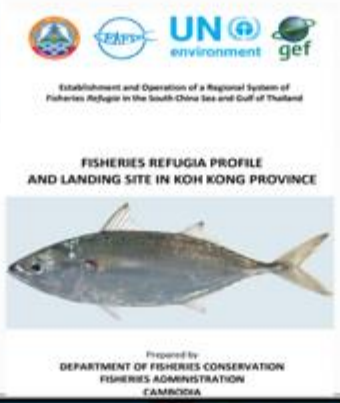
3. MANAGEMENT AND COORDINATION STRUCTURE

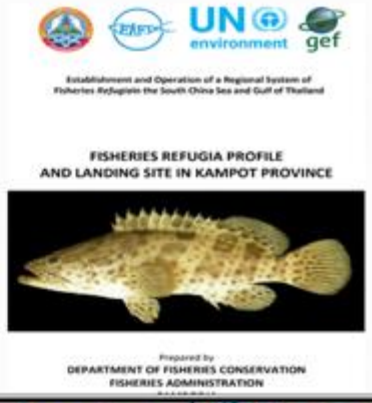


- *At national level it, Technical Working Group (TWG) for Fisheries is chaired by Director General of FiA. Fisheries Refugia in sub-group of socio economic and conversation chaired by DDG of FiA .*
- *At provincial level, Provincial Management Committee (PMC) is chaired by Provincial Governor. Technical Working Group for Site chaired by Provincial Deputy Governor.*

4. Legal Framework and Strategy plan for Fisheries Refugia Management

- Three proclamations on the establishment of the management area of fisheries refugia in kep, Koh Kong, and Preh Sihanouk provinces have been adopted
- Three fisheries refugia profiles in Kep, Kampot, and Koh Kong province have been adopted





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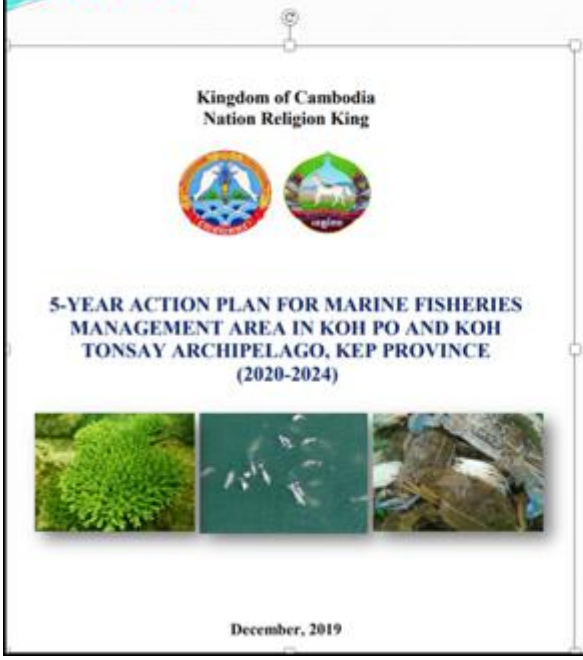


- 5 year-Action Plan for Marine Fisheries Management Area including BSC refugia at Koh Po and Koh Tonsay Archipelago, Kep province has been officially approved and implemented
- National guideline for fisheries refugia management is a final draft , but it is needed to review it again before publishing
- National Action Plan for Fisheries Refugia Management is needed to consult and discuss more with relevant stakeholders at provincial and national level to finalize this document

4. Continue

The concept of fisheries *refugia* has been integrated into:

- National Plan of Action for Combating IUU Fishing
- Final draft of 10 year strategy plan for fisheries conservation,
- Marine Management Plan
- Included in the draft New Law on Fisheries Law as follows:
  - Article 15 and 16: Stated about type of Fisheries Management with inclusion of Fisheries Refugia (FR)
  - Article 17: Stated about Legal type to support the establishment of FR
  - Article 20: Stated about Where FR shall be established
  - Article 24: Stated about Restriction of fishing activities within FR
  - Article 126: Stated about Penalty (250$ - 2500$) and in some case the amount is double.

4. Continue

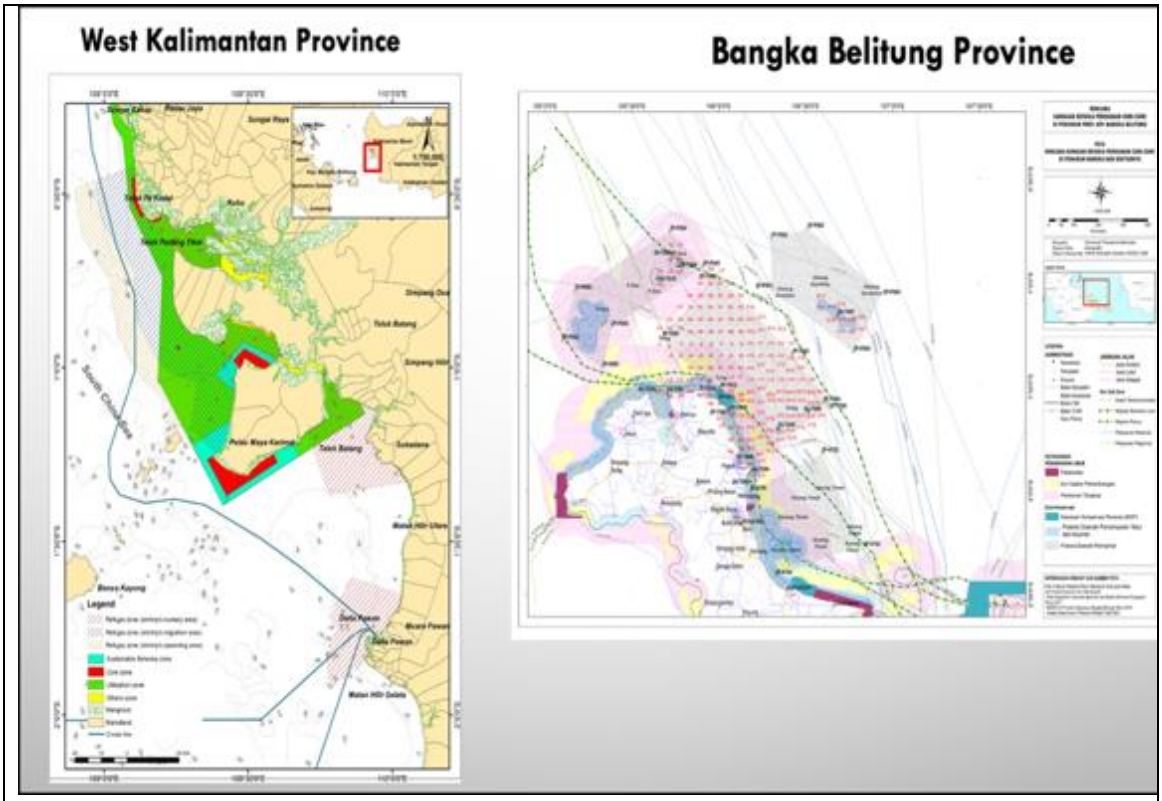
Leaflets on fisheries refugia has been published and distributed to participants during National Fish Day Ceremony on 1st July 2022.

ANNEX 7: PROGRESS WORKS BY INDONESIA

Objective/ Targets	Outcomes	Results	Code	Expected Outputs	Indonesia (2 Sites)
1) Effective management of key threats to 14 fisheries refugia sites [269,500 ha], including ~50 percent reduction in fishing pressure within sites at times critical to the life-cycles of fished species of transboundary significance	Reduced stress on fish stocks and coastal habitats via improved national management of key anthropogenic threats to fisheries and critical habitat linkages	It is expected that by end of 2022, the effective management of 14 fisheries refugia about 660,236 ha, including effective management measures on reducing >50% fishing presusure that impact to refugia identified by stakeholders.	A01	Fisheries refugia profile reports, including GIS maps & site characterisations, published	West Kalimantan& Bangka Belitung (completed)
			A02	Published management plans (Link to B02)	On process to be approved by Directorate General , Governemnet Province
			A03	Quarterly/Annual Technical reports of network meetings and activities (Number of reports)	39

A01. Fisheries Refugia Profile

Name/Location/Province	Target Species	Estimated Refugia size (Hectares	Marine Habitat Linkage
Kubu Raya (Padang Tikar), Ketapang (Delta Pawan) and North Kayong (Dusun Besar)/West Kalimantan	Penaeid shrimp (*Penaeus merguiensis)*	414,807 ha	Mangrove
Bangka Regency/Tuing Village	Squid (*Uroteuthis chinensis*)	468,828.32	Coral reef, sea grass



OBJECTIVE :1) EFFECTIVE MANAGEMENT OF KEY THREATS TO 14 FISHERIES REFUGIA SITES [269,500 HA], INCLUDING ~50 PERCENT REDUCTION IN FISHING PRESSURE WITHIN SITES AT TIMES CRITICAL TO THE LIFE-CYCLES OF FISHED SPECIES OF TRANSBOUNDARY SIGNIFICANCE

A02. PUBLISHED MANAGEMENT PLANS

On Process To Be Approved By Directorate General & Government Province

The fisheries refugia team under the Agency Of Research And Human Resources is responsible until the stage o producing policy paper which contain recommendation for developing fisheries refugia management pla Furthermore, this policy paper will be basis for develop a management plan especially for shrimp and squid in FM 711. The related agency in this stage will be as follow:

- Directorate General Of Marine Spatial Planning (Directorate Of Marine Spatial Planning) Related To The Use O Marine Space For Particular Purposes.
- Directorate General Of Capture Fisheries (Directorate Fish Resource Management) Related To The Management O Fish Resources And Regulation Of Fishing.
- The Government Of West Kalimantan Province & Bangka Belitung Province As The Authority For The Managemer Of Areas And The Management Of Fish Resources Under The Authority Of The Local Government.

Objective/ Targets	Outcomes	Results	Code	Expected Outputs	Indonesia (2 Sites)
2) National and regional policy, legal and planning frameworks for demarcating boundaries and managing fisheries refugia, resulting in, inter alia, a 20 percent increase in small-scale fishing vessels using fishing gear and practices designed to safeguard fish stock and critical habitat linkages at priority sites	Increased institutional capacity in the 6 participating countries for the designation and operational management of fisheries refugia via the transformation of enabling environments and the generation of knowledge for planning	National policy, legal and planning framwork are being achieved, three of six countries completed, while the other three are in process for adoption by government. The effective management of fisheries refugia are not focused only increasing of small-scale fishing vessels that must use to the best practices fishing gears, but covering the medium and large scale fishing vessels that are >50% prohibited to operate in the refugia areas. The demercating boundaries refugia site are identified with the critical habitat linkages to ensure that the refugia designed to safeguard fish stock and critical habitat linkages. The Regional Action Plan for mannagement of fisheries refugia was adopted by six participatinng countries and scale-up covering the Southeast Asian Regiona under the ASEAN policy framework.	B01	Published national reviews and recommendations for reforms of national regulations/ordinances	on progress ; target : publishe during the third quarter
			B02	Endorsed revised policies, Strategic Managment Plan, Fisheries Master Plan	On proccess Regulation of the Minister of Marine Affairs and Fisheries of t Republic of Indonesia No. 59 o 2020, concerning fishing lanes a fishing gear
			B03	Published national guidelines on establishing and operating fisheries refugia	On proccess
			B04	National reports on policy, legal and institutional aspects of refugia establishment and management published	On process to develop draft regulation

OBJECTIVE :2) NATIONAL AND REGIONAL POLICY, LEGAL AND PLANNING FRAMEWORKS FOR DEMARCATING BOUNDARIES AND MANAGING FISHERIES REFUGIA, RESULTING IN, INTER ALIA, A 20 PERCENT INCREASE IN SMALL-SCALE FISHING VESSELS USING FISHING GEAR AND PRACTICES DESIGNED

B01. Published national reviews and recommendations for reforms of national regulations/ordinances.

- ❑ The national review and recommendations for reform of national regulations/regulations are still in progress and will be published during the third quarter of 2022.

B02. Endorsed revised policies, strategic management plan, fisheries master plan,

- ❑ Revision of management regulations and policies at the national level (revised regulation of FMA 711)
- ❑ Recommendation for the revision of regional regulations regarding the zoning plan for coastal areas and small islands in both West Kalimantan and Bangka Belitung province
- ❑ The Quota-based Fishing Policy. Currently, Indonesia has formulated the Draft Regulation of The Quota Based Fishing Policy, which divide the FMA into some zones (commercial/industries fishing zones, local fishers, non commercial, and spawning and nursering zones). This policy is inline Fisheries Refugia concept that helps the rehabilitation of aquatic resources and critical habitat in certain area, in this stage we initiate to implement in FMA 711 for Squid and Shrimp. We are finalizing the draft of regulation regarding the quota-based fishing policy and we do hope will be endorsed within this year. Once it is endorsed, the policy will be applied in all Indonesia FMA. In this matter, the is Fisheries refugia concept in might be adopted in all Indonesian FMA. Each FMA will be managed be the FMA Management Institutions that has been stipulated in 2021.

B03. Published National Guidelines On Establishing And Operating Fisheries Refugia

The preparation of a National guideline on establishing and operating fisheries refugia has been carried out and is in the process of being approved by an authorized institution at the directorate general level.

B04. National reports on policy, legal and institutional aspects of refugia establishment and management.

After developing a policy brief the next stage is to develop the draft of the regulation. In the stages, the multi-stakeholder discussion will required longer to compile the substances/material regarding fisheries refugia establishment management into legal text.

National Guidelines of Fisheries Refugia Outlines

THE OUTLINES
FOREWORD HEAD OF THE AGENCY
CHAPTER 1. INTRODUCTION
A. Background
B. Purpose and Purpose
C. Scope
D. General understanding
CHAPTER 2 CAPTURE FISHERIES IN INDONESIA
A. Status of fish resources
A. Status of marine space fish resources
A. Fish resource habitat
A. Socio-Economic Condition
A. Governance and Institutions
CHAPTER 3. FISHERIES REFUGIA
A. Definition of Fisheries Refugia
A. Differences between Fisheries Refugia and Marine Protected Area
A. Fisheries Refugia in fisheries management
CHAPTER 4. DEVELOPMENT STAGES OF FISHERIES REFUGIA
A. Formation of the team
A. Determination of targeted species
A. Ecological studies of targeted species
A. Identification of potential fisheries refugia area
A. The suitability of the Fisheries Refugia area recommendation with the zoning plan and spati plan
A. Preparation of Fisheries Refugia Management Plan (FRMP) and institutional strengthening
A. Agreement with stakeholders: coordination and consultation with stakeholders
A. Implementation of Fisheries Refugia Management
A. Monitoring and evaluation
CHAPTER 5. CASE STUDY OF FISHERIES REFUGIA IN PROV. KALBAR AND BABEL
CHAPTER 6. CLOSING

Objective :2) National and regional policy, legal and planning frameworks for demarcatin boundaries and managing fisheries refugia, resulting in, inter alia, a 20 percer increase in small-scale fishing vessels using fishing gear and practices designed

B05. Endorsed policy and executive orders, provincial/local ordinances, and by-laws (proclamation, provincial orders for each site).

As reflected in point A02, the process of endorsing policy and regulation in national, as well as provincial and local level will require longer process and steps. However, the fisheries refugia team has completed policy paper as basis to develop national, and local/provincial policies and regulations.

B06. Endorsed national action plan for the management of priority fisheries refugia and associated biodiversity.

The national action plan is a part of the fisheries refugia management plan itself. As reflected also in point A02, the process of endorsing policy and regulation in national, as well as provincial and local level will require longer process and steps. Once the FR management plan is endorsed, subsequently the national action plan will be endorsed as well.

B07. Databases online and populated with datasets included fish stock

We have already identified the basis data containing ecology, biology, eco-soc, from the FR research. In this stage, we still need more time to analyze and conduct data processing until its ready to be uploaded to the website.

Objective/ Targets	Outcomes	Results	Code	Expected Outputs	Indonesia (2 Sites)
2) National and regional policy, legal and planning frameworks for demarcating boundaries and managing fisheries refugia, resulting in, inter alia, a 20 percent increase in small-scale fishing vessels using fishing gear and practices designed to safeguard fish stock and critical habitat linkages at priority sites	Increased institutional capacity in the 6 participating countries for the designation and operational management of fisheries refugia via the transformation of enabling environments and the generation of knowledge for planning	National policy, legal and plannning framwork are being achieved, three of six countries completed, while the other three are in process for adoption by government. The effective management of fisheries refugia are not focused only increasing of small-scale fishing vessels that must use to the best practices fishing gears, but covering the medium and large scale fishing vessels that are >50% prohibited to operate in the refugia areas. The demercating boundaries refugia site are identified with the critical habitat linkages to ensure that the refugia designed to safeguard fish stock and critical habitat linkages. The Regional Action Plan for mannagement of fisheries refugia was adopted by six participatinng countries and scale-up covering the Southeast Asian Regiona under the ASEAN policy framework.	B05	Endorsed policy and executive orders, provincial/local ordinances and by-laws (proclamation, Provincial Orders for each site)	
			B06	Endorsed National Action Plan for the management of priority fisheries refugia and associated biodiversity	
			B07	Databases online and populated with datasets included fish stock	

Objective/ Targets	Outcomes	Results	Code	Expected Outputs	Indonesia (2 Sites)
2) National and regional policy, legal and planning frameworks for demarcating boundaries and managing fisheries refugia, resulting in, inter alia, a 20 percent increase in small-scale fishing vessels using fishing gear and practices designed to safeguard fish stock and critical habitat linkages at priority sites	Increased institutional capacity in the 6 participating countries for the designation and operational management of fisheries refugia via the transformation of enabling environments and the generation of knowledge for planning	National policy, legal and plannning framwork are being achieved, three of six countries completed, while the other three are in process for adoption by government. The effective management of fisheries refugia are not focused only increasing of small-scale fishing vessels that must use to the best practices fishing gears, but covering the medium and large scale fishing vessels that are >50% prohibited to operate in the refugia areas. The demercating boundaries refugia site are identified with the critical habitat linkages to ensure that the refugia designed to safeguard fish stock and critical habitat linkages. The Regional Action Plan for mannagement of fisheries refugia was adopted by six	B08	Endorsed Regional Action Plan for fisheries refugia	cooperated
			B09	National and Regional Geographical Information System online	Being developed
			B10	Characterisations for 14 refugia sites accessible online	The data has been completed and on the procces to be published online (during third qurter)
			B11	Modelling system online	
			B12	Best practice fishing methods and practices to address key threats to fish stock and critical habitat linkages	there is already an environmentally friendly fishing method regulated in a ministerial regulation.

