



The 5th 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

16-17 March 2022
(08:30 – 12:00 am, UTC+7)
Zoom platform

YEAR-END REPORT FOR 2021

Executive Summary

The executive summary highlights the progress works from January to December 2021 by all executing partners, including the regional program by PCU. All 32 national activities, including national committee meetings, stakeholder consultations/workshops, field surveys, capacity building training, were conducted. PCU convened two regional project steering committee meetings and one regional scientific and technical committee meeting. The following summary highlights the progress of the project:

- Three fisheries refugia: two in Cambodia (in Kep and Koh Kong provinces) and one in Surat Thani provinces are adopted by the respective government. Seven fisheries refugia: one in Kampot/Cambodia, one in Trat/Thailand, two in Johor and Miri, Malaysia, and three in Bolinao, Masinloc, and Coron of Philippines are in process for adoption by the responsible agencies or ministry after receiving the perception and agreement from the stakeholder communities. Indonesia is in the process of identifying the fisheries refugia boundaries in both pilot sites that require responsible interagency support in the establishment of the fisheries management areas. Viet Nam attempts to implement at some pilot sites while reducing the scale of project implementation due to delay initiatives. It is expected that in 2022 Viet Nam will implement one or two pilot sites.
- Improve or reform fishery Legal and regulations and management plan: Cambodia and Thailand, and Cambodia have completed the tasks to support the established refugia. Philippines, Malaysia, Viet Nam have reviewed the fisheries legislation and management plans to support long-term refugia implementation. While Indonesia continues to discuss with the Directorate General of Marine Spatial Management to include the fisheries refugia characteristic in the MPA regulation.
- Since each country partner implemented the project until the end of 2021, Cambodia published 94 papers, while the Philippines, Thailand, Malaysia, and Indonesia published 41, 52, 33, and 31 papers, respectively. In addition, the PCU published one regional policy paper and 12 regional meeting reports.
- In terms of the strengthened knowledge management and information sharing and access, PCU created a regional website, while Thailand and Indonesia created a national refugia web portal. Philippines, Malaysia, and Cambodia are underway. Regarding establishing a learning center to promote the fisheries refugia concept and project implementing program, Malaysia has developed two centers and plans to expand more learning centers by the end of the project. Philippines and Thailand plan to set up the learning center in the region/province where the refugia project is located.
- Cumulative expenditures and Co-financing as of 31 Dec 2021 are presented.

ACTIONS BY THE RSTC5:

- ❖ The Committee is invited to consider and suggest/comment to the progress of project implementation as of December 2021.
- ❖ The Committee is also requested to endorse this report for further dissemination and online

YEAR-END REPORT FOR 2021

I. INTRODUCTION

The project entitled "Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and the Gulf of Thailand" is working with communities and governments to integrate habitat and biodiversity conservation considerations into fishery management and practices. The initiative is financed by the GEF, implemented by UNEP, and executed regionally by SEAFDEC in partnership with the Fisheries Departments of Cambodia, Indonesia, Malaysia, Philippines, Thailand, and Vietnam. Four countries, namely Cambodia, Malaysia, Philippines, and Thailand, have signed a Letter of Agreement with SEAFDEC and commenced project implementation in 2017. Indonesia and Vietnam signed the agreement in 2019. Before the project started, the institutional framework and implementation arrangements are needed to support the project implementation. Each country partner sets up the committees, including the National Steering Committee, National Scientific and Technical Committee, and Site-based Management Boards, to support and ensure the implementation meets the project's long-term goals. This report updates the progress and achievements since the project started in 2016. The report also highlights the 2021 progress of 32 meetings/consultations conducted by country partners and three regional meetings by SEAFDEC/PCU.

II. ESTABLISHMENT OF FISHERIES REFUGIA

2.1 CAMBODIA

Fisheries Administration of Cambodia (FiA), as a national lead agency, started the project since January 2017. Through a series of stakeholder consultation, capacity building training and workshops on the refugia concept and baseline surveys, a total of 82 main activities were implemented until 2020. The concept of fisheries refugia has been integrated into national fisheries policy and legal basic, including the Law of Fisheries, National Plan for Action, Plan on Combating IUU Fishing, 10 year strategy plan for fisheries conservation, and 5 year management plan for fisheries conservation, to ensure fisheries refugia management effectively. The establishment of three pilot fisheries refugia sites has been progressed as of 31 December 2020 as follows:

- 1) **Blue Swimming Crab Refugia:** Marine Fisheries Management Area including Blue swimming crab Fisheries Refugia at Koh Po and Koh Tonsay Archipelago, Kep province is officially promulgated by the Minister of MAFF on 12 April 2018, which covers the total area of 11307ha including 417ha for blue swimming crab refugia site. At that time, two committees have been formulated, Provincial Management Committee is chaired by Kep Governor and Technical Working Group for the Management of Marine Fisheries Management Area is chaired by Deputy Governor of Kep province.
- 2) **Mackerel Fisheries Refugia:** Fisheries refugia for short mackerel at Peam Krasob, Koh Kong province is officially promulgated by the Minister of MAFF on 16 September 2019, which covers the total area of 1283ha. At that time, Technical Working Group for Marine Fisheries Management has been established in February 2020 and Deputy Governor of Koh Kong province is the Chairperson of the TWG.
- 3) **Grouper Fisheries Refugia:** Marine fisheries management area including grouper Fisheries Refugia at Prek Thnaot, Kampot province has not been adopted officially yet due to overlapping some parts of the fisheries refugia sites with economic development projects.

In 2021, Fisheries Administration of Cambodia continued their implementation to meet three target refugia areas: the main activities conducted are as follows:

- Solving the issues on overlapping areas between the Marine Fisheries Management Area (MFMA) including grouper fisheries refugia and the Development Company areas in the coastal off Kampot province. Throughout a series of consultation such as:

- Local community consultation held on 26 January 2021, the draft map of MFMA and the development company meet the agreement for further submission to the Kampot Administration.
 - Stakeholder consultation on verification of the draft MFMA map held on 5 May 2021.
 - Provincial-level stakeholder consultation on establishment of MFMA held on 8 September 2021
 - Provincial-level stakeholder consultation on mapping verification of MFMA held on 23 September 2021, and
 - Internal consultation with the Provincial Department of Land Management, Urbanization Construction, and Cadastral held on 27 October 2021.
- In conclusion, establishment of the refugia in Kampot needs more time to work and finalize the MFMA area including fisheries refugia for grouper with that Provincial Department of Land Management, Urbanization Construction, and Cadastral. It is expected that these revised MFMA and refugia boundary areas are finalized and adopted by the end of 2nd quarter in 2022.
 - Other activities in 2021 are to follow up the activities and achievements in Kep Province for blue swimming crab refugia and Koh Kong Province for short mackerel refugia.



Internal Meeting with Kep Governor to introduce project activities and reform Management Committee of Marine Fisheries Management Area in Kep province (6 Jan.21)



Dissemination and patrolling at Koh Po, Kep for blue swimming crab refugia during closed fishing season from 1st May to 31st July 2021.



Site Base Management Board Meeting in Kep province on 20 August 2021



Internal Consultation Meeting with Kampot Provincial Department of Land Management, Urbanization, Construction, and Cadastral to Review and Verify the Map of Marine Fisheries Management Area and Development Companies on 27 October 2021



Technical Working Group Meeting to Review Achievement Results in Marine Fisheries Management Area including Blue Swimming Crab Fisheries Refugia in Kep province on 7 December 2021.



Site-Based Management Board Meeting for Mackerel Refugia Management in Koh Kong province on 16 December 2021

2.2 INDONESIA

Since the project implementation started in Mid June 2019, identifying priority fisheries refugia sites was based on the existing data and information reviews by fishery experts from various institutions. Few data and information collection on fisheries and coastal habitats has been carried out to enrich a fisheries refugia information profile at both pilot refugia sites. Agency for Marine Fisheries Research and Human Resources (AMFRHR), a lead implementing agency, has reviewed the existing data/information and identified two priority fisheries refugia sites which located in the National Fisheries Management Area (FMA) 711, namely 1) Mitre squid (*Uroteuthis chinensis*) fisheries refugia site, located in Bangka Belitung (islands) Province, and 2) Indian white shrimp (*Fenneropenaeus indicus*) refugia site located in West Kalimantan Province. AMFRHR defined both species are a high-value commodity in Indonesia.