Objective/ Targets	Outcomes	Results	Code	Expected Outputs	Indonesia (2 Sites)
3) National and regional systems for knowledge management and sharing, including the development of indicator sets and standardized statistics to guide the replication, scaling-up and mainstreaming of good practices in the use of fisheries refugia as a spatial planning tool	Strengthened knowledge management and information sharing and access for enhanced uptake of good practice in integrating fisheries management and biodiversity conservation in the design and implementation of fisheries and environmental management systems, including Marine Spatial Planning	Six countries are in process for enhancing the national systems for knowleadge management and sharing. Five Refugia Information Centres have been established in Malaysia and Philippines. Three national webportal are onlined, while other countries underways. The Regional website and Repository system are developed linking to the SEAFDEC network system. Regional Guidelines on Indicators is drafted for adoption by Project Steering Committee.	C01	Best practice approaches and measures for integrated fisheries and habitat management	being prepared publised
			C02	Public awareness and Outreach programmes including tracking of extent of community acceptance	
			C03	Education and awareness centre on fisheries and criticle habitat established	Being prepare
			C04	Regional agreement/guidelines on indicators for managed refugia (including standardized data collection)	
			C05	Online national web portals on fisheries refugia	Created/online

Objective/ Targets	Outcomes	Results	Code	Expected Outputs	Indonesia (2 Sites)
4) Effective multi-lateral and intergovernmental communication and joint decision-making, including the use of a consensual knowledge-base in planning ecologically and cost-effective management actions	Cost-effective and efficient coordination of national and regional level cooperation for integrated fisheries and environmental management	National and regional cooperation and coordination for integrated fish stock and critical habitat management in the South China Sea and Gulf of Thailand	D01	NFRC Terms of Reference and reports	Need updated
			D02	NSTC Terms of Reference and reports	Need updated
			D03	Management Board Terms of Reference and Reports	Need updated

Dokumentasi/Foto2


Thank you

ANNEX 8: PROGRESS WORKS BY MALAYSIA

Part 1: Spiny Lobster Refugia

DEVELOPMENT OF A REFUGIUM MANAGEMENT PLAN FOR THE MUD SPINY LOBSTER (Panulirus polyphagus) AT TANJUNG LEMAN, JOHOR

Presented in RSTC6

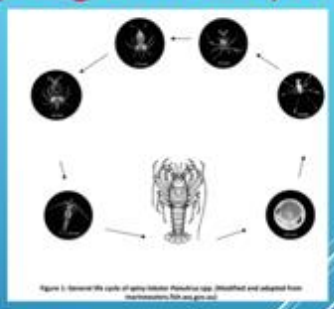
Samut Prakan

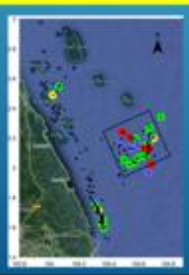
Thailand

4-6 July 2022

Distribution of lobster Panulirus polyphagus in Malaysia

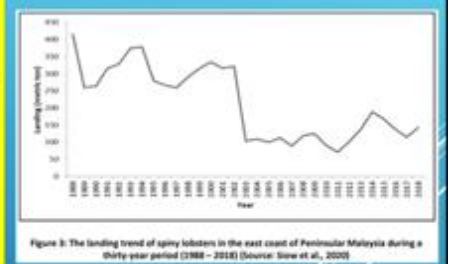
- Spiny lobster is a carnivorus predator feeding
- Found in shallow and deep water depend on their stages of life cycle
- Egg & Phyllosoma- offshore
- Juvenile-1-2 years –Inshore
- Adults Offshore 2-3 years
- Area found in Southern part of east Johor coast





THREATS TO THE LOBSTERS' POPULATION

- Declining trend since early 2000's had triggered the push towards conserving the lobster population in Malaysia
- Habitat degradation, illegal fishing activities, and over-fishing are the key drivers that deteriorated the lobster population in the area
- To deal with this declining resource, recommendations for the implementation of a lobster refugia in Malaysia
- Present status stock is in overfished area:
  - F/Fmsy 1.94
  - B/Bmsy 0.3



THE MANAGEMENT STEERING FRAMEWORK

- 35- Series of number in technical report of network meeting and activities has been done
- Latest report on
  - Development of Refugium management plan for the mud spiny lobster at Tanjung Leman
  - Management plan for the tiger prawn refugia at Kuala Baram

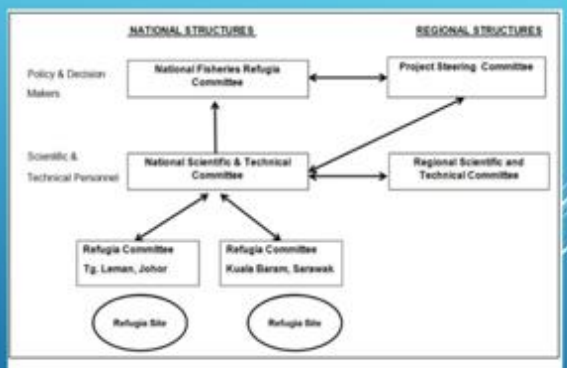
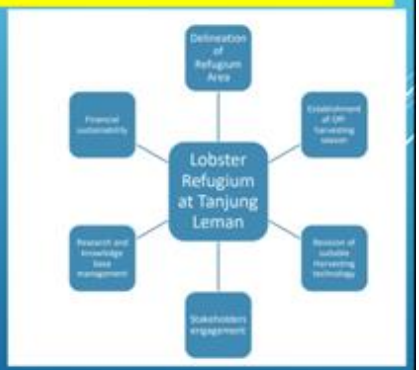


Figure 4: The national and regional coordination mechanism for the execution of Fisheries Refugia in Malaysia (Source: Siow et al., 2020)

STRATEGIES AND COMPONENT OF REFUGIUM PLAN

To achieve the refugium's objectives, the current management plan endorsed the following strategies to address they key concerns highlighted in the publication. Table and Figure elaborated the key strategies that formed the framework for lobster refugium management plan at Tanjung Leman, Johor

Component for the establishment of lobster refugia	Strategies	Related Outputs	
OTU/ Targeted species	To elaborate lobsters' biology and reproduction cycle	To identify suitable harvesting technique for sustainable fisheries	Financial Sustainability
Establishment of refugium area	To outline potential migration patterns of the spiny lobster To identify area of potential settlement of the lobster's larvae	To delineate critical area to sustain lobster population in the area	
	To identify target groups for public awareness and dissemination of information	To collect information for public awareness program	
Off-season proposal for lobster refugium	To identify strategic period for closure of lobster fishing ground in the area	To identify critical period/ time/ spawning in a year for the lobster population	
Insufficient scientific data for decision support system	To identify information gaps and method for data collection	To involve fishers in the data collection of sustainable lobster fisheries	

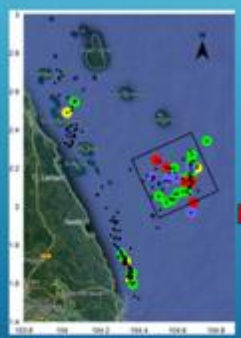


DELINEATION OF LOBSTER REFUGIUM AT TANJUNG LEMAN

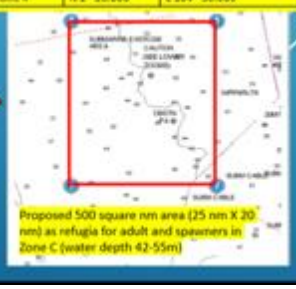
- The proposed delineation based on the current circulation pattern, habitats and critical area for the migration route as well as sensitive area for the lobster- **PROPOSED A SITE WITH MINOR COORDINATE ADJUSTMENT-**

Justification

1. Since nursery area in Zone A are also a major fishing grounds for traditional fishers, at initial stage to gazette only spawning ground as refugia in Zone C. Next step will be followed by refugia in Zone B and Zone A after some progress of refugia in Zone C.
2. This strategy is to prevent social conflict with traditional fishers in zone A and at the same time the DOFM has more time for public awareness campaign activities to them.
3. The most potential area to be gazetted as first lobster refugia in zone C. This area was located in was suggested from studied earlier in Zone Southern part of Pulau Aur, in Johor waters and have a high concentration of mud spiny lobsters compared to other areas.
4. This area also has a higher density of adult female lobsters including berried females which are ready to release its eggs.
5. New coordinates is good for management and monitoring purposes during enforcement activity by the DOFM officers and for good memories for fishing vessel skippers



Position	Latitude	Longitude
Point 1	N 1° 55.000'	E 104° 30.000'
Point 2	N 2° 20.000'	E 104° 30.000'
Point 3	N 1° 55.000'	E 104° 50.000'
Point 4	N 2° 20.000'	E 104° 50.000'



ARTIFICIAL REEFS FOR LOBSTERS

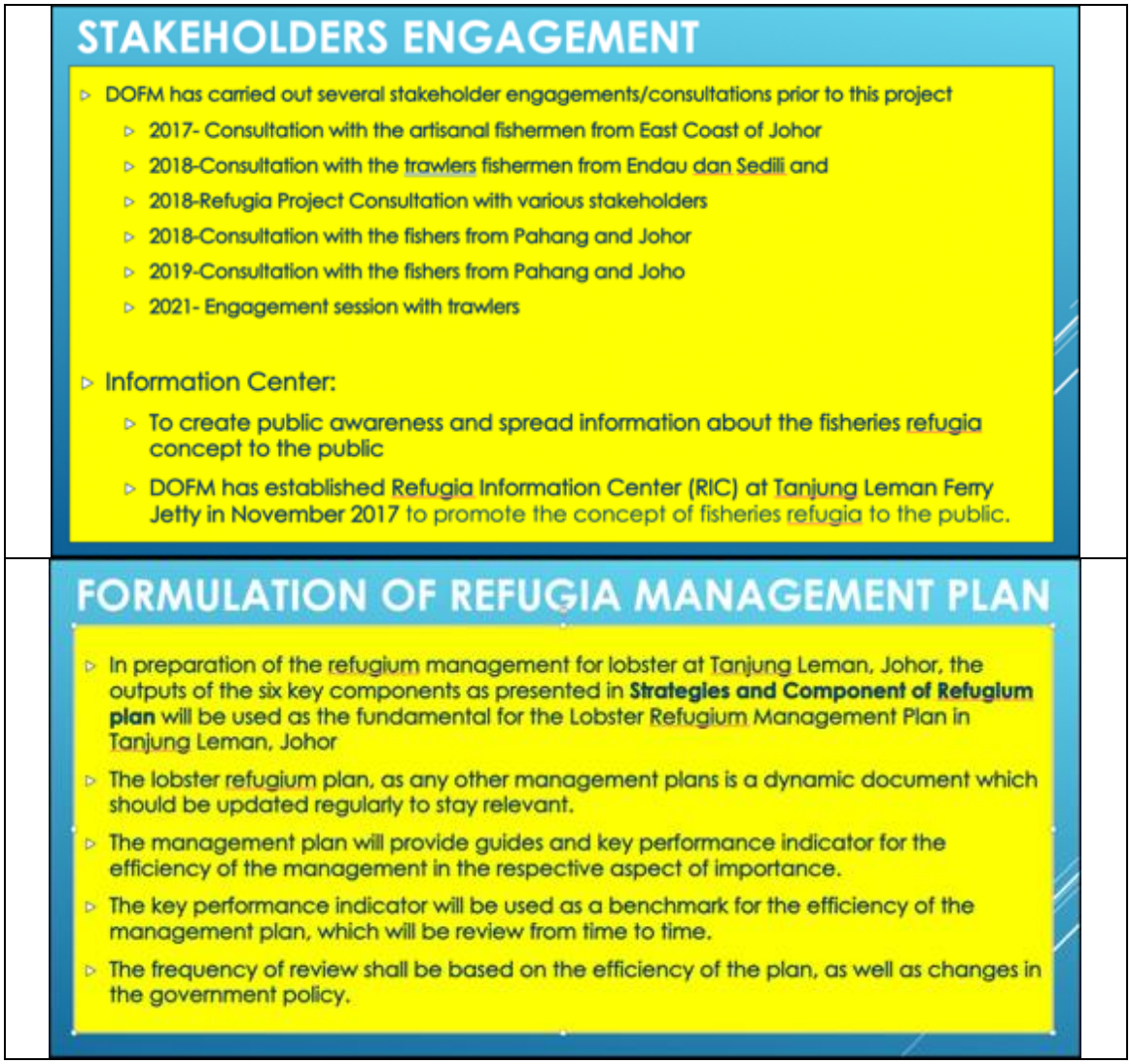
- Alternatives to resolve the conflicting issue with in fishes and management is to introduce artificial reefs into the refugium
- Artificial reefs for Post-larvae, Juvenile and Sub-adult Lobsters
- Artificial Reefs for Adult Lobsters
- The artificial reefs can serve two major roles:
  - 1. Establish new habitats for the lobster in the area. These new "artificial" habitats can potentially be the no take zone within the refugium
  - 2. To deter operation of bottom trawler within the refugium. Bottom trawling has long known to be destructive to the benthic ecosystem. This destructive method should be phased out in stages and replace with a less destructive fishing method

ESTABLISHMENT OF OFF-HARVESTING SEASONS

- The aim of the off-harvesting seasons establishment is to protect this resource during the major spawning period
- Defined as the prohibition of any activity regarding fishing of spiny lobster within a certain period.
- Already started in 2021- July to Sept.
- During the closure, spiny lobster shall not be harvested, possessed, purchased, or sold.

REVISION OF HARVESTING SIZE AND TECHNOLOGY

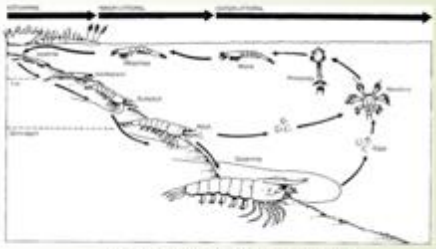
- The main problems that affect the sustainability of spiny lobster resources are the capture of undersized lobster.
- Undersized lobster is captured and accepted for trading to increase profitability
- In order to establish guideline for harvesting size and technology, thorough literature related to the size at sexual maturity of spiny lobster and fishing gear in Malaysian coastal waters areas will be accumulated, and a comprehensive literature review will be made to clarify the status of Malaysia spiny lobster and the technical aspect capturing the lobster.
- The estimated size at maturity for the spiny lobster at the proposed refugia site-This size could be suggested as minimum CL to catch
  - males was 6.58 cm - 8.18 cm CL
  - females was 6.75 cm- 7.58 cm (based on CPL).



Part 2: Tiger Prawn Refugia

Distribution of *P .monodon*

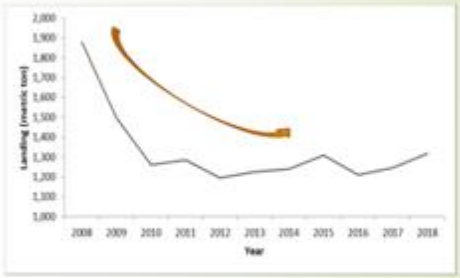
- Ecologically, penaeid shrimps have to go through two major ecosystems: the offshore and the coastal inshore environments in order to complete their life cycle
- Mature penaeids breed in deep water while post-larval and juvenile stages inhabit inland marshes, estuaries, brackish water and mangrove areas, then they migrate back to the sea for maturation and breeding



Life cycle of P. monodon

Current threats to tiger prawn population

- *P. monodon* has been extensively farmed to meet increasing demand, they were also caught in the wild for production and spawners collection for seed production purposes.
- The high dependency of wild-caught spawners for seed production thus resulted in over-exploitation of the natural population, affecting the sustainability and biodiversity of fishery resources
- The declining number of tiger shrimp landing was reported between from 2008 to 2018 due to unrestricted coastal development.
- The problem of over-exploitation of the tiger prawn resource is aggravated by the deployment of destructive fishing gears such as beam-trawl and mechanized push net in the coastal prawn nursery areas.
- Prawn nursery area in the riverine ecosystem is also affected by deforestation of mangrove area for development and housing



Present status stock is in recovery area:
F/Fmsy 0.99
B/Bmsy 0.96

The management steering framework

- 35- Series of number in technical report of network meeting and activities has been done
- Latest report on
  - Development of Refugium management plan for the mud spiny lobster at Tanjung Leman
  - Management plan for the tiger prawn refugia at Kuala Baram

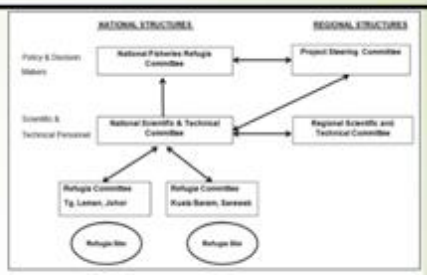


Figure 4: The national and regional coordination mechanism for the execution of Fisheries Refugia in Malaysia (Source: Siow et al., 2020)

Based on the previous engagement session (Department of Fisheries, Malaysia, 2021),

- All stakeholders agreed with the proposal of the tiger prawn refugia establishment.
- August to October will be regulated as the closed season for tiger prawns.
- This regulation is applicable for all trawlers at Zone C7. All fishing activities by the trawlers must operate at 12 nautical miles from the shoreline.
- 2021 will be the first year of the implementation of this regulation
- The department also encourages the fishermen to comply with this regulation voluntarily for this year. In the year 2023, the department will fully enforce these regulations.
- For tiger prawn, specifically for Kuala Baram, the Close season from August to October will be included as an additional clause in the Vessel License and Fishing Equipment for fishermen's Zone C7.