Based on the progress report presented at RTSC4, in 2020, AMFRHR could not well implemented the observations and surveys on site, as planned, due to the covid-19 outbreak restrictions on visits and mobility to the pilot sites. However, AMFRHR has made several efforts to overcome the obstacles from COVID-19, such as desk studies, developing a web portal, and collaborating with universities and related institutions in both sites via virtual meetings to complete data and information that is not available yet for establishing fisheries refugia. AMFRHR has also consulted with the relevant interagency, particularly the Directorate General of Marine Spatial Planning, on establishing fisheries refugia earlier in 2020. In addition, several virtual technical meetings and seminars have been conducted to build awareness and introduce the fisheries refugia concept and project plans to all relevant stakeholders. AMFRHR also indicated the proposed framework to define the refugia area that most of the activities would be focused on downstream/implementation of the scientific evidence for refugia, not only on the baseline data acquisition.

In 2021, while the impact from COVID-19 exists, AMFRHR conducted seven meetings: three national committee meetings, one expert meeting, and three consultative meetings. Fisheries refugia profile of the tiger prawn in West Kalimantan, including the perception of fisheries refugia by fishers, environmental and oceanographic characteristics, and structural population, are reviewed. A working group of researchers, experts, local government, academics/universities, and related institutions is set to support the project implementation. AMFRHR organized three national committee meetings: the National Scientific and Technical Committee meetings in March and September 2021, and the National Fisheries Refugia Committee in June 2021, in which the key inter-agencies such as Research Institute of Fish Resources Enhancement (RIFE), Center for Fisheries Research (CRF), Agency of Marine and Fisheries Research, and Human Resources (AMFRHR), and Directorate General of Marine Spatial Management (DGMSM) joined the discussion on two refugia sites. In general, the committees agreed that Fisheries refugia can be integrated

with conservation areas, for example, management of conservation areas in other zones (one of the four divisions of marine conservation area zones) determined by the central government or the marine protected areas determined by local governments. Determination of a fisheries refugia area is carried out by considering critical areas (spawning ground or nursery ground) for economic fish species as targeted fish in the area; for example, in Bangka Belitung, the focus is on squid species, and in West Kalimantan the target species is shrimp. The Management measures in each refugia area can be defined as regulate the types of fishing gear, establish a closed fishing season system, where the capture of target species is closed in certain months (will be studied further)

The initial findings show that the southern part of West Kalimantan (Kubu Raya, Kayong Utara & Ketapang district) consists of mangrove and seagrass ecosystems. Kayong Utara District area consists of a core conservation zone (15,350 ha), utilization zone (31,228 ha), sustainable fisheries zone (65,755 ha), and other zones (3,411 ha). In particular, the fishing gears used to catch shrimps are trammel net, push net, stow nets, and mini trawl. While some fishers still use destructive fishing gears in the area.

For the Mitre squid (*Uroteuthis chinensis*) fisheries refugia, the results based on survey shows several updated information and scientific findings for identification and establishment of refugia boundary areas such as type of fishing gears used, spawning and nursery grounds, spawning period, critical habitats linkage, existing legal/decreed related to management of fisheries in the area.

The following steps are Identifications of key threats to fisheries refugia sites and the management measures in both refugia sites, and map out refugia boundary areas, as well as the assessment impact of other users to the critical habitat condition particularly the tin mining activity in Tuing, Bangka Belitung. Regarding this, AMFRHR conducted two pilot sites surveys:

A) Stakeholder Consultation in West Kalimantan on 22-27 September 2022

The stakeholder consultation meeting was organized by Research Institute for Fish Resource Enhancement in Padang Tikar Village (Kubu Raya District), and Dusun Besar-Pulau Maya (Kayong Utara District), West Kalimantan on September 22- 27, 2021. The results are as follows: 1) updated information regarding fishing activities and fishing ground for banana shrimp (*Penaeus merguensis*) and white shrimp (*Penaeus indicus*) in Padang Tikar; 2) identified key threats to shrimp stock and the critical habitat linkages in Padang Tikar area; 3) identified key threats to fisheries refugia site; and 4) drafted maps of fisheries refugia boundary area in West Kalimantan.

B) Survey and interviews on squid processors in Bangka Regency on 12 November 2021

Squid is a marine fishery commodity that has an important economic value from Bangka Regency. Squids from the Bangka sea are marketed throughout Indonesia and even international markets. The squids are caught by squid jigging, lift net, and floating lift net almost throughout the year with the peak season around April – May and October- November. The abundance of squids in Bangka brings opportunities to the community and fishery industry to produce a variety of squid-based products. The results from these surveys and interviews are the utilization of squid and their eggs and the market flow squid-based products to support the decision on establishment of the squid refugia in Bangka Regency.