Key components and strategies of tiger prawn refugia establishment

Component for tiger prawn refugia establishment	Strategies	Related outputs
Focused area for refugia establishment	To determine the migration pattern of tiger prawn from larvae to adulthood.	Identify potential area for tiger prawn fishing activity and protect vulnerable populations.
Protection of spawners and seasonal closure	To determine the ovarian maturation stages	Preserve spawners population to allow more natural larvae production.
	To determine the length of tiger prawn at maturity	To protect the harvested species and prevent overfishing.
	To propose off-season for tiger prawn	Yearly scheduled area closed for fishing.
Data acquirement for decision support system	To identify information gaps, insufficient data and method	To allow better data collection method and analysis for sustainable tiger prawn fishing plan.
Stakeholders engagement	To facilitate and validate the proposed management with stakeholders	Ensure an accurate representation of information regarding the program from relevant parties.
		For a smooth collaboration setting.
Developing refugia trust fund	Financial model for effective mix of finance solution	For financial sustainability: lower cost, increase capital flow.

Designated area for refugia

- Fig. 4 showed the location of the proposed tiger prawn refugia site off Kuala Baram (red-dash lines), covering an area of approximately 556 km². (55,600 hectare)
- Adjustment at sea based on having tiger prawn during fishing activities and
- In Mangrove area to protect nursery area of the tiger prawn post-larva and juvenile in the 5 rivers Sg. Pasu, Sg Lutong, Sg. Miri, Sg. Bakam Sg. Sibuti

Table 3: Coordinates of proposed area of tiger prawn refugia site.

Point	Longitude	Latitude
A	N 04° 35.000'	E 114° 04.000'
B	N 4° 39.000'	E 114° 03.000'
C	N 4° 46.000'	E 113° 55.000'
D	N 4° 43.000	E 113° 49.000'
E	N 4° 24.000'	E 113° 59.000'

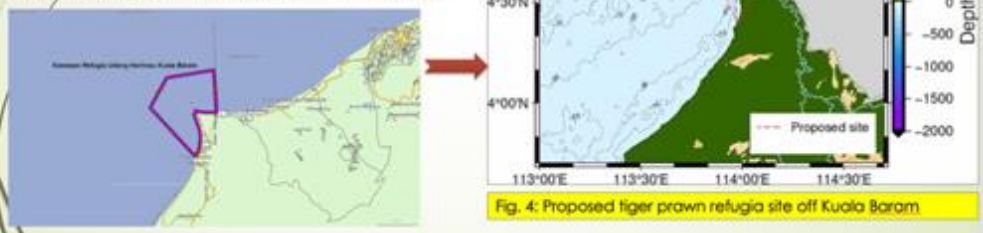


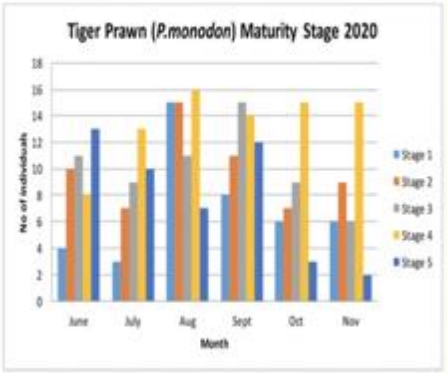
Fig. 4: Proposed tiger prawn refugia site off Kuala Baram

Population preservation and restoration effort

- **Population preservation and restoration effort**
  - **Mangrove buffer zones** of 50 to 100 m facing open seas and 20 to 50 m along riverbanks should be preserved to protect the nursery area of the tiger prawn post larvae and juvenile
- **Stock enhancement program**
  - Whereby prawn fries produced from Kuala Baram spawners in the hatchery are release back into these rivers should be carried out at least twice a year. This is to increase prawn stock in the refugia area as well as the surrounding sea.
  - Stock assessment and biological survey for post larvae and juveniles prawn in the area before and after the release program should also be carried out
- **Stock assessment** for the tiger prawn resource in the refugia area is to be carried out once a year to ascertain the success of the demarcation of the area in preserving the stock

Protection of spawners and seasonal closure

- Numerous studies have shown that environmental factors can directly and indirectly affect prawn's life cycles in many ways
- In the worst-case scenario, a change in the environment can cause the recruitment of prawn to collapse
- In Kuala Baram, all sizes of *P. monodon* and all maturation stages, from immature juveniles to mature adults and berried females, are harvested. This scenario is especially dangerous because it will cause the collapse of a population in near future.
- Base research on ovarian maturation stage finding.
  - **Implement closure or other protective measures in August until October to ensure that females are protected during such a high reproductive output period**

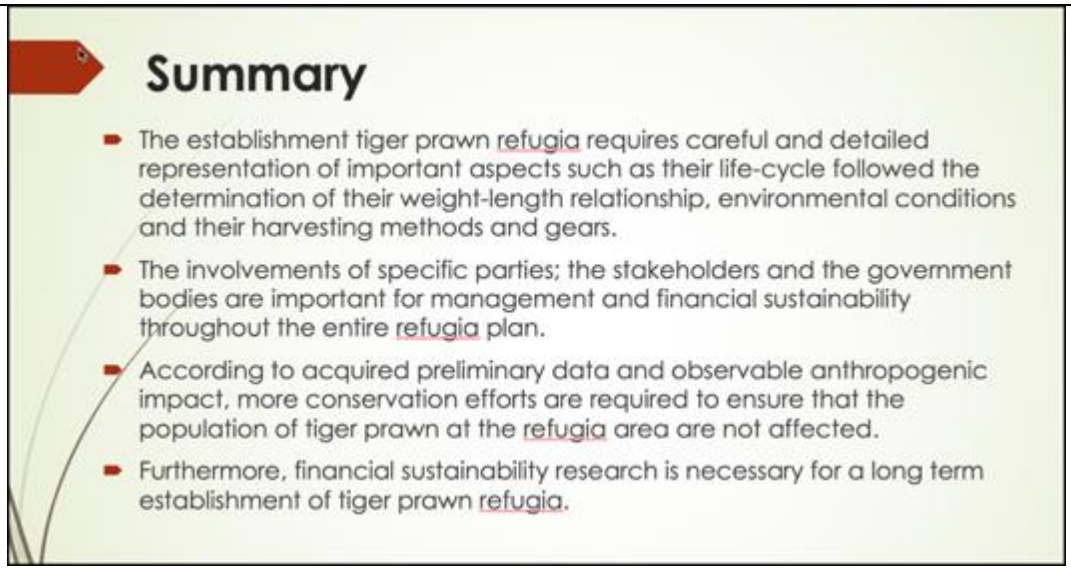


Revision of harvest methods and gears

- **Fishing gears and trawling areas**
  - A total of 112 fishers operating drift net, hook & line, trammel net and trawl net (twin out-rigger) are being used at the coastal waters up to 15NM offshore in Miri.
  - The number of licenses by zone: C12-30; C10-1; C7-24 and the rest (57 boats) are traditional operators from zone B and A.
  - With the new regulation of shifting the trawling area to 8NM and above, the areas of less than 5 NM are considered protected from trawling activities where the stations of high concentration of tiger shrimp spawners are in the range of 4.47 – 5.76 NM
- **Harvest strategy- use the Limit Reference Points**
  - The primary strategy would be to introduce measures that would reduce fishing capacity by 50% through limited access and the use of rights-based approaches in small-scale fisheries.

Identification and engagement with stakeholders

- Most of the fishermen involved in the harvest of *P. monodon* are small-scale fishers that operate along the coastal zones and utilize traditional gears, although there are also some fishermen that operate trawlers and purse seine in deeper off coastal zones of more than 5 nautical miles.
- The establishment of a refugia requires the combined effort from various stakeholders.
- Public participation and the active involvement of community players are critical to ensure the successful implementation and sustainability of any refugia management plan
- The latest stakeholders' engagement with other relevant stakeholders, including Miri Port Authority, Sarawak Fishing Vessel Association, Department of Marine Fisheries, Sarawak, Sarawak Forestry Corporation, Miri Fishermen Association, Department of Irrigation and Drainage Branch Miri, and Sarawak Rivers Board was held on 23rd September 2021 and 21st October 2021
- Based on the report, all stakeholders understand the importance of the establishment of *P. monodon* refugia to safeguard the wild *P. monodon* populations at Kuala Baram, Miri, Sarawak.


Summary
The establishment tiger prawn refugia requires careful and detailed representation of important aspects such as their life-cycle followed the determination of their weight-length relationship, environmental conditions and their harvesting methods and gears.
The involvements of specific parties; the stakeholders and the government bodies are important for management and financial sustainability throughout the entire refugia plan.
According to acquired preliminary data and observable anthropogenic impact, more conservation efforts are required to ensure that the population of tiger prawn at the refugia area are not affected.
Furthermore, financial sustainability research is necessary for a long term establishment of tiger prawn refugia.

ANNEX 9: PROGRESS WORKS BY THE PHILIPPINES

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

PHILIPPINES

Valeriano M. Borja| Joeren Yleana

A food-secure and resilient Philippines with empowered and prosperous farmers and fisherfolk

Activities Conducted

Monitoring for Reproductive Biology Sampling in 2 *refugia* sites
Bolinao, Pangasinan and Masinloc, Zambales

Refugia Site Management Committee Meetings

Bolinao, Pangasinan

March 31, 2022 and June 09, 2022

Meeting with RSMC Focal on IEC Materials, Distribution, requests on technical reports for landing data on site

Bolinao, Pangasinan|May 18-20, 2022

Refugia Site Management Committee Meetings

Masinloc, Zambales

Refugia Site Management Committee Meetings

Masinloc, Zambales **March 24, 2022**

Meeting with RSMC Focal on IEC Materials, Distribution, MOA, requests on technical reports for landing data on site

Masinloc, Zambales | May 11-13, 2022

Component 1

Code	Expected Outputs	Remarks
A01	Fisheries *refugia* profile reports, including GIS maps & site characterisations, published	• Fisheries *Refugia* Profile Reports for 3 sites completed • Boundary delineation – for finalization (coordinates)
A02	Published management plans (Link to B02)	• (on-going) For presentation and approval of the site committee
A03	Quarterly/Annual Technical reports of network meetings and activities (No. of reports)	• 57 reports (Linked to Regional Refugia Website)

- Minutes of the Meeting for Q1-Q2/2022 - for comments and approval of the site committee

Component 2

Code	Expected Outputs	Remarks
B01	Published national reviews and recommendations for reforms of national regulations/ordinances	
B02	Endorsed revised policies, Strategic Management Plan, Fisheries Master Plan	
B03	Published national guidelines on establishing and operating fisheries refugia	
B04	National reports on policy, legal and institutional aspects of refugia establishment and management published	
B05	Endorsed policy and executive orders, provincial/local ordinances and by-laws (proclamation, Provincial Orders for each site)	
B06	Endorsed National Action Plan for the management of priority fisheries refugia and associated biodiversity	
B07	Databases online and populated with datasets included fish stock	(Linked to Regional Refugia Website)
B08	Endorsed Regional Action Plan for fisheries refugia	cooperated
B09	National and Regional Geographical Information System online	
B10	Characterisations for 14 refugia sites accessible online	

Component 3

Code	Expected Outputs	Remarks
C01	Best practice approaches and measures for integrated fisheries and habitat management	• Included in Quarterly Reports
C02	Public awareness and Outreach programmes including tracking of extent of community acceptance	
C03	Education and awareness centre on fisheries and criticle habitat established	• 2 refugia info centres established • Bolinao and Masinloc Site
C04	Regional agreement/guidelines on indicators for managed refugia (including standardized data collection)	• cooperated
C05	Online national web portals on fisheries refugia	• Created/onlined

Component 4

Code	Expected Outputs	Remarks
D01	NFRC Terms of Reference and reports	TORs Completed
D02	NSTC Terms of Reference and reports	TORs Completed
D03	Management Board Terms of Reference and Reports	TORs Completed

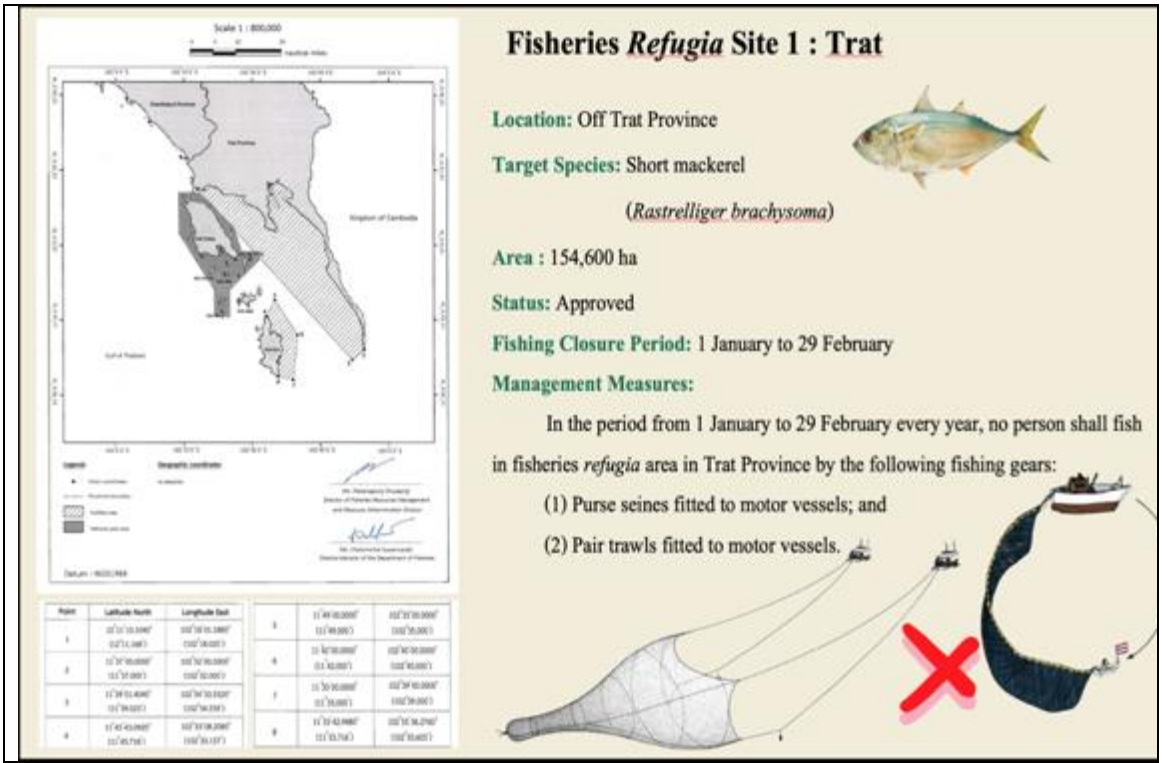
Accomplishment

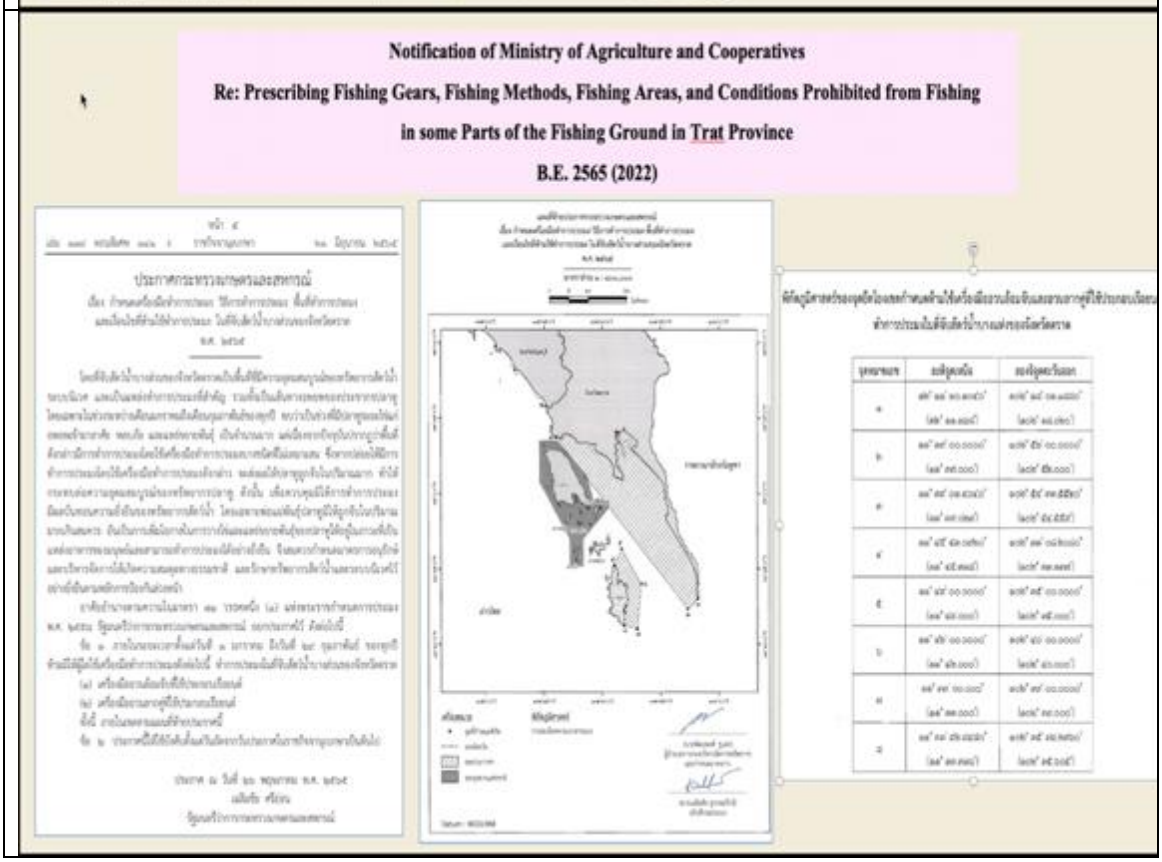
- ✓Finalized National Guidelines for the Establishment and Operation of Fisheries *Refugia* in the Philippines
- ✓Drafted Management Plan for 3 sites (for approval and comments of the 3 management committees)
- ✓Finalized data on Fish Eggs and Larvae of 3 *refugia* sites (for reporting)
- ✓Reproductive Biology Data (for analysis)
- ✓Fisheries Landing Data (report preparation on-going)

Accomplishment

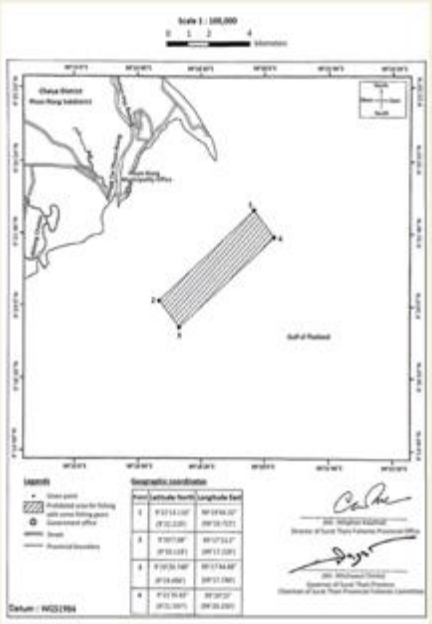
- ✓Observer Program Final Report
- ✓Draft Action Plan (on-going)
- ✓Draft Law Enforcement Capacity Building (report on-going)
- ✓*Refugia* Boundary Delineation

ANNEX 10: PROGRESS WORKS BY THAILAND





Fisheries *Refugia* Site 2 : Surat Thani



Location: Around Koh Sed in Ban Don Bay of Surat Thani Province

Target Species: Blue swimming crab

(*Portunus pelagicus*)

Area : 900 ha

Status: Approved

Fishing Closure Period: All year

Management Measures:

No person shall fish in fisheries *refugia* area at Koh Sed off Surat Thani Province by the following fishing gears:

(1) Crab traps; and

(2) Crab gill nets of a mesh size less than 3 inches.

Notification of Surat Thani Provincial Fisheries Committee

Re: Prohibition of Some Fishing Gears Fishing in the Fishing Ground within the Coastal Seas around the Area of Koh Sed, Phum Riang Subdistrict, Chaiya District, Surat Thani Province

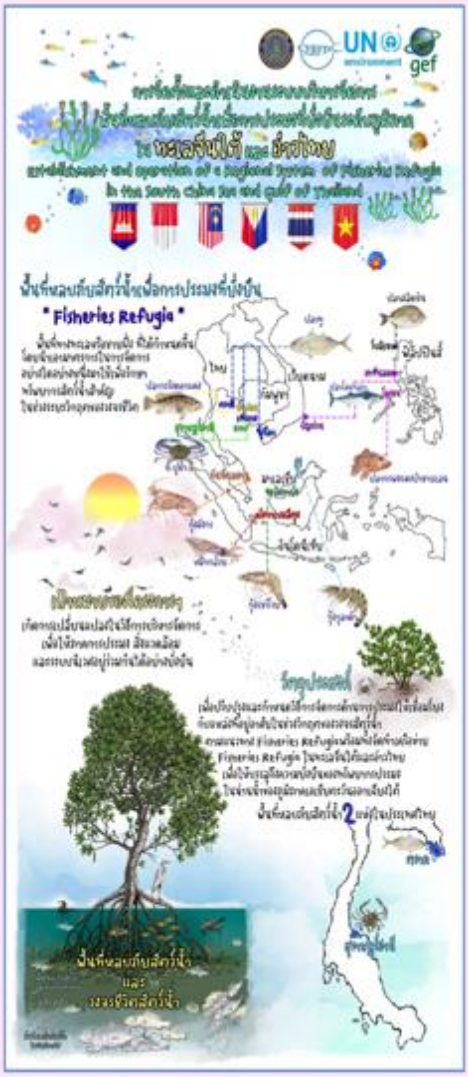
B.E. 2565 (2022)

Roll-up for Learning Center
in Trat and Surat Thani Fisheries *Refugia* Site

Establishment and Operation of a Regional System

of Fisheries *Refugia*

in the South China Sea and Gulf of Thailand



Establishment and Operation of

Fisheries *Refugia* in Trat Site

Establishment and Operation of

Fisheries *Refugia* in Surat Thani Site

ANNEX 11: PROGRESS WORKS BY VIET NAM

VIETNAM NATIONAL RESULTS FRAMEWORK

The 6th Regional Scientific and Technical Committee Meeting For the SEAFDEC/UNEP/GEF Project on Establishment and Operation of a Regional System of Fisheries *Refugia* in the South China Sea and the Gulf of Thailand

4-6 July 2022
SEAFDEC/Training Department, Samutprakarn, Thailand

Master plan on protection and exploitation of fisheries resources

- According to the Fisheries Law 2017, the protection of aquatic resources mainly focuses on the protection of endangered, precious and rare species, economic and indigenous species.
- At the local level, the survey to identify resource protection areas is of interest to be implemented and mainly focuses on economic and indigenous objects.
- A total of 73 marine fisheries protection zones are planned in the period 2021-2030 nationwide, with a total area of about 1,416,547 hectares, equivalent to about 1.5% of the natural area of Vietnam's sea area. male

Activities in Vietnam

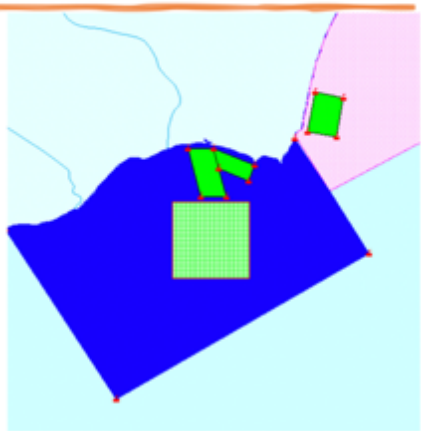
- Formulate and propose to promulgate regulations on fishery resource protection zones in Article 17 of the Fisheries Law 2017 to protect residences, breeding concentration areas, fledgling fisheries areas concentrated in inland areas and waters of Vietnam in the approach to protecting fisheries resources of the project; at the same time, it replaced the provisions on inland water reserves previously in the Fisheries Law 2003.
- Formulate and propose the Ministry of Agriculture and Rural Development to promulgate regulations guiding the management of fishery resource protection zones in accordance with the actual situation of localities in Circular No. 19/2018/TT-BNNPTNT dated November 15, 2018. In particular, local authorities may assign the management of fisheries resource protection zones to organize the community of local people in accordance with the law on co-management in the protection of fisheries resources.

Activities in Vietnam

- Collect historical documents and data on fisheries, fisheries resources and habitats of aquatic species at selected locations (waters of islands: Bach Long Vy, Lagi and Phu Quoc) and the surrounding area to identify 03 areas protecting the source of some aquatic species as objects of important economic value such as krill two pieces of shells, crustaceans and sea fish. These areas may be proposed for planning as 03 corresponding fishery resource protection zones included in the draft Plan on Protection and Exploitation of Fisheries Resources.
- Develop a draft framework management plan for 3 selected areas in accordance with the current provisions of the law on fisheries and the actual situation of fisheries activities of the locality; propose basic criteria for determining the maintenance and protection of aquatic breed sources in coastal areas.

Refugia site 1
Coastal area of Lagi – Binh Thuan

- 73,900 ha
- Target species in this project: Subcrenata ark (Anadara subcrenata)
- Ranges, boundaries and coordinates:
- V54a (10° 43' 37"N, 108° 00' 30"E)
- V54b (10° 36' 09"N, 108° 05' 09"E)
- V54c (10° 26' 39"N, 107° 48' 50"E)
- V54d (10° 37' 42"N, 107° 41' 40"E)
- Parties involved: Directorate of Fisheries (D-Fish), Department of Agriculture and Rural Development, Sub-department of Fisheries, local authorities and local people in 3 communes (Thuan Quy, Tan Thanh, Tan Thuan).



Refugia site 2
Eastern coastal area of Phu Quoc – Kien Giang

- 32,860 ha
- Target species in this project: Blue Swimming Crab (portunus pelagicus)
- Ranges, boundaries and coordinates:

V73a (10° 21' 58"N, 104° 08' 50"E)
V73b (10° 21' 57"N, 104° 13' 01"E)
V73c (10° 04' 05"N, 104° 13' 01"E)
V73d (10° 04' 05"N, 104° 04' 39"E)
V73d (10° 15' 09"N, 104° 09' 02"E)

- Parties involved: Drectorate of Fisheires (D-Fish), Department of Agriculture and Rural Development, Sub-department of Fisheires, local authorities and local people.

ANNEX 12: THREATS AND BEST PRACTICE FISHING GEARS AND METHODS

PCU

I. INTRODUCTION

The South China Sea is a global center of shallow-water marine biological diversity that supports significant fisheries that are important to the food security and export income of Southeast Asian countries. These fisheries are characterized by high levels of fishing effort from the small-scale sector. Accordingly, all inshore waters of the South China Sea basin are subject to intense fishing pressure. This high small-scale fishing pressure and declining fisheries resources have contributed to adopting unsustainable fishing methods to maintain catch and increase incomes in the short term. These include using destructive fishing gear and practices, detonating explosives, and releasing fish poisons in critical marine habitats such as seagrass, coral reef, and mangrove. Small-scale inshore fishing pressure has been identified as a significant cause of the degradation and loss of coastal habitats in the South China Sea. For these reasons, the rate of loss of coastal habitats has been implemented by countries bordering the South China Sea, and the decadal rate of loss of such habitats remains high, e.g., seagrass beds (30 percent), mangroves (16 percent), and coral reefs (16 percent)(Vo *et al*, 2013). This continued decline in the total area of habitats critical to the life cycles of most aquatic species, combined with the high levels of coastal community dependence on fish, has raised serious concerns for the long-term sustainability of small-scale fisheries in the region. With fish production intrinsically linked to the quality and area of habitats and the heightened dependence of coastal communities on fish, a need exists to improve the integration of fish habitat considerations and fisheries management in the region.

II. USE OF DESTRUCTIVE AND NON-SELECTIVE FISHING GEARS IN SOUTHEAST ASIA

This issue is prevalent across various fisheries and habitat types in the South China Sea. For example, destructive and unsustainable fishing gear and practices have been identified as critical threats to fish stocks and their habitats in the mangrove areas at Trat in Thailand and at Batu Amphur in Indonesia, the extensive seagrass areas of Bolinao in the Philippines and Kampot in Cambodia, and at the regionally significant coral reef areas at Belitung in Indonesia, Masinloc in the Philippines and Phu Quoc in Vietnam.

Several studies on destructive and unsustainable fishing gear and practices in Southeast Asia have been reported as follows:

- Push net and inshore trawling cause habitat impacts and selectivity issues. Catches in these gear types from coastal waters are composed mainly of juveniles, and at high fishing effort levels are thought to contribute to growth overfishing. Such a situation hinders fisheries management efforts which primarily focus on developing sustainable livelihoods, and is a critical threat on inshore where push nets are used extensively over seagrass beds to take juveniles of the economically important species.
- Digging and gleaning of seagrass beds and mangrove forests is an area of concern at most of the priority refugia sites in the South China Sea. Growing demand for seafood in local markets has resulted in a marked increase over recent years in the number of people digging for sipunculid worms, gastropods, and crustaceans in the seagrass beds, leading to damage of seagrass plants, de-stabilization of sediments (and subsequent erosion), and the over-exploitation of benthic organisms. Intensive digging and grazing in some mangrove areas contribute to the occurrence of the dwarf; low-density mangrove stands at several sites due to disturbance of mangrove roots and seedlings.
- Blast fishing, poisons, and non-selective fishing gears and practices are well-known and documented threats to fisheries and habitats in nearly all areas of the South China Sea. These fishing practices often result in mortalities of a wide range of size classes of target and non-target species, contributing to growth and recruitment overfishing. The effects of blasting on the physical structure of coral communities are of particular concern, and blast fishing “craters” on heavily discharged reefs significantly impact coral reef-associated fish assemblages.

- Non-selective fishing gears, such as trammel nets, are utilized in most fished coral reef areas along the South China Sea coast. The use of non-selective fishing gear and practices and methods, such as luring light purse seine and large-scale lift net with light, has been identified as an environmental-unfriendly fishing practice due to catching of immature stock, high rate of by-catch and discard. Those unselective fishing activities are causing the problem of declining fisheries resources. The growing need to minimize the impacts of such practices on critical habitats necessitates developing best practices to manage these problems.

III. CAUSAL CHAIN ANALYSIS FOR SUSTAINABLE FISHERIES REFUGIA MANAGEMENT

The fisheries refugia project applies the Causal Chain Analysis (CCA)[1], often also called Root Cause Analysis (RCA), for a better understanding of an ordered sequence of events linking the causes of a problem with its effects. Each link in the causal chain is created by repeatedly answering the question 'Why?' A simple schematic showing the major components of a CCA are shown below in the Figure 1.

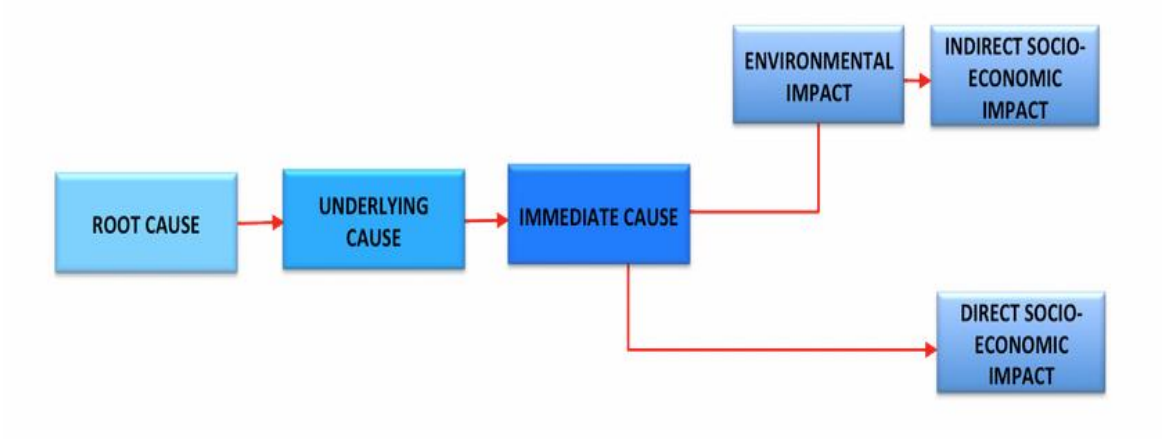


Figure 1: A simple schematic showing the major components of a CCA

At the initial stage of the project implementation, the national lead agency of each respective country worked locally with multi-stakeholders at project priority refugia sites on causal chain analysis. The resulting matrix of the Causal Chain Analysis (CCA) is defined from the stakeholder consultations as compiled from five countries, namely Cambodia, Indonesia, Malaysia, Philippines, and Thailand, shown in Table 1. This table composed of identified threats to the critical fisheries resources and their habitats, immediate cause, root cause, and proposed management actions. For Viet Nam, due to delayed implementation, the PCU will closely work and update them later when inputs are available.

[1] https://iwlearn.net/manuals/tda-sap-methodology/development-of-the-tda/causal-chain-analysis/what-is-causal-chain-analysis

Table 1. The resulting matrix of the Causal Chain Analysis (CCA) from multi-stakeholder consultations at fisheries *refugia* sites in Cambodia, Indonesia, Malaysia, Philippines, and Thailand.