In December 2021, AMFRHR drafted the fisheries refugia management plan for penaeid shrimps in West Kalimantan based on the results of stakeholder consultations, the key points are as follows:

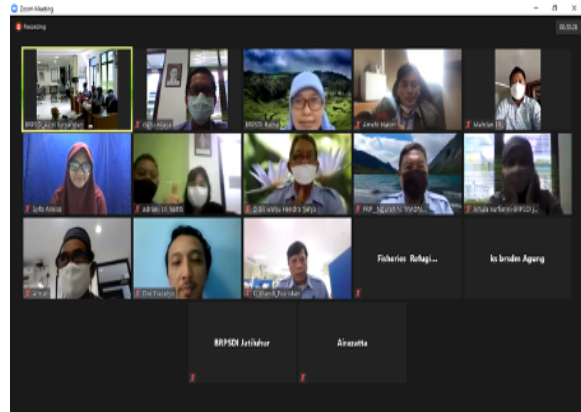
- Mangrove areas in Padang Tikar and Dusun Besar were the nursery habitat for many species of shrimp, especially banana shrimp
- The spawning area of banana shrimp was about 15-20 miles from the coastal line at the 20-30 m depth.
- There are conservation areas that has been designated by the Ministry of Marine Affairs and Fisheries around the Kubu raya and Kayong utara which are close to the proposed fisheries refugia area.
- The fisheries refugia approach will strengthen and complete the fisheries management measures in West Kalimantan
- Gear restriction is focused to “**stow net**” which are spread along the Padang Tikar coastal area.

The draft management plan will be further discussion with the Directorate General of Marine Spatial Planning and the local government in 2022 before finalization of fisheries refugia boundary area for penaeid shrimps in West Kalimantan.

Other activities in 2021 is the development of refugia web portal for Indonesia. AMFRHR created a fisheries refugia website via the URL: (<http://fisheries-refugia-indonesia.org>).



2nd National Scientific and Technical Committee Meeting
(17 March 21)



National Fisheries Refugia Committee Meeting
(17 June 21)



3rd National Scientific and Technical Committee Meeting
(10 September 21)



Fisheries Refugia Websites via the URL: <http://fisheries-refugia-indonesia.org>



Consultation meeting with the marine and fisheries agency of West Kalimantan Province (22 Sep.21)



Stakeholder consultation in Padang Tikar Village, Kubu Raya District (24 Sep. 21)



Suveys on the squid utilizations and processors in Sungai Liat District, Bangka Regency in November 2021



2nd Meeting of fisheries refugia management plan drafting for penaeid shrimp in West Kalimantan (16 December 21)

2.3 MALAYSIA

Department of Fisheries Malaysia (DOF/MY) has initiated the project implementation since June 2017. Throughout several stakeholder consultations, capacity building to local community, baseline surveys including socio-economic surveys at two pilot project sites, two priority fisheries *refugia* sites were selected: 1) Spiny lobsters *refugia* site locates at Tanjung Leman, Johor State, and 2) Tiger prawn *refugia* site locates in MIRI, Sarawak State. During 2018-2019, DOF/MY conducted several research surveys on board research vessels and commercial fishing boats in the coastal and offshore areas to identify the spiny lobster and the tiger prawn life cycle and the boundary area of refugia for both targeted species.

In 2020, DOF/MY finalized the survey results based on studying the distribution, density, and biomass of tiger prawns in Pasu, Bakam, and Lutong Rivers in Miri, Sarawak, indicated essential nursery grounds that need to be preserved to ensure the life cycle of *P. monodon* withstands. In addition, DOF/MY also concluded the migration pattern of spiny lobster in the coastal area of Tanjung Leman, Johor State, and revealed the potential refugia boundary area of spiny lobster based on the spawning grounds that need to be protected. DOF/MY has planned to conduct the stakeholder consultation to discuss with fisheries community on the proposed refugia boundary during the last Quarter of 2020, unfortunately, the COVID-19 pandemic seriously affected the work plan; DOF/MY postponed the site activities, while only two national committee meetings such as National Scientific and Technical Committee and National Fisheries Refugia Committee were made in the 2nd half of 2020.