Country	Site Location	Target Species	Stage of life cycle	Threats	Immediate Cause	Root Cause	Management Action
Cambodia	Kep	Blue swimming crab	Juvenile	• Loss of habitat *(i.e*. sea grass • Illegal fishing • Habitat destruction • Overfishing	• Use of unsustainable fishing gear/practice (*i.e*. Small Mesh elongated collapsible trap) • Destructive fishing gear • Purse seine net trawlers	• High market demand • High price • Unsustainable fishing gear using • Destructive fishing gear	• Strengthening fisheries law enforcement • Fisheries law extension • Establishment of a conservation area • Creating crab bank • Alternative livelihood provision
		Blue swimming crab	Spawning (December to January)	• Destruction of spawning habitat • Loss of seagrass • Overfishing	• Illegal fishing • Trawlers with small mesh size net • Use of inappropriate fishing gear • Small Mesh elongated collapsible trap • Purse seine trawlers • Unsustainable fishing gears	• Effort fishing to catch more fish • High price • High market demand	• Conservation area development • Strengthening law enforcement • Fisheries law extension • Creation of conservation area • Strengthening patrolling and monitoring
	Kampot	Grouper (*Epinephelus spp.*)	Adult	• Declining fish • Habitat destruction	• Mouse tailed trap • Trawler with ball light	• High demand • High price in market	• Strengthening law enforcement • Strengthening patrolling group • Strengthening cooperation with relevant stakeholders • Establishing fisheries refugia
		Grouper (*Epinephelus*	Fingerlings (October to	• Declining of fingerlings	• Mosquito (Small) net fishing gear	• High Demand from cage culture	• Strengthening law enforcement

Country	Site Location	Target Species	Stage of life cycle	Threats	Immediate Cause	Root Cause	Management Action
		spp.)	December)	• Habitat destruction such as sea grass, coral reef, and mangrove forest	• Push net fishing with electric • Mouse tailed trap • Trawler with ball light • Hand Push net	• High price in market	• Strengthening patrolling group • Strengthening cooperation with relevant stakeholders • Establishing fisheries *refugia* • Strengthening the extension to fish seed traders • Replanting flooded forest (Wetland)
	Koh Kong	Mackerel	Spawning (November to January at Koh Kapi, Prek 3& 2, Boeung Kachang, Koh Yor, and Koh Nou)	• Habitat loss • Overfishing	• Illegal fishing • Mackerel gill net with small mesh size • Light Luring fishing • Purse seine net and trawlers from neighboring country • Trawlers with small mesh size net from 2.5 to 3cm	• High market demand in neighboring country • Destructive fishing gears • Illegal fishing from outside area	• Establishment of fisheries refugia • Strengthening patrolling group to make MCS • Strengthening law enforcement • Extending fisheries law • Making co-operation with relevant stakeholders • Strengthening transboundary-bilateral operation
	Preah Sihanouk	Blood Cockle	Will be updated	•	•	•	•
Indonesia	West Kalimantan Province	White Prawn (*Penaeus merguiensis*)	Juvenil /pre-recruit	• Loss of habitat (mangrove) • Overfishing •	• conversion of mangrove land to oil palm plantations • destructive and non-selective gear •	• high demand for livelihoods • Effort fishing to catch more fish •	• Mangrove rehabilitation. • rearrangement and limitation of fishing area and fishing time. • Controlling of fishing on the critical habitat and critical phase of the shrimp

Country	Site Location	Target Species	Stage of life cycle	Threats	Immediate Cause	Root Cause	Management Action
			Adult/spawning	• Overfishing •	• destructive fishing gear	• High price	• rearrangement and limitation of fishing area and fishing time.
	Bangka Belitung Province	Mitre squid	Juvenil /pre-recruit	• Loss of habitat (sea grass and coral reef) • Overfishing •	• Sedimentation and high turbidity • Non-selective fishing gears (lift net with small mesh size) •	• Tin mining activities in coastal area. • Effort fishing to catch more fish •	• A moratorium on permits for offshore tin mining and regulates the pattern of mining operations based on region. • Rearrangement and limitation of fishing area and fishing time.
			Adult/spawning	• Overfishing	• The capture of late mature stage of squid (with eggs inside)	• High price and high demand of adult squid and eggs squid.	• Rearrangement and limitation of fishing area and fishing time (open closed season)
Malaysia	Kuala Baram, Sarawak	Tiger Prawn (*P. monodon*)	Juvenile	• Deforestation • Deepen the river process • Water pollution	• Destructive fishing gear •	• Overlapped functions of relevant state and federal authorities • Lacking in fisheries conservation awareness	• Strengthening enforcement • Establishment of river conservation • Creating awareness
			Pre-recruit	• Shrimp push net & bag net	• Illegal fishing	• High market demand	• Strengthening fisheries law • Creating awareness
			Adult	• Trawl net	• Illegal fishing	• High market demand	• Strengthening enforcement on fisheries law by Department of Fisheries Malaysia • Enforce close sessions • Creating awareness

Country	Site Location	Target Species	Stage of life cycle	Threats	Immediate Cause	Root Cause	Management Action
			Spawning	• Trawl net	• Illegal fishing •	• High market demand •	• Strengthening enforcement on fisheries law by Department of Fisheries Malaysia • Enforce close sessions • Creating awareness
	Tanjung Leman, Johor	Lobster (*Panulirus spp.*)	Juvenile	• Overfishing • Habitat loss (coastal development)	• Available market demand of small size lobster •	• Lacking in fisheries conservation awareness • Good price in market •	• Increasing awareness • Promoting participatory approach fisheries management • Empowering the communities on community base fisheries management
			Young Adult	• Overfishing	• High market demand •	• High price in market	• Increasing awareness • Promoting participatory approach fisheries management • Empowering the communities on community base fisheries management
			Spawning	• Trawl net • Overfishing • Illegal fishing	• Illegal fishing • Invasion of foreign fishing • High market demand	• High price in market • Illegal fishing from foreign vessels	• Increasing awareness • Promoting participatory approach fisheries management • Empowering the communities on community base fisheries management • Strengthening fisheries law enforcement • Establishing fisheries refugia

Country	Site Location	Target Species	Stage of life cycle	Threats	Immediate Cause	Root Cause	Management Action
	Kuala Baram, Sarawak	Tiger Prawn (*P. monodon*)	Juvenile	• Deforestation • Deepen the river process • Water pollution	• Destructive fishing gear •	• Overlapped functions of relevant state and federal authorities • Lacking in fisheries conservation awareness	• Strengthening enforcement • Establishment of river conservation • Creating awareness
Philippine	Bolinao	Rabbit fish (*Siganus spp.)*	juveniles	• Over harvesting of juveniles	• high demand of fish paste	• Easy source of income for marginal fisherman	• Size regulation on the harvesting of Rabbit fish & provision of supplemental livelihood
	Mazinloc	Frigate tuna (*Auxis spp.*)	Pre-recruits / Juvenile	• Overfishing, use of fine mesh nets	• FADs fishing	• Due to high demand	• FAD Management plan, Mesh size regulation
	Colon	Fusilier fish		• Overfishing: due to illegal fishing, non-selective gears, recruitment, catching of juvenile • Loss of coral habitat	• Unsustainable fishing practice: • Use of cyanide in the live reef fish industry • Blast fishing • Non-selective fishing gear and practices • Collection of corals as sinker • Solid waste pollution	• High demand of all fish size • Municipal fishery ordinances are not fully implemented • Weak enforcement	• Implementation of fishery law • Strengthening Information dissemination
Thailand	Trat	Indo-Pacific mackerel	Whole life cycle	• Overfishing • Destructive fishing gears	• Illegal fishing • Invasion of foreign fishing	• Increasing number of small-scale fishing boats altered	• Strengthening fisheries law enforcement • Creating conservation areas (restricted fishing gear)

Country	Site Location	Target Species	Stage of life cycle	Threats	Immediate Cause	Root Cause	Management Action
				(e.g. giant trawls)	• Fishing by foreigner workers • High market demand • Needs of small size for processing	from the commercial ones • Non-cooperation of some fishing group • Lacking in fisheries conservation awareness • Insufficiency of public authority • Overlapped functions of relevant public authorities	• Increasing awareness • Promoting participatory approach fisheries management • Empowering the communities on community base fisheries management • Promoting community regulations for fisheries management • Promoting fishing eco-tourism • Establishing aquatic animal banks • Rehabilitating and establishing fisheries habitat • Promoting mesh size restriction
	Surat Thani	Blue swimming crab	Whole life cycle	• Use of Unsustainable fishing gears • Overfishing	• Illegal fishing • Fishing of small- size crabs in seagrass bed • Small mesh-size nets	• Illegal fishing • High market demand • Lacking in fisheries conservation awareness • Low water quality • Climate change	• Strengthening fisheries law enforcement • Establishing crab bank • Creating conservation areas • Creating awareness

IV. CHALLENGES AND SOLUTIONS ON BEST PRACTICES FISHING GEARS AND METHODS

Taking into account the target objectives of the SEAFDEC/UNEP/GEF Project on the Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and the Gulf of Thailand, Component 2 aims to strengthen the enabling environment for the formal designation and operational management of refugia. Additionally, the component will lead to considerable stress reduction. Specifically, the demonstrations of best practice fishing methods and practices aimed at addressing key threats to fish stock and critical habitat linkages, and the adoption of supporting laws, will result in a 20% increase in vessels applying improved gear/techniques to safeguard fish stock and critical habitat linkages at priority sites. This component has identified one crucial national-level activity: Targeted demonstration activities stated in activity 2.9. The activities will support, guide, and build up the National lead agency in establishing coastal fisheries management systems in priority fisheries refugia, including creating a trial approach to reducing the effects of non-selective fishing gears on critical habitats.

Unfortunately, the demonstration of responsible fishing practices has been stopped due to the COVID-19 pandemic from 2020 to the present (Q2/2022). In addition, the knowledge on the development and improvement of fishing gear technologies is limited and challenging at national levels, even though the Southeast Asian Fisheries Development Center (SEAFDEC) is leading and supporting the country.

The Southeast Asian Fisheries Development Center (SEAFDEC) has long experience in implementing various projects concerning improving fishing gear and practices for sustainable coastal fisheries management in Southeast Asia, such as:

- The Juvenile and Trash Excluders Devices (JTEDs) to reduce the capture of juvenile and small fish in Trawl fishing,
- Turtle Excluders Devices (TEDs) to release a sea turtle which incidental catch by trawl fishing,
- Circle Hook(C-Hook) to prevent capturing a sea turtle by longline fishing,
- Crab Bank project,
- Enlarging the cod end mesh size for trawl net, traps, gillnet, purse seine net, etc., and
- Deployment of an artificial reef to protect nursery and spawning grounds.

Nevertheless, the Department of Fisheries Thailand has succeeded to convinces fishers and fishing associations to a voluntary approach to releasing the gravid blue swimming crab caught by trawlers [2]from 2019 to the present. In the early days of this program only few trawlers joined, but after 6 months from August to December 2019, 45 trawlers participated in the program in Surat Thani Province and more than 4,000 berried female crabs were returned to the sea for natural spawning in their life cycle and preferred habitat. Taking into account that one female crab depending upon its weight can provide 200,000 to 2 million eggs (average 1 million eggs/one female crab) and considering that almost 4,000 million eggs of blue swimming crabs are naturally hatched in the sea, this has been an impressive practice. To date, this is one of the most successful and effective practices and a game changer resulting in sustainable long-term changes in fisher's attitude now supporting and engaging on conservation and restoration for healthy oceans and sustainable fisheries in their home water.

To support the achievement of project component 2, several fisheries management options are compiled and guided here are based on the FAO technical guidelines [3]for responsible fisheries No. 4 Suppl. 2 (FAO, 2003), the PCU summarized as shown in Table 2.

V. WAYS FORWARD

Considering each country's resulting matrix of CCA, few management actions are defined concerning improving fishing gears and developing responsible fishing practices. Accordingly, this matter will be raised for further discussion at the RTSC6.

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[2] https://news.iwlearn.net/changing-attitudes-to-spark-restoration-of-blue-swimming-crabs-in-thailand

[3] FAO Fisheries Department. The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries. No. 4, Suppl. 2. Rome, FAO. 2003. 112 p.

Table 2: Fishing Management Options, summarized from the FAO technical guidelines for responsible fisheries

1. Technical measures	Gear modifications that improve selectivity	• Gear restriction • Mesh size restrictions • Fishing method control • Non-target species selectivity (TEDs, JTEDs, C-hook, etc.)
	Other gear issues	• Environmental conditions (light level, temperature, current speed, etc.) • Ghost fishing control
	Spatial and temporal controls on fishing	• Seasonal closure • Fisheries *Refugia* • MPA
	Control of the impact from fishing gear on habitats	• Prohibition of certain gear in some habitats (trawling in coral reef and seagrass areas) • Replace a high-impact fishing method with one with less impact on the bottom, *e.g*. trapping, longlining or gillnetting.
	Energy efficiency and pollution	• Reduce of CO2 emissions. • Energy optimization
2. Input (effort) and output (catch) control	Controlling overall fishing mortality	• Capacity limitation spatial/temporal • Access limitations • Effort limitation
	Catch controls	• By-catch controls (such as quotas)
3. Ecosystem manipulation	Habitat modifications	• Preventing habitat degradation • Prohibition of destructive fishing methods in ecologically sensitive habitats (such as seagrass beds); • Prohibition of intentional cleaning of the seafloor to facilitate fishing; and • Reduction of the intensity of fishing in some fishing grounds to ensure that non-target • Providing additional habitat
	Population manipulation	• Restocking and stock enhancement
4. Rights-based management approaches		• User rights • Effort rights • Catch rights • Effort management

ANNEX 13: MARINE CAPTURE FISHERIES DATABASE AND DASHBOARD

INTRODUCTION

An obvious barrier in terms of environmental and natural resource governance and management is that environment and fisheries are treated as separate sectors for planning and management purposes leading to:

- Overlapping or conflicting mandates between different ministries, as in the case of fisheries and environment, for example, where internal mechanisms for managing the impacts of fishing practices on habitats and the physical environment do not exist;
- Problems related to effective control of environmental degradation resulting from land-based pollution where the interface between the industrial and environmental sectors is not well developed; and
- Lack of adequate consideration of the consequence of environmental degradation and habitat loss due to ineffective means of valuing ecological goods and services and where they exist, a failure to use such values in social cost-benefit analysis.

To solve those mentioned above, a need for national action to strengthen the integration of fisheries and habitat management along the South China Sea coast through the Fisheries Refugia Approach, as a novel fisheries resource management for the identification and designation of priority areas in which to integrate fisheries and habitat management in the context of maintaining fish stock, and critical habitats as satisfying the fishing community, social needs now and futures.

However, at the implementation level, i.e., the actual establishment and management of fisheries refugia sites and a regional system of refugia, key barriers have been identified to include:

- Lack of procedures for the demarcation of fisheries *refugia* boundaries and the setting of priorities for *refugia* site management;
- Limited experience in the development and implementation of community-based management plans for fisheries refugia sites;
- Weak national-level policy and planning frameworks for refugia designation and management; and
- Irregular and uncoordinated update of national and regional information and databases relating to fish stocks and their habitats, including fish early life history science.

The paper introduces the development of the marine capture fisheries database in Southeast Asia, covering eight ASEAN Member States in Western Central Pacific (WCPO) and four AMS in Eastern Indian Ocean (EIO) areas. The marine capture fisheries data from 1950 to the present are referenced in the FAO Fishery and Aquaculture Statistics "Global capture production 1950-2019" (FishstatJ, 2021), in which 2019 is the latest updated data in 2022. The Project Coordination Unit develops this fisheries resource database to support the national and regional fish stock status analysis. Considering several pelagic and demersal fish are transboundary species concerns, managing fish stock needs not only national but regional stock assessment. Therefore, this database supports the useful marine capture data source for analysis.

DATABASE AND DASHBOARD

There are 193 marine species, based on the FAO-ASFIS species list, in the database covering 9 ASEAN Member States in the Southeast Asia (see Annex 1). Users can access the database via https://fisheries-refugia.org by clicking on the database logo.

In addition, the Fisheries Refugia dashboard is developed under the same URL link. Users can find the interactive graphs displaying the trends of target fish species in weight (tonnes). The dashboard covers nine priority target species for fisheries refugia.

HOW DATABASE WORK:

1) Access to the https://fisheries-refugia.org by clicking on the database logo, the database and dashboard will appear as Figure 1.

Figure 1: Database and dashboard webpage

2) From Figure 1, the database part is located on the leftside, user can find simple data sorting consisting of :
   - **Seleect Area**: there are two main areas: 1) WCPO Area (FAO Fishing Zone 91), and 2) EIO Area (FAO Fishing Zone 57).
   - **Select Country**: This database covers 9 ASEAN Member States, namely Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam. The country will link to the Area such as the WCPO Area includes eight countries, but the EIO Area consists of 4 countries.
   - **Select Start Year**: from 1950 – 2019 (as of June 2022)
   - **Select End Year**: from 1950 – 2019 (as of June 2022)

3) Remarks: Once user select the area, country, and the start-end years, all 193 marine fishes will be listed as shown in Appendix 1; for eaxample user selected EIO area, Malaysia, and 1970 the result will show as Figure 2.

4) User can export the data to excel file by click on " 

", user may finds some message for downloading (see Figure 3),

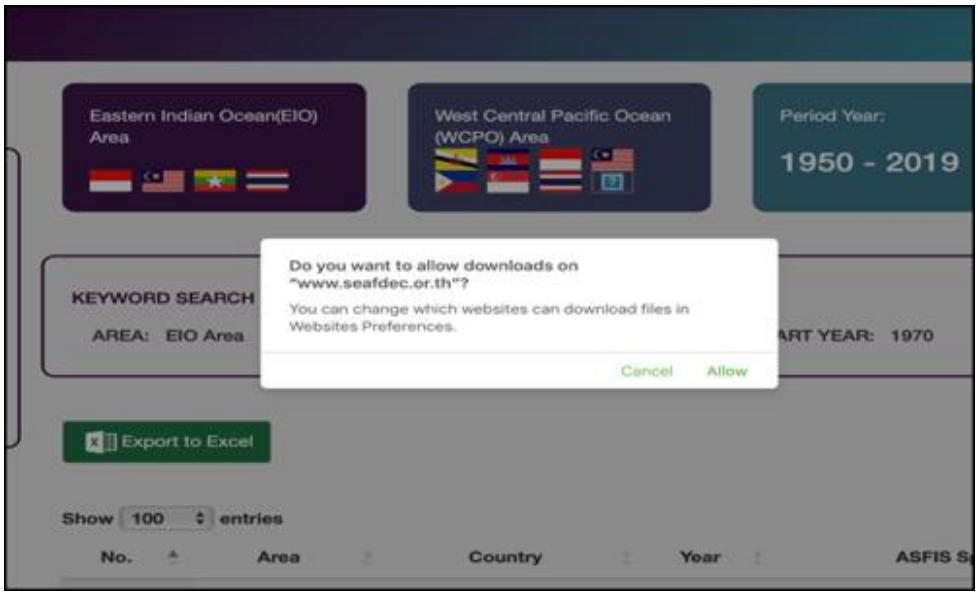


Figure 3: Message from the system to allow downloads from the database server.