In 2021, the existing of Covid19 pandemic caused the delay of DOF/MY to complete stakeholder consultation for establishment of fisheries refugia in both pilot sites. However, DOF/MY could conduct three meetings:

1) Discussion session on way forward:

The session aimed to update the scientific findings based on the stock assessment, biological studies, oceanographic survey, and socio-economic studies. DOF/MY reviewed the impact of the establishment of fisheries refugia on fishers socio-economic based on the recent year study. For spiny lobster refugia site, most artisanal fishers agreed and supported the establishment of spiny lobster refugia in the waters of south Pahang to east Johor. However, the meeting suggested to conduct other socio-economic study and perspective on the proposed refugia establishment by involving respondents from both trawler and commercial fishers. In addition, University Malaysia Terengganu will share the landing catch data to DOF/MY researchers for finalizing the spawning season of spiny lobster in the area. For tiger-prawn, 92% of respondents agreed with the Refugia establishment, while DOF/MY identified spawning ground of tiger prawns during a period between August and October in Kuala Baram.

2) Seminar on the establishment of fisheries refugia for lobster in Tanjung Leman, Johor and tiger prawn in Kuala Baram, Sarawak.

The seminar aimed discussion among the inter-agencies to: 1) update the scientific findings and proposed refugia's area selection; 2) Information sharing platform between the expertise from Centre of

excellence and the Department of Fisheries; 3) Integrating research data to determine the refugia boundary areas for both target species; 4) identification of the critical species life stage that needs to be managed and protected; 5) Evaluate and identify appropriate management measures based on the findings; and 6) Discuss and formulate further actions towards the management of refugia areas identified.

3) Stakeholders' engagement on the proposal of establishing a tiger prawn refugia in Kuala Baram, Miri, Sarawak:

Based on the scientific findings and identification of fisheries refugia for tiger-prawn, DOF/MY proposes the refugia area in Kuala Balam, Miri to be gazette as a Protected Area to conserve and sustainably manage the tiger prawn (*Penaeus monodon*). The proposed refugia site has an area of 852km², whereas most of stakeholders particularly traditional fishermen from Zone A and Zone B, as well commercial fishermen from Zone C7 stakeholders agreed that establishment of fisheries refugia has a significant potential for an agrotourism in Miri. To support the proposed establishment DOF/MY organized this stakeholder consultation to further discuss and seek cooperation from other stakeholder engagements such as Miri port authority, Miri Resident Office, and Miri Town Council, Sarawak Fishing Vessel Association (SFVA), Department of Marine Fisheries Sarawak, Sarawak Forestry Corporation (SFC), Miri Fishermen Association, Department of Irrigation and Drainage Branch Miri, and Sarawak River Board. The meeting agreed the establishment of fisheries refugia for tiger prawn and set a closed season period from August to October. Management measures will be applied to all trawlers at Zone C7, including additional clause in the Vessel License and Fishing Equipment for fishermen's Zone C7. DOF/MY also encourages the fishermen to comply with this regulation voluntarily for 2021-2022. In the year 2023, the DOF/MY will fully enforce these regulations.

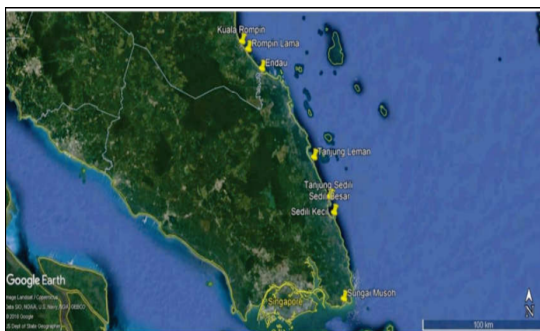
DOF/MY assumes that the establishment of refugia is the best for conservation of tiger prawn at Kuala Baram waters off Miri, Sarawak and spiny lobster from from the South of Pahang to East of Johor. Nevertheless, the impact on the stakeholders should be monitored periodically while mitigation measures are in place. This is the essence of adaptive management, whereby the results of this socio-economic information can reinforce the decisions made by top management. On-going monitoring of the economics of fisheries as these refugia are fully implemented is to look at the development and its impact on fishers, resources, and the environment.



The Crew of KK Senangin II, the research team and the RTM documentary filming team involved in the survey of spiny lobster resources in the waters off Tioman Island.



Lobster caught at the Pulau Sibu to Desaru waters on the fourth trip on board Commercial Fishing Vessel JHF5222T.



The spiny lobster study locations from the South of Pahang to East of Johor



The latest nursery river for *P. monodon*, Sg. Bakam



Stakeholders' Engagement on the Proposal of Establishing a Tiger Prawn Refugia In Kuala Baram, Miri, Sarawak (21 October 2021)



Mr. Bohari Leng, Director of Sarawak Marine Fisheries Department chaired the discussion

2.4 PHILIPPINES

National Fisheries Research and Development Institute (NFRDI) in collaboration with the Bureau of Fisheries and Aquatic Resources (BFAR) are lead agencies implementing the national refugia project since January 2017. Three priority fisheries *refugia* sites were selected: 1) **Bolinao refugia** site located off Bolinao coastal area in Pangasinan Province; 2) **Masinloc refugia** site located off the Masinloc coastal area in Zambales Province; and 3) **Coron refugia** site located off Coron Islands, Palawan Province. Since the project started till the end of 2020, NFRDI conducted 49 activities covering the inception meetings, capacity building trainings, baseline surveys, quarterly data collections at the landing sites, ichthyoplankton surveys and stakeholder consultations/workshops. Identification of fisheries refugia boundaries at each pilot sites are on going works. In 2020, references to the information drive from baseline surveys conducted by NFRDI in three refugia sites, the results were presented at the stakeholder consultations where about 413 persons attended. Most of the participants appreciated the discussion on the commonly essential species in their area. Some participants even voiced out their concerns about the existing Marine Protected Areas (MPAs) in the municipality. At sea mapping for boundary delineation of the proposed three refugia sites were conducted by the NFRDI researcher team. Moreover, the knowledge on refugia concept that stakeholders gained, allowed them to comprehend the importance of protecting the spawning and nursery refugia of their priority species. As part of the project's critical activities, the project can allow the fisherfolk to allocate at least some time for information dissemination in the project sites to empower and share the significance of fisheries management in the economic opportunity and habitat protection of the municipality.

In 2021, the activities mainly validated the refugia boundaries, drafted a refugia management plan based on identifying critical threats to refugia and habitat linkages, and assessed the environment and social impacts of refugia designation at 3 locations. In addition, NFRDI reviews fishery policy and legal aspects and consults with national experts to formulate agreed recommendations for policy and legal reforms to support the establishment and operations of fisheries refugia. NFRDI conducted two meetings of refugia site management committee:

A) Refugia Site Management Committee Meeting in Candelaria, Zambales:

The meeting, chaired by Municipal Mayor Hon. Mayor Arsenia J. Lim, aimed at updating the stakeholders of the project progress and forthcoming activities as well as validate the fisheries profile, boundary delineation, vision, goals and threats of the refugia site which will be part of the fisheries refugia management plan for three targeted species, namely *Auxis thazard* (Tulingan), *Pterocaesio tessellata* (Terong), and *Sardinella fimbriata* (Bilis).

B) Refugia Site Management Committee Meeting in Bolinao, Pangasinan:

The meeting, chaired by Vice Mayor Hon. Richard Celeste, also aimed at updating the stakeholders of the project progress and forthcoming activities as well as validate the fisheries profile, boundary

delineation, vision, goals and threats of the refugia site which will be part of the fisheries refugia management plan for Siganids species (Barangen Pusa).

NFRDI indicated that the formulation of management plans for all refugia sites are referred to the Fisheries refugia concept, which aligns with the Ecosystem Approach to Fisheries Management pillars and will also take off from the existing Local Government Unit (LGU) documents such as the Comprehensive Land Use Plan, etc. In order to finalize the management plan, the focal point and expert team are formed. In addition, the refugia management team, including law enforcement, public education, and livelihood, would be created too.

Will be updated	
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2.5 THAILAND

Department of Fisheries Thailand (DOF/TH), as a national lead agency, started the project since March 2017. DOF/TH conducted a series of consultation meetings including capacity building training/workshop and baseline surveys in collaboration with multi interagency, academy, and civil society organization (CSO). A total of 30 events were made as of 31 December 2020. There are two priority fisheries *refugia* sites as follows: 1) Indo-pacific mackerel refugia site locates in Trat Province, and 2) Blue swimming crab *refugia* site locates off Ban Don, Surat Thani Province. In 2020, the Stakeholder Consultation Workshop for short mackerel refugia was conducted in July to discuss a critical period, prohibited fishing gear types, and proposed refugia boundary area for short mackerel. The workshops were spit into five events covering 5 Districts at community levels, namely Muang District, Koh Chang District, Laem Ngop District, Khlong Yai District, Koh Kut District. About 400 stakeholders, including fishers, local officers, and observers, attended the workshop. The fisheries refugia boundary and management plan for short mackerel refugia in Trat was concluded and supported from the majority vote by stakeholder engagements. DOF/TH also conducted the Site-based Management Board in Surat Thani Refugia site in December to update and discuss on technical information of coastal resources and ecosystems including Boundary Delineation and Management Planning of Fisheries Refugia for Blue Swimming Crab in Koh Sed Ban Don Bay, Surat Thani Province. Taking into accounts the process in establishing fisheries refugia, the provincial-agreed fisheries refugia boundary area and management measures requires adoption by the Fisheries Resource Conservation Measure Determination Committee of the DOF/TH before further consideration and approval by the Ministry of Agriculture and Cooperatives. The notification on the fisheries refugia management measures can be issued for implementation. The boundary of fisheries refugia for Blue swimming crab and management plans in Surat Thani Province were agreed and supported by the 7th Meeting of the National Fisheries Refugia Committee (NFRC7) led by Director-General of DOF/TH held on 30 November 2020.