HOW DASHBOARD WORK

1) The PCU developed the Stock Status Trends of the important refugia target species as follows:
    - Overall fisheries productions in the Southeast Asia, covering two areas (WPCO, and EIO Areas).
    - Short Mackerel Fisheries Production in Southeast Asia (Tonnes)
    - Spiny Lobster Fisheries Production in Southeast Asia (Tonnes)
    - Marine Crab nei Fisheries Production in Southeast Asia (Tonnes)
    - Fusilliers Fisheries Production in Southeast Asia (Tonnes)
    - Rabbitfish nei Fisheries Production in Southeast Asia (Tonnes)
    - Anchovies Fisheries Production in Southeast Asia (Tonnes)
    - Groupers Fisheries Production in Southeast Asia (Tonnes)
    - Penaeus Shrimps Fisheries Production in Southeast Asia (Tonnes)
    - Banana Prawn Fisheries Production in Southeast Asia (Tonnes)
    - Snapers/Jobfishes Fisheries Production in Southeast Asia (Tonnes)
2) User can use curser to the data on each graph to see the production value.
3) PCU may update the Dashboard quarterly.

KEYWORD SEARCH

AREA: EIO Area COUNTRY: Malaysia START YEAR: 1970 END YEAR: 1970

Export to Excel

Show 100 entries

No.	Area	Country	Year	ASFIS Species	Production (tonnes)
1	EIO Area	Malaysia	1970	Barracudas nei	190.00
2	EIO Area	Malaysia	1970	Black pomfret	380.00
3	EIO Area	Malaysia	1970	Carangids nei	990.00
4	EIO Area	Malaysia	1970	Chacunda gizzard shad	490.00
5	EIO Area	Malaysia	1970	Clams, etc. nei	670.00
6	EIO Area	Malaysia	1970	Clupeoids nei	4400.00
7	EIO Area	Malaysia	1970	Croakers, drums nei	2000.00
8	EIO Area	Malaysia	1970	Cuttlefish, bobtail squids nei	2200.00
9	EIO Area	Malaysia	1970	Daggertooth pike conger	500.00
10	EIO Area	Malaysia	1970	Demersal percomorphs nei	10.00
11	EIO Area	Malaysia	1970	Eeltail catfishes	340.00
12	EIO Area	Malaysia	1970	Flatfishes nei	380.00
13	EIO Area	Malaysia	1970	Fusiliers nei	10.00
14	EIO Area	Malaysia	1970	Goatfishes, red mullets nei	290.00
15	EIO Area	Malaysia	1970	Groupers nei	1040.00
16	EIO Area	Malaysia	1970	Indian mackerels nei	23250.00
17	EIO Area	Malaysia	1970	Indian pellona	190.00
18	EIO Area	Malaysia	1970	Indian scad	2700.00
19	EIO Area	Malaysia	1970	Kawakawa	262.00
20	EIO Area	Malaysia	1970	Largehead hairtail	590.00
21	EIO Area	Malaysia	1970	Lizardfishes nei	530.00
22	EIO Area	Malaysia	1970	Longtail tuna	211.00
23	EIO Area	Malaysia	1970	Mangrove red snapper	500.00
24	EIO Area	Malaysia	1970	Marine crabs nei	1660.00
25	EIO Area	Malaysia	1970	Marine fishes nei	49060.00
26	EIO Area	Malaysia	1970	Mullets nei	1690.00
27	EIO Area	Malaysia	1970	Natantian decapods nei	33780.00
28	EIO Area	Malaysia	1970	Ponyfishes(=Slipmouths) nei	340.00
29	EIO Area	Malaysia	1970	Rainbow runner	110.00
30	EIO Area	Malaysia	1970	Rays, stingrays, mantas nei	1060.00
31	EIO Area	Malaysia	1970	Sea catfishes nei	1640.00
32	EIO Area	Malaysia	1970	Sergestid shrimps nei	130.00
33	EIO Area	Malaysia	1970	Silver grunt	470.00
34	EIO Area	Malaysia	1970	Snappers nei	280.00
35	EIO Area	Malaysia	1970	Snappers, jobfishes nei	240.00
36	EIO Area	Malaysia	1970	Spotted sicklefish	20.00
37	EIO Area	Malaysia	1970	Stolephorus anchovies nei	20020.00
38	EIO Area	Malaysia	1970	Threadfin breams nei	1600.00
39	EIO Area	Malaysia	1970	Threadfins, tasselfishes nei	750.00
40	EIO Area	Malaysia	1970	Tonguefishes	430.00
41	EIO Area	Malaysia	1970	Torpedo scad	5770.00
42	EIO Area	Malaysia	1970	Triggerfishes, durgons nei	60.00
43	EIO Area	Malaysia	1970	Tuna-like fishes nei	2019.00
44	EIO Area	Malaysia	1970	Wolf-herrings nei	2260.00
45	EIO Area	Malaysia	1970	Yellowstripe scad	720.00
No.	Area	Country	Year	ASFIS Species	Production (tonnes)

Showing 1 to 45 of 45 entries Previous 1 Next

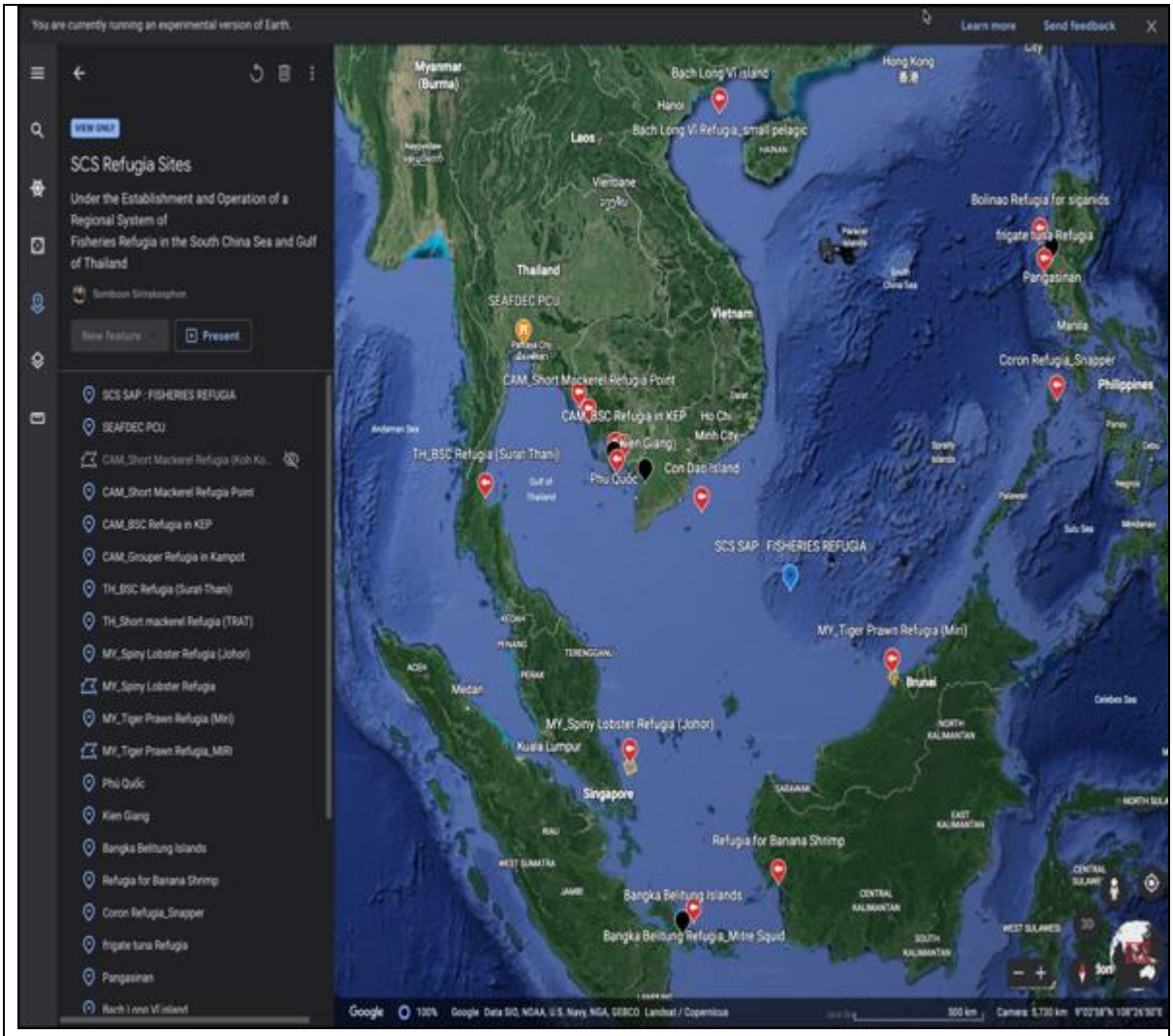
Figure 2: Marine Capture Fisheries Production of Malaysia of the EIO Area in 1970.

Appendix 1: List of ASFIS species in Marine Capture Fisheries Database

Code	ASFIS species (Name)	Code	ASFIS species (Name)
1001	Akiami paste shrimp	1098	Leopard coral grouper
1002	Albacore	1099	Lobster nei
1003	Abalones nei	1100	Longtail tuna
1004	Anchovies, etc. nei	1101	Mackerels nei
1005	Anadara clams nei	1102	Mangrove red snapper
1006	Aquatic invertebrates nei	1103	Marine crabs nei
1007	Bali sardinella	1104	Marine fishes nei
1008	Banana prawn	1105	Marine molluscs nei
1009	Barracudas nei	1106	Mackerel sharks, porbeagles nei
1010	Barramundi (=Giant seaperch)	1107	Mantas, devil rays nei
1011	Batfishes	1108	Marine crustaceans nei
1012	Bigeye scad	1109	Marine turtles nei
1013	Bigeye tuna	1110	Marlins, sailfishes, etc. nei
1014	Bigeyes nei	1111	Metapenaeus shrimps nei
1015	Bigfin reef squid	1112	Milkfish
1016	Black marlin	1113	Mojarras (=Silver-biddies) nei
1017	Black pomfret	1114	Monocle breams
1018	Blackbanded trevally	1115	Moonfish
1019	Blood cockle	1116	Mullets nei
1020	Blue mackerel	1117	Narrow-barred Spanish mackerel
1021	Blue marlin	1118	Natantian decapods nei
1022	Blue shark	1119	Needlefishes nei
1023	Blue swimming crab	1120	Octopuses, etc. nei
1024	Bombay-duck	1121	Pacific Chub Mackerel
1025	Bullet tuna	1122	Pelagic percomorphs nei
1026	Butterfishes, pomfrets nei	1123	Penaeus shrimps nei
1027	Carangids nei	1124	Percoids nei
1028	Cephalopods nei	1125	Pickhandle barracuda
1029	Chacunda gizzard shad	1126	Pike-congers nei
1030	Clams, etc. nei	1127	Ponyfishes (=Slipmouths) nei
1031	Chocolate hind	1128	Porgies, seabreams nei
1032	Clupeoids nei	1129	Queenfishes
1033	Cobia	1130	Rainbow runner
1034	Commercial top	1131	Rainbow sardine
1035	Common dolphinfish	1132	Rays, stingrays, mantas nei
1036	Common squids nei	1133	Red bigeye
1037	Conger eels, etc. nei	1134	Requiem sharks nei
1038	Croakers, drums nei	1135	Sardinellas nei
1039	Cupped oysters nei	1136	Sawfishes
1040	Cuttlefish, bobtail squids nei	1137	Scads nei
1041	Daggertooth pike conger	1138	Scallops nei
1042	Demersal percomorphs nei	1139	Scalloped hammerhead
1043	Diadromous clupeoids nei	1140	Scats
1044	Dorab wolf-herring	1141	Sea catfishes nei
1045	Dogfish sharks nei	1142	Sea cucumbers nei
1046	Dogtooth tuna	1143	Sea urchins nei
1047	Eagle rays nei	1144	Seerfishes nei
1048	Eeltail catfishes	1145	Sergestid shrimps nei

Code	ASFIS species (Name)	Code	ASFIS species (Name)
1049	Emperors (=Scavengers) nei	1146	Sharks, rays, skates, etc. nei
1050	Endeavour shrimp	1147	Shi drum
1051	False trevally	1148	Shortbill spearfish
1052	Flatfishes nei	1149	Short mackerel
1053	Flatheads nei	1150	Shortbill spearfish
1054	Flathead lobster	1151	Short neck clams nei
1055	Flying fishes nei	1152	Sillago-whitings
1056	Fourfinger threadfin	1153	Silver grunt
1057	Frigate and bullet tunas	1154	Silver pomfret
1058	Frigate tuna	1155	Silversides (=Sand smelts) nei
1059	Fusiliers nei	1156	Silver sillago
1060	Giant tiger prawn	1157	Skipjack tuna
1061	Glassfishes	1158	Slipper cupped oyster
1062	Goatfishes	1159	Slipper lobsters nei
1063	Goatfishes, red mullets nei	1160	Snappers nei
1064	Gobies nei	1161	Snappers, jobfishes nei
1065	Goldstripe sardinella	1162	Spinefeet(=Rabbitfishes) nei
1066	Greasy grouper	1163	Southern bluefin tuna
1067	Great barracuda	1164	Spotted sardinella
1068	Greater lizardfish	1165	Spotted sicklefish
1069	Green mussel	1166	Squillids nei
1070	Green tiger prawn	1167	Stingrays, butterfly rays nei
1071	Groupers nei	1168	Stolephorus anchovies nei
1072	Groupers, seabasses nei	1169	Stomatopods nei
1073	Grunts, sweetlips nei	1170	Striped bonito
1074	Guitarfishes, etc. nei	1171	Striped marlin
1075	Hairtails, scabbardfishes nei	1172	Surgeonfishes nei
1076	Halfbeaks nei	1173	Sweetlips, rubberlips nei
1077	Hammerhead sharks, etc. nei	1174	Swordfish
1078	Hard clams nei	1175	Terapon perches nei
1079	Honeycomb grouper	1176	Threadfin breams nei
1080	Humpback grouper	1177	Threadfins, tasselfishes nei
1081	Humphead wrasse	1178	Thresher sharks nei
1082	Horse mussels nei	1179	Tiger shark
1083	Indian halibut	1180	Toli shad
1084	Indian mackerel	1181	Tonguefishes
1085	Indian mackerels nei	1182	Torpedo scad
1086	Indian pellona	1183	Triggerfishes, durgons nei
1087	Indian scad	1184	Tropical spiny lobsters nei
1088	Indo-Pacific king mackerel	1185	Tuna-like fishes nei
1089	Indo-Pacific sailfish	1186	Various squids nei
1090	Indo-Pacific swamp crab	1187	Wahoo
1091	Indo-Pacific tarpon	1188	Western king prawn
1092	Jacks, crevalles nei	1189	Whitespotted wedgefish
1093	Jellyfishes nei	1190	Wolf-herrings nei
1094	Jobfishes nei	1191	Wrasses, hogfishes, etc. nei
1095	Kawakawa	1192	Yellowfin tuna
1096	Largehead hairtail	1193	Yellowstripe scad
1097	Lizardfishes nei		

ANNEX 14: FISHERIES *REFUGIA* MAPPING ON GOOGLE EARTH



Development of the fisheries refugia mapping on Google Earth was initiated in 2020, the updated GIS mapping is ongoing, the PCU expects to complete by October 2022. More information via the following URL: https://earth.google.com/web/@9.04959801,108.44739046,450.93473411a,5729544.47573483d,30y,-0h,0t,0r/data=MikKJwolCiExdUdDaHFGVU85MWVXT3V3RHJXeWd0LThkb1BMN3pyb1YgAQ

ANNEX 15: GENDER MAINSTREAMING IN FISHERIES REFUGIA PROJECT

EXECUTIVE SUMMARY

The Project "Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand" (Fisheries Refugia Project) implemented by the United Nations Environment Programme (UNEP) from 2016 to 2022 with financial support from the Global Environment Facility (GEF), has successfully mainstreamed gender into its development as well as implementation. As a result, the Project which was executed in the South China Sea area by the Southeast Asian Fisheries Development Center (SEAFDEC) in partnership with the Fisheries Departments of the riparian countries of South China Sea, namely: Cambodia, Indonesia, Malaysia, Philippines, Thailand, and Viet Nam, was able to improve the involvement of women in the Project activities. Focused mainly on establishing a regional system of fisheries management areas (fisheries refugia) in the South China Sea and Gulf of Thailand, the Project comprises four components, namely: (1) establishment of operational management at 15 priority fisheries refugia, with community-based refugia management plans being the key outputs; (2) strengthening of the enabling environment for the formal designation and operational management of refugia; (3) strengthening of information management and dissemination for enhancing the national uptake of best practices in integrating fisheries management and biodiversity conservation, and in improving community acceptance of area-based approaches to fisheries and coastal environmental management; and at the national level, (4) strengthening the cross-sectorial coordination for integrated fisheries and environmental management while harnessing national scientific and technical expertise, and knowledge required to promote policy, legal and institutional reforms for fisheries refugia management in the participating countries. Specifically, Component 1 encompasses five expected outcomes, one of which is to bring about "Empowered fishing communities, particularly artisanal fishermen and women involved in inshore gleaning and processing, for enforcement of agreed management rules at 15 priority refugia sites in the South China Sea and Gulf of Thailand." This outcome has been realized by mainstreaming gender not only in the Project development but also in the implementation, having been pursued through capacity-building activities at the community level with the specific objective of enhancing the capabilities of target community members, particularly artisanal fishermen and women, while participating in refugia management at the 15 fisheries refugia sites. Having empowered the fishing communities at the 15 sites, the Project has catalysed community action for fisheries refugia management and strengthened the participation of civil society and community organisations in fisheries refugia management. Indeed, such feat, which had been attained mainly through gender mainstreaming and promoting gender dimension in the Project execution, has resulted in the improved role of women in fisheries management and balanced benefits obtained by the fishermen and fisherwomen in the established refugia sites bringing about gender equality and gender equity, and contributed to the pool of projects in the Southeast Asian region where gender had been successfully mainstreamed not only in the project development but also in the implementation, monitoring, and evaluation.