In 2021, DOF/TH continues their efforts on establishing the refugia in both priority sites. One stakeholder consultation meeting and four national committee meetings were organized as follows:

A. Stakeholder Consultation Workshop at Surat Thani Province

The workshop was co-organized with Chumphon Fisheries Research and Development Center (CFRDC) and Surat Thani Fisheries Provincial Office during 9-15 March 2021. The objectives are to enhance the local engagement in fisheries refugia boundary delineation and management plans and measures for blue swimming crab refugia in Surat Thani. The workshops covered 7 coastal districts of the Surat Thani Provinces. A total number of 497 participants in 7 districts are from fishers in the area, local district officers, other stakeholders such as small-scale fishing group, local NGOs, CSOs, private sectors from processing plants, seafood restaurant, and fish vender. The results and recommendations from workshops will be included in the policy guidance for further consideration by the Provincial Fisheries Committee prior to submission to the responsible committee in the Department of Fisheries.

B. 8th Meeting of the National Fisheries Refugia Committee (NFRC8)

NFRC8 was updated on the progress workshop in March, proposed revision of the Notifications related to the members of following Fisheries Refugia Committee:

- Thailand's National Fisheries Refugia Committee,
- Thailand's National Scientific and Technical Committee,
- Site-based Fisheries Refugia Management Board in Trat Province, and
- Site-based Fisheries Refugia Management Board in Surat Thani Province

In addition, the management planning including measures of Fisheries Refugia for Short Mackerel in Trat was revisited and suggested to further discuss at the next NSTC5 Meeting.

C. 5th Meeting of the National Scientific and Technical Committee (NSTC5)

Main issues of NSTC5 are discussion of the management measures particularly prohibition and regulation of fishing gears in the short mackerel refugia was revisited even though the results from the stakeholders in 5 coastal districts of Trat Province has agreed on the refugia boundary area of 1,546 km² with the management plan of the prohibition of purse seiners, trawlers, and mackerel gill netters fishing in the critical period at January – February. However, some recommendation on the reconsideration of the prohibition of gill netters was raised, due to small number of short mackerel were catch by fishers in the area. In addition, the committee also consider the project indicator required 50% reduction of fishing pressure in the refugia area. Unfortunately, some commercial fisheries such as purse seine, trawl, and gill net fisheries were not ready in the discussion, the responsible research center will compile and propose to the next NSTC6.

D. 6th Meeting of the National Scientific and Technical Committee (NSTC6)

NSTC6 continued discussion on the management measures for short mackerel fisheries refugia based on the catch data providing by the Rayong Marine Fisheries Research and Development Center. The meeting considered the total catch landing and composition of fishing gears operated in the proposed refugia area. The meeting revealed that among three types of gear, purse seine and bottom trawl are commercial fisheries, while gill-netters from small-scale fisheries. The statistical data shows small percentage of short mackerel in the catch composition of mackerel gill netters, 7.32% in 2020 and 1.24% in 2021. In addition, there are small number of mackerel gill netters in the area – about 32-35 boats out of 1,596 and 1,639 small-scale fishing boats in the year 2019 and 2020, respectively. In conclusion, taking into accounts the prohibition of fishing gill netters would affect the economic condition of small-scale fishers, particularly at the situation of COVID 19 pandemic. The meeting, therefore, concluded that management measures will focus on prohibition of purse seiners and trawlers during a period of January – February in Trat fisheries refugia site. The proposed Fisheries refugia for short mackerel in Trat together with its management measures and supporting data will be submitted to the Aquatic Resources Conservation Committee of the Department of Fisheries for further consideration and approval.