The sex ratio (in percent) between females and males in each target activity is calculated as the number of women per hundred men engaged in the project activities by year and entered project from 2017-2021. The PCU divided 225 activities into three main activities, as shown in Figure 1. The results of sex ratios per activity of the entire project are summarized in Table 1.

Figure 1: The sex ratios are calculated based on three groups of activities

Cambodia	Participants	Male	Female	Gender Ratio
Overall Total	1,893	1,517	376	24.79
Act.1	453	401	52	12.97
Act. 2	768	532	236	44.36
Act. 3	151	123	28	22.76
Indonesia	Participants	Male	Female	Gender Ratio
Overall Total	539	337	202	59.94
Act.1	241	134	107	79.85
Act. 2	298	203	65	32.02
Act. 3	7	6	1	16.67
Malaysia	Participants	Male	Female	Gender Ratio
Overall Total	662.0	488.0	174.0	35.66
Act.1	271.0	150.0	121.0	80.67
Act. 2	451.0	379.0	72.0	19.00
Act. 3	10.0	3.0	7.0	233.33
Philippines	Participants	Male	Female	Gender Ratio
Overall Total	1,284	953	331	34.73
Act.1	326	216	110	50.93
Act. 2	851	674	177	26.26
Act. 3	107	63	44	69.84
Thailand	Participants	Male	Female	Gender Ratio
Overall Total	1,650	1,066	584	54.78
Act.1	410	269	141	52.42
Act. 2	1,219	793	426	53.72
Act. 3	21	4	17	425.00

ALL COUNTRY	Participants	Male	Female	Gender Ratio
Overall Total	6,028	4,361	1,667	38.23
Act.1	1,701	1,170	531	45.38
Act. 2	3,587	2,581	976	37.81
Act. 3	296	199	97	48.74

Table 1: Gender Ratio in Percent Between Women and Men Engaged in Fisheries Refugia Per Activity

Conclusion

Therefore, having empowered the fishing communities at the 15 sites, the Project has catalyzed community action for fisheries refugia management and strengthened the participation of civil society and community organizations in fisheries refugia management. Indeed, such feat, which had been attained mainly through gender mainstreaming and promoting gender dimension in the Project execution, has resulted in the improved role of women in fisheries management and balanced benefits obtained by the fishermen and fisherwomen in the established refugia sites bringing about gender

equality and gender equity and contributing to the pool of projects in the Southeast Asian region where gender had been successfully mainstreamed not only in the project development but also in the implementation, monitoring, and evaluation.

It should be noted, however, that the overall gender ratio in some countries is still not high as gender mainstreaming is a continuing process. Based on the initiatives of the Fisheries Refugia Project, however, other similar projects that mainstream gender in their development and implementation could attain a much-improved overall ratio. Also, some countries encountered various constraints in implementing specific activities amidst the onslaught of the COVID-19 pandemic in 2020-2021. Nonetheless, the targets of the Project were still pursued by the participating countries by pooling the implementation of some specific activities.

ANNEX 16: THE FORTH BUDGET REVISION AS OF 31 MARCH 2022

Executive Summary

Referring to the results of the Project Steering Committee at its Seventh Ad-hoc Meeting held on 27 May 2022, the meeting adopted the unspent budget requested from Cambodia and Thailand with the proposed budget revision. The committee also agreed with the proposal to include the budget revision from other countries and partners by the end of July 2022. Malaysia and SEAFDEC/PCU proposed the budget revision on 31 March 2022 to be included in the PSC7 Ad-hoc Report. Accordingly, the Project Coordination Unit compiles all revised budgets from countries and partners, as shown in Appendic 1 and 2 A,B,C,and D, for consideration and further consultation with the Sixth Meeting of the Regional Scientific and Technical Committee (RSTC6) held on 4-6 July 2022.

APPENDIX 1

4th Revision of the Project Budget (as of 31 March 2022)

UNEP PROJECT NO	829
FINANCIAL YEAR	2022
FUND	3,000,000
PROJECT ID	5401

	Code	Description	3rd Revision of Budget (as of 30 SEP 2021)	Balance as of 31 March 22	4th Revision of Budget (as of 31 March 2022)	Adjustment	Justi-fication
10	PROJECT PERSONNEL COMPONENT		C	B	C	C-A	
	1100	Project Personnel w/m	243,101.50	61,703	236,805.80	(6,296)	Ref:1
	1200	Consultants w/m	1,252,756.95	302,510	1,276,585.57	23,829	Ref:2
	1600	Travel on official business (above staff)	278,545.64	41,327	270,657.06	(7,889)	Ref:3
	1999	**Component Total**	**1,774,404.09**	**405,539**	**1,784,048.43**	**9,644**	
20	SUB-CONTRACT COMPONENT				-		
	2100	Sub-contracts (MoU's/LA's for UN cooperating agencies)	-	-	-	-	
	2200	Sub-contracts (MoU's/LA's for non-profit supporting organizations)	294,785.36	157,732	234,386.66	(60,399)	Ref:4
	2300	Sub-contracts (commercial purposes)	80,888.46	30,514	81,387.73	499	Ref:5
	2999	**Component Total**	**375,673.82**	**188,246**	**315,774.39**	**(59,899)**	
30	TRAINING COMPONENT				-		
	3200	Group training (study tours, field trips, workshops, seminars, etc)	279,203.79	114,679	296,696.23	17,492	Ref:6
	3300	Meetings/conferences (give title)	374,251.43	209,081	405,864.50	31,613	Ref:7
	3999	**Component Total**	**653,455.22**	**323,760**	**702,560.73**	**49,106**	
40	EQUIPMENT & PREMISES COMPONENT				-		
	4100	Expendable equipment (items under $1,500 each, for example)	8,638.50	4,646	8,786.54	148	Ref:8
	4200	Non-expendable equipment (computers, office equip, etc)	43,883.83	(8)	44,000.00	116	Ref:9
	4300	Premises	18,585.28	4,819	15,266.00	(3,319)	Ref:10
	4999	**Component Total**	**71,107.61**	**9,457**	**68,052.54**	**(3,055)**	
50	MISCELLANEOUS COMPONENT				-		
	5100	Operation and maintenance of equipment	3,332.27	2,254	3,351.87	20	Ref:11
	5200	Reporting costs (publications, maps, newsletters, printing, etc)	34,081.35	25,804	35,388.64	1,307	Ref:12
	5300	Sundry (communications, postage, freight, clearance charges, etc)	9,945.65	1,201	12,823.40	2,878	Ref:13
	5400	Hospitality and entertainment	-	-	-		
	5500	Evaluation (consultants fees ETC)	78,000.00	67,200	78,000.00	-	Ref:14
	5999	**Component Total**	**125,359.27**	**96,459**	**129,563.91**	**4,205**	
					-		
99	**9999**	**GRAND TOTAL**	**3,000,000**	**1,023,463**	**3,000,000**	**(0)**	

Ref#	BL	Justification
1	1100	Reduced 6.3k to cover the consultant costs of BL 1200 requested by Malaysia
2	1200	Increase 23.83k for consultant costs requested by Cambodia and Malaysia
3	1600	Reduced 7.9k to cover the consultant costs of BL 1200 requested by Malaysia
4	2200	Reduced 55.4k from Viet Nam Unspent to spare for Regional Meeting BL 3300, BL 5300, and BL4200, but increased to BL2200 to Cambodia
5	2300	Increase to cover the expenses from the PCU for financial audit for 2022 and other commercial purposed
6	3200	Increase 17.5 K to cover the activities requested by the Cambodia and Malaysia
7	3300	Increase 17.5 K to cover the activities requested by the Cambodia, Malaysia, and regional Meetings
8	4100	Increase 0.15 K to cover the anticipated activities
9	4200	Increase 0.12 K to cover the anticipated activities
10	4300	Reduced from Malaysia to cover the anticipated expenses under BL5200 and BL 5300 (effects from exchange rates and bank charges)
11	5100	Increase 0.02 K to cover the anticipated activities
12	5200	Increase 1.3 K to cover the activities requested by Malaysia
13	5300	Increase 1.3 K to cover the activities requested by Malaysia and Regional Program/PCU
14	5500	no change

Remarks: Some parts of The 4th Budget Revision as of 31 March 2022 was principal approved by the Project Steering Committee at its PSC7 Adhoc Meeting held on 27 May 2022. Since this would be the last budget revision before project end, Malaysia and PCU proposed the Budget Revision to include in the PSC7 Ad-hoc Meeting Report.

APPENDIX 2A: Cambodia's Budget Revision as of 31 March 2022

Code		CAMBODIA	3rd Budget Revision as at 30 SEP 2021 (OVERALL)	Cumulative Expenditures as of 31 Mar 22	Balance as at 31 Mar 22	Added Unspent Budget from VN	4th Budget Revision as of 31 Mar 2022	Adjustment as of 31 March 2022	Justification (refers to Proposal at RSTCS)	4th Budget Revision as of 31 Mar 2022 (OVERALL)
10	PROJECT PERSONNEL COMPONENT		(A)	(B)	C = A-B	(D)	E = C+D	F		(A' = A + F)
	1100	Project Personnel w/m	52,000.00	43,900.00	8,100.00		8,100.00	-		52,000.00
	1200	Consultants w/m	29,900.00	25,252.00	4,648.00	5,500.00	10,148.00	5,500.00	Ref-1	35,400.00
	1600	Travel on official business (above staff)	77,823.51	75,513.76	2,309.75		2,309.75	-		77,823.51
	1999	Component Total	159,723.51	144,665.76	15,057.75	5,500.00	20,557.75	5,500.00	-	165,223.51
20	SUB-CONTRACT COMPONENT									
	2100	Sub-contracts (MoU's/LA's for UN cooperating agencies)	-	-	-		-	-		-
	2200	Sub-contracts (MoU's/LA's for non-profit supporting organizations)	29,570.00	19,570.00	10,000.00	4,500.00	14,500.00	4,500.00	Ref-2	34,070.00
	2300	Sub-contracts (commercial purposes)	-	-	-		-	-		-
	2999	Component Total	29,570.00	19,570.00	10,000.00	4,500.00	14,500.00	4,500.00	-	34,070.00
30	TRAINING COMPONENT									
	3200	Group training (study tours, field trips, workshops, seminars, etc)	33,921.10	30,317.35	3,603.75	6,000.00	9,603.75	6,000.00	Ref-3	39,921.10
	3300	Meetings/conferences (give title)	43,219.65	10,562.65	32,657.00	4,000.00	36,657.00	4,000.00	Ref-4	47,219.65
	3999	Component Total	77,140.75	40,880.00	36,260.75	10,000.00	46,260.75	10,000.00	-	87,140.75
40	EQUIPMENT & PREMISES COMPONENT									
	4100	Expendable equipment (items under $1,500 each, for example)	2,088.64	1,125.89	962.75		962.75	-		2,088.64
	4200	Non-expendable equipment (computers, office equip, etc)	4,521.00	4,498.00	23.00		23.00	-		4,521.00
	4300	Premises (office rent, maintenance of premises, etc)	-	-	-		-	-		-
	4999	Component Total	6,609.64	5,623.89	985.75		985.75	-	-	6,609.64
50	MISCELLANEOUS COMPONENT									
	5100	Operation and maintenance of equip.	1,811.50	1,107.00	704.50		704.50	-		1,811.50
	5200	Reporting costs (publications, maps, newsletters, printing, etc)	4,000.00	1,625.00	2,375.00		2,375.00	-		4,000.00
	5300	Sundry (communications, postage, freight, clearance charges, etc)	1,236.14	892.41	343.73		343.73	-		1,236.14
	5400	Hospitality and entertainment	-	-	-		-	-		-
	5500	Evaluation (consultants fees ETC)	-	-	-		-	-		-
	5999	Component Total	7,047.64	3,624.41	3,423.23		3,423.23	-	-	7,047.64
99	9999	GRAND TOTAL	280,091.54	214,364.06	65,727.48	20,000.00	85,727.48	20,000.00	-	300,091.54

APPENDIX 2B: Thailand's Budget Revision as of 31 March 2022

Code		THAILAND	3rd Budget Revision as at 30 SEP 2021 (OVERALL)	Cumulative Expenditures as of 31 Mar 22	Balance as at 31 Mar 22	Added Unspent Budget from VN	4th Budget Revision as of 31 Mar 2022 for Thailand	Adjustment as of 31 Mar 2022	Justification (refers to Proposal at RSTCS)	4th Budget Revision as of 31 Mar 2022 (OVERALL)
10	PROJECT PERSONNEL COMPONENT		(A)	(B)	C = A-B	(D)	E = C+D	F = E-C		(A' = A + F)
	1100	Project Personnel w/m	83,148.53	71,183.03	11,965.50		11,965.50	-		83,148.53
	1200	Consultants w/m	51,727.92	42,024.00	9,703.92		9,703.92	-		51,727.92
	1600	Travel on official business (above staff)	16,459.75	10,951.18	5,508.57		5,508.57	-		16,459.75
	1999	Component Total	151,336.20	124,158.21	27,177.99	-	27,177.99	-	-	151,336.20
20	SUB-CONTRACT COMPONENT									
	2100	Sub-contracts (MoU's/LA's for UN cooperating agencies)	-	-	-		-	-		-
	2200	Sub-contracts (MoU's/LA's for non-profit supporting organizations)	16,106.00	16,106.00	-		-	-		16,106.00
	2300	Sub-contracts (commercial purposes)	-	-	-		-	-		-
	2999	Component Total	16,106.00	16,106.00	-	-	-	-	-	16,106.00
30	TRAINING COMPONENT									
	3200	Group training (study tours, field trips, workshops, seminars, etc)	36,199.70	23,408.60	12,791.10		12,791.10	-		36,199.70
	3300	Meetings/conferences (give title)	22,334.91	11,844.16	10,490.75		10,490.75	-		22,334.91
	3999	Component Total	58,534.61	35,252.76	23,281.85	-	23,281.85	-	-	58,534.61
40	EQUIPMENT & PREMISES COMPONENT									
	4100	Expendable equipment (items under $1,500 each, for example)	2,948.38	931.62	2,016.76		2,016.76	-		2,948.38
	4200	Non-expendable equipment (computers, office equip, etc)	-	-	-		-	-		-
	4300	Premises (office rent, maintenance of premises, etc)	-	-	-		-	-		-
	4999	Component Total	2,948.38	931.62	2,016.76		2,016.76	-	-	2,948.38
50	MISCELLANEOUS COMPONENT									
	5100	Operation and maintenance of equip.	800.00	-	800.00		800.00	-		800.00
	5200	Reporting costs (publications, maps, newsletters, printing, etc)	813.12	413.12	400.00	3,000.00	3,400.00	3,000.00	Ref1	3,813.12
	5300	Sundry (communications, postage, freight, clearance charges, etc)	-	-	-		-	-		-
	5400	Hospitality and entertainment	-	-	-		-	-		-
	5500	Evaluation (consultants fees ETC)	-	-	-		-	-		-
	5999	Component Total	1,613.12	413.12	1,200.00	3,000.00	4,200.00	3,000.00	-	4,613.12
99	9999	GRAND TOTAL	230,538.31	176,861.71	53,676.60	3,000.00	56,676.60	3,000.00	-	233,538.31

APPENDIX 2C: Malaysian's Budget Revision as of 31 March 2022

Code		MALAYSIA	3rd Budget Revision as at 30 SEP 2021 (OVERALL)	Cumulative Expenditures as of 31 Mar 22	Balance as at 31 Mar 22	4th Budget Revision as of 31 Mar 2022	Adjustment as of 31 Mar 2022	Justification	4th Budget Revision as of 31 Mar 22 (OVERALL)
10	PROJECT PERSONNEL COMPONENT		(A)	(B)	C = A-B	D	E = D-C		(A'. = A + E)
	1100	Project Personnel w/m	24,995.19	22,995.19	2,000.00	-	(2,000.00)	REF-1	22,995.19
	1200	Consultants w/m	59,705.14	4,705.14	55,000.00	65,000.00	10,000.00	REF-2	69,705.14
	1600	Travel on official business (above staff)	45,503.59	37,803.59	7,700.00		(7,700.00)	REF-3	37,803.59
	1999	Component Total	130,203.92	65,503.92	64,700.00	65,000.00	300.00	-	130,503.92
20	SUB-CONTRACT COMPONENT		-						-
	2100	Sub-contracts (MoU's/LA's for UN cooperating agencies)	-	-	-	-	-		-
	2200	Sub-contracts (MoU's/LA's for non-profit supporting organizations)	-	-	-	-	-		-
	2300	Sub-contracts (commercial purposes)	-	-	-	-	-		-
	2999	Component Total	-	-	-	-	-	-	-
30	TRAINING COMPONENT		-						-
	3200	Group training (study tours, field trips, workshops, seminars, etc)	46,098.04	13,259.88	32,838.16	34,332.28	1,494.12	REF-4	47,592.16
	3300	Meetings/conferences (give title)	24,133.18	8,306.41	15,826.77	15,000.00	(826.77)	REF-5	23,306.41
	3999	Component Total	70,231.22	21,566.29	48,664.93	49,332.28	667.35	-	70,898.57
40	EQUIPMENT & PREMISES COMPONENT		-						-
	4100	Expendable equipment (items under $1,500 each, for example)	1,400.00	-	1,400.00	1,400.00	-		1,400.00
	4200	Non-expendable equipment (computers, office equip, etc)	5,068.60	5,068.60	-	-	-		5,068.60
	4300	Premises (office rent, maintenance of premises, etc)	18,585.28	13,766.00	4,819.28	1,500.00	(3,319.28)	REF-6	15,266.00
	4999	Component Total	25,053.88	18,834.60	6,219.28	2,900.00	(3,319.28)	-	21,734.60
50	MISCELLANEOUS COMPONENT		-						-
	5100	Operation and maintenance of equip.	-	-	-	-	-		-
	5200	Reporting costs (publications, maps, newsletters, printing, etc)	4,169.08	921.01	3,248.07	4,557.50	1,309.43	REF-7	5,478.51
	5300	Sundry (communications, postage, freight, clearance charges, etc)	6.30	(551.20)	557.50	1,600.00	1,042.50	REF-8	1,048.80
	5400	Hospitality and entertainment	-	-	-	-	-		-
	5500	Evaluation (consultants fees ETC)	-	-	-	-	-		-
	5999	Component Total	4,175.38	369.81	3,805.57	6,157.50	2,351.93	-	6,527.31
			-						-
99	9999	GRAND TOTAL	229,664.40	106,274.62	123,389.78	123,389.78	(0.00)	-	229,664.40

APPENDIX 2D: PCU's Budget Revision as of 31 March 2022

Code		REGIONAL PROGRAMS	3rd Budget Revision as at 30 SEP 2021 (OVERALL)	Cumulative Expenditures as of 31 Mar 22	Balance as of 31 Mar 22	Unspent Budget from VN	Balance as of 31 Mar 22 (Meareged VN Unspent)	4th Budget Revision as of 31 Mar. 2022	Adjustment as of 31 Mar 2022	Justificatio n	3th Budget Revision + VN Unspent	4th Budget Revision + VN Unspent as of 31 Mar 2022 (OVERALL)
10	PROJECT PERSONNEL COMPONENT		(A)	(B)	C = A-B	(D)	E = C + D	F	J = F-E		(A'' = A+D)	(A'' = A' + J)
	1100	Project Personnel w/m	-	-	-	8,547.00	8,547.00	8,547.00	-		8,547.00	8,547.00
	1200	Consultants w/m	944,253.43	780,753.43	163,500.00	-	163,500.00	163,500.00	-		944,253.43	944,253.43
	1600	Travel on official business (above staff)	95,190.17	90,690.16	4,500.01	2,871.00	7,371.01	7,371.01	-		98,061.17	98,061.17
	1999	Component Total	1,039,443.60	871,443.59	168,000.01	11,418.00	179,418.01	179,418.01	-	-	1,050,861.60	1,050,861.60
20	SUB-CONTRACT COMPONENT											
	2100	Sub-contracts (MoU's/LA's for UN cooperating agencies)	-	-	-	-	-	-	-		-	-
	2200	Sub-contracts (MoU's/LA's for non-profit supporting organizations)	41,022.82	30,022.82	11,000.00	94,676.00	105,676.00	47,703.33	(57,972.67)	REF-1	135,698.82	77,726.15
	2300	Sub-contracts (commercial purposes)	66,387.73	50,374.12	16,013.61	5,000.00	21,013.61	26,013.61	5,000.00		71,387.73	76,387.73
	2999	Component Total	107,410.55	80,396.94	27,013.61	99,676.00	126,689.61	73,716.94	(52,972.67)	-	207,086.55	154,113.88
30	TRAINING COMPONENT											
	3200	Group training (study tours, field trips, workshops, seminars, etc)	37,835.87	5,635.87	32,200.00	-	32,200.00	32,200.00	-		37,835.87	37,835.87
	3300	Meetings/conferences (give title)	174,518.69	114,706.18	59,812.51	8,514.67	68,327.18	120,000.00	51,672.82	REF-2	183,033.36	234,706.18
	3999	Component Total	212,354.56	120,342.05	92,012.51	8,514.67	100,527.18	152,200.00	51,672.82	-	220,869.23	272,542.05
40	EQUIPMENT & PREMISES COMPONENT											
	4100	Expendable equipment (items under $1,500 each, for example)	2,349.52	2,021.14	328.38	-	328.38	328.38	-		2,349.52	2,349.52
	4200	Non-expendable equipment (computers, office equip, etc)	34,099.26	34,099.26	-	-	-	311.14	311.14		34,099.26	34,410.40
	4300	Premises (office rent, maintenance of premises, etc)	-	-	-	-	-	-	-		-	-
	4999	Component Total	36,448.78	36,120.40	328.38	-	328.38	639.52	311.14	-	36,448.78	36,759.92
50	MISCELLANEOUS COMPONENT											
	5100	Operation and maintenance of equip.	720.77	243.40	477.37	-	477.37	477.37	-		720.77	720.77
	5200	Reporting costs (publications, maps, newsletters, printing, etc)	11,887.98	3,971.97	7,916.01	-	7,916.01	7,916.01	-		11,887.98	11,887.98
	5300	Sundry (communications, postage, freight, clearance charges, etc)	6,484.24	5,472.95	1,011.29	-	1,011.29	2,000.00	988.71	REF-3	6,484.24	7,472.95
	5400	Hospitality and entertainment	-	-	-	-	-	-	-		-	-
	5500	Evaluation (consultants fees ETC)	78,000.00	10,800.00	67,200.00	-	67,200.00	67,200.00	-		78,000.00	78,000.00
	5999	Component Total	97,092.99	20,488.32	76,604.67	-	76,604.67	77,593.38	988.71	-	97,092.99	98,081.70
99	9999	GRAND TOTAL	1,492,750.48	1,128,791.30	363,959.18	119,608.67	483,567.85	483,567.85	0.00	-	1,612,359.15	1,612,359.15

ANNEX 17: REGIONAL TRAINING WORKSHOP ON LARVAL FISH IDENTIFICATION

PHASE I: LARVAL FISH IDENTIFICATION
(SPONSOR BY SEAFDEC/UNEP/GEF/FISHERIES REFUGIA)

15-27 NOV 2022, SEAFDEC TRAINING DEPARTMENT

PROGRAM AND SYLLABUS

Date/Time	Training Activity/Topic	Resource Person
15 Nov. 22 - Tuesday		
	Participants arrive at SEAFDEC Training Department, Samut Prakan, Thailand	SEAFDEC Personnel
16 Nov. 22 - Wednesday		
0830-0900	Registeration	SEAFDEC & SEAFDEC-Refugia
0900-0920	Opening ceremony & group photo	SEAFDEC & SEAFDEC-Refugia
0920-0940	Refreshment	SEAFDEC Personnel
0940-1000	Brief on schedule and anticipated output	SEAFDEC Personnel
1000-1200	Country report on the implementing plan of the fisheries resources refugia project (20 minutes each countries)	Participants (Cambodia, Indonesia, Malaysia, Philippines, Thailand and Vietnam)
1200-1330	Lunch break	SEAFDEC Personnel
1330-1500	Keynote Address: Early life history studies of the subtropical marine fishes in Okinawa, Japan (tentative)	Prof. Dr. Katsunori Tachihara (University of the Ryukyus)
1500-1520		
1520-1600	Case Study 2: Distributions and transportation of jack mackerel (*Trachurus japonicus*) larvae and juveniles in the East China Sea	Dr. Yoshinobu Konishi (former, Seikai National Fisheries Research Institute, Japan)
1600-1700	Case Study 3: Utilization of DNA barcodes for the identification of tropical larval fishes in Klang Strait, Straits of Malacca (tentative)	Dr. Cecillia Chu (University of Malaya)
1700-1800	Practical: DNA barcode collecting and preserving technique	Dr. Cecillia Chu (University of Malaya)
1830-2200	Welcome Dinner	SEAFDEC Personnel
17 Nov. 22 - Thursday		
0900-1000	Lecture: Review on morphological development of larval fish characters	Yoshinobu Konishi
1030-1200	Lecture: Identification methods of the Scombridae larvae and juveniles in the Southeast Asian region	Yoshinobu Konishi
1200-1330	Lunch break	SEAFDEC Personnel
1330-1700	Practice: Species identification and morphological description of the Scombridae larvae and juveniles - 1	Instructor Team

18 Nov. 22 - Friday		
0900-1200	Practice: Species identification and morphological description of the Scombridae larvae and juveniles - 2	Instructor Team
1200-1330	Lunch break	SEAFDEC Personnel
1330-1700	Practice: Species identification and morphological description of the Scombridae larvae and juveniles - 3	Instructor Team
19 Nov. 22 - Satuarday		
0900-1000	Lecture: Identification methods of the Carangidae larvae in the Southeast Asian region	Yoshinobu Konishi
1030-1200	Practice: Species identification and morphological description of the Carangidae larvae - 1	Instructor Team
1200-1330	Lunch break	SEAFDEC Personnel
1330-1700	Practice: Species identification and morphological description of the Carangidae larvae - 2	Instructor Team
20 Nov. 22 - Sunday		
	Rest Day	
21 Nov. 22 - Monday		
0900-1200	Practice: Species identification and morphological description of the Carangidae larvae - 3	Instructor Team
1200-1330	Lunch break	SEAFDEC Personnel
1330-1430	Lecture: Identification methods of the Engraulidae larvae in the Southeast Asian region	Yoshinobu Konishi
1500-1700	Practice: Species identification and morphological description of the Engraulidae larvae - 1	Instructor Team
22 Nov. 22 - Tuesday		
900-1200	Practice: Species identification and morphological description of the Engraulidae larvae - 2	Instructor Team
1200-1330	Lunch break	SEAFDEC Personnel
1330-1700	Practice: Species identification and morphological description of the Engraulidae larvae - 3	Instructor Team
23 Nov. 22 - Wednesday		
0900-1200	Presentation of case study on early life history science based on the references for planning of future working subjects in participating countries	Participating countries
1200-1330	Lunch break	SEAFDEC Personnel
1330-1430	Lecture: Identification methods of the Lutjanidae, Siganidae and serranid Epinepherinae larvae in the Southeast Asian region	Yoshinobu Konishi
1430-1700	Practice: Species identification and morphological description of the Lutjanidae, Siganidae and serranid Epinepheninae larvae - 1	Instructor Team
24 Nov. 22 - Thursday		
0900-1200	Practice: Species identification and morphological description of the Lutjanidae, Siganidae and serranid Epinepheninae larvae - 2	Instructor Team
1200-1330	Lunch break	SEAFDEC Personnel

1330-1700	Practice: Species identification and morphological description of the Lutjanidae, Siganidae and serranid Epinepheninae larvae - 3	Instructor Team
25-Nov-22 - Friday		
0900-1200	Practice: Species identification and morphological description of the Lutjanidae, Siganidae and serranid Epinepheninae larvae - 4	Instructor Team
1200-1330	Lunch break	SEAFDEC Personnel
1330-1700	Preparation of presentation on species identification and morphological descriptions of examined larvae and juveniles, and on future working subjects to be planned	Yoshinobu Konishi Rangsan Chayakul Teerapong Duandee
26 Nov. 22 - Saturday		
0900-1200	Presentation on results of species identification and morpholog- ical descriptions of examined larvae and juveniles, and on future working subjects to be planned	Yoshinobu Konishi Rangsan Chayakul Teerapong Duandee
1200-1330	Lunch break	SEAFDEC Personnel
1330-1430	Training course evaluation	SEAFDEC-Refugia
1430-1500	Clossing for Phase I	
27 Nov. 22 - Sunday		

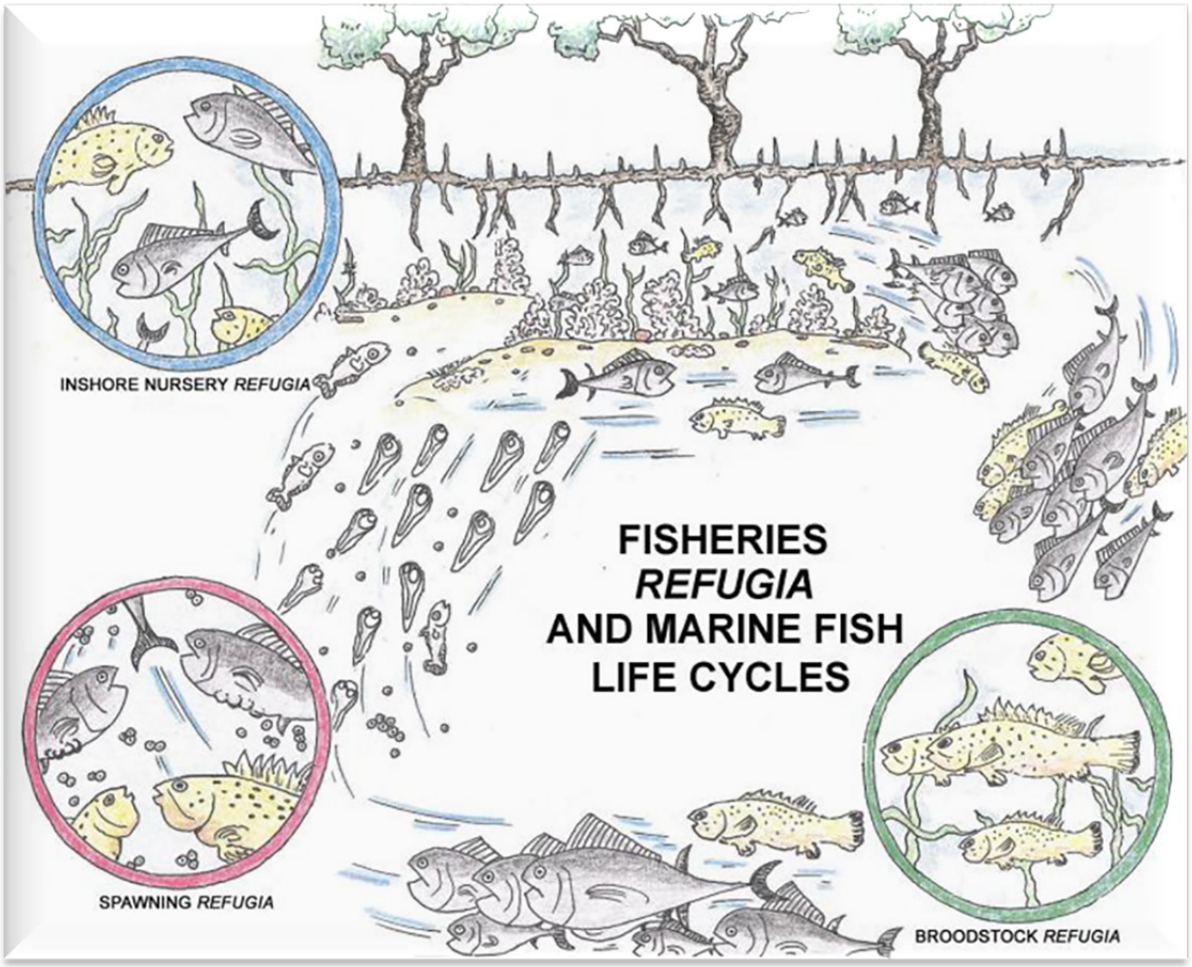
PHASE II: DETERMINE SPAWNING AND NURSING GROUND BASE ON SURVEY RESULTS
(SPONSOR BY JAPANESE TRUST FUND)

28 NOV - 3 DEC 2022, SEAFDEC TRAINING DEPARTMENT

PROGRAM AND SYLLABUS

28 Nov. 22 - Monday		
0900-1200	Principle of GIS and Vector data model	
1200-1330	Lunch break	
1330-1630	work with QGIS opensource software GIS and Map creation	
29 Nov. 22 -		
0900-1200	Raster data model in GIS	
1200-1330	Lunch break	
1330-1630	work with raster data and simple modelling	
30 Nov. 22 -		
0900-1200	the principle of prediction model	
1200-1330	Lunch break	
1330-1630	work with R statistic free software	
1 Dec. 22		
0900-1200	Introduction to Maxent plugin	
1200-1330	Lunch break	
1330-1630	Work with dummy data that SEAFDEC/TD prepared	
2 Dec 22 - Saturday		
0900-1200	Introduction of ageing analysis using otolith	
1200-1330	Lunch break	

1330-1630	cutting otolith of larvae sample (using grouper larvae sample from aquaculture,)	
3 Dec. 22 - Saturday		
0900-1200	Counting ring age using Image-J program	
1200-1330	Lunch break	
1330-1630	Back calculation to spawning ground using age data and current data	
1630-1700	Training course evaluation	
1700-1730	Clossing for Phase I	
1830-2030	Farewell party	



What are Fisheries *Refugia*?

The term 'refugia' is the plural form of the noun of refugium, which in ecology is commonly referred to as an area that has escaped ecological changes experienced elsewhere and so provides suitable habitat for given species. The meaning of fisheries refugia is defined as: "Spatially and geographically defined marine or coastal areas in which specific management measures are applied to sustain important species [fisheries resources] during critical stages of their lifecycle, for their sustainable use."

The Establishment and Operation of A Regional System of
Fisheries Refugia in the South China Sea and Gulf of Thailand is a part of
the Strategic Action Programme for the South China Sea