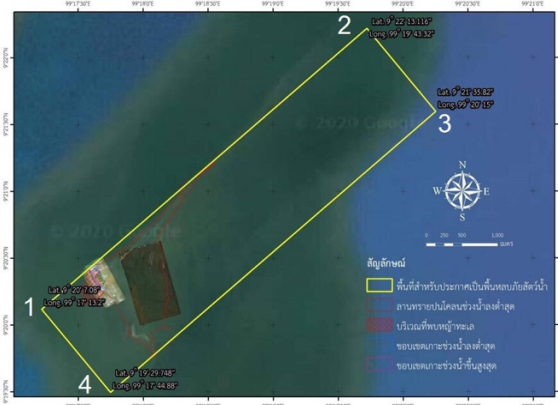
E. 3rd Meeting of the Site-based Management Board (SMB3) in Surat Thani site

The SMB3, held on 21 December 2021, was chaired by the Mr. Itthiphon Kwathai, Director of Surat Thani Fisheries Provincial Office. The meeting considered and acknowledged the detailed Notification of Surat Thani Provincial Fisheries Committee Re: Prescribing Fishing Gears Prohibited from Fishing in Coastal Seas around Koh Sed, Phum Rieng Subdistrict, Chaiya District, Surat Thani Province. Accordingly, the meeting amended the final notification for further approval by the Minister of Agriculture and Cooperative. The meeting also agreed the proposed members of Fisheries Refugia Operational Management Board in Surat Thani Site and its terms of reference (TOR). In addition, installation of marking buoys for Fisheries Refugia Boundary at Surat Thani Site are agreed and planned for 2022 activities.

Other achievements in 2021 are the exposing of national web portal for fisheries refugia in Thailand. via an URL of <https://inter.fisheries.go.th/fishrefugia> as well as the law and regulation reformed including revised fisheries management plans which embracing the progress in legislation on best practice Fisheries Refugia in two pilot sites.



Stakeholder Workshops to finalize the proposed fisheries refugia boundary and management plans for Blue swimming crab in Surat Thani Province (from 9-15 March 2021)



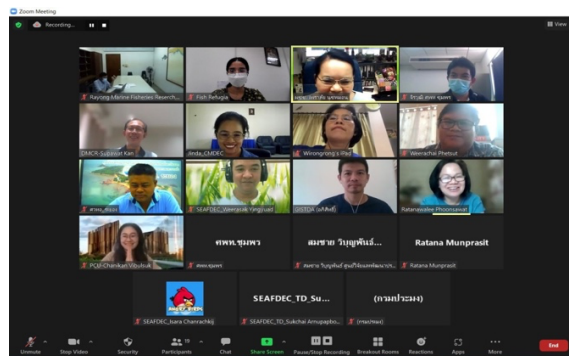
Geographic location of tentative fisheries refugia boundary around Koh Sed of Surat Thani Site based on stakeholder consultation in March 2021



NFRC8, Virtual Meeting held on 19 April 2021



NSTC5, Virtual Meeting held on 6 July 2021



NSTC6, Virtual Meeting held on 11 August 2021

2.6 VIET NAM

Unfortunately, there is no detailed information and reports on activities in the past. Unless the National Focal Point, Mr. Nguyen Thann Binh stated at the 5th Project Steering Committee meeting that Directorate of Fisheries (D-Fish) of Viet Nam had recognized the concept of fisheries refugia by the project implementation since 2017. Therefore, Viet Nam has already prepared provisions of the new Fisheries Law on the fisheries resource protection area which is equivalent to fisheries refugia. Since then, a number of fisheries resource protection areas have been established and managed in some provinces under the Fisheries Law and related regulations. Therefore, this project is an important basis for developing and revising regulations focusing on establishing and managing the fisheries resources protection areas, the same as the Fisheries Refugia site. There are 22 sites for the protected areas in the central province of Thua Thien Hue in Viet Nam. The three of those sites developed by this project shall be included in the fisheries master plan until 2030, which will be approved by the Prime Minister. Therefore, the sites will be official established and managed by the government. For further information about this master plan, there will be more sites to be included because of the adoption of the fisheries refugia concept from the project. D-FISH has communicated with the provincial fisheries administration, local government, and fishing communities to get involved in the determining of target species, fisheries resources and the boundaries of the areas. For the management, the provincial government is in charge in accordance with the law in-force.

III. REGIONAL PROGRAM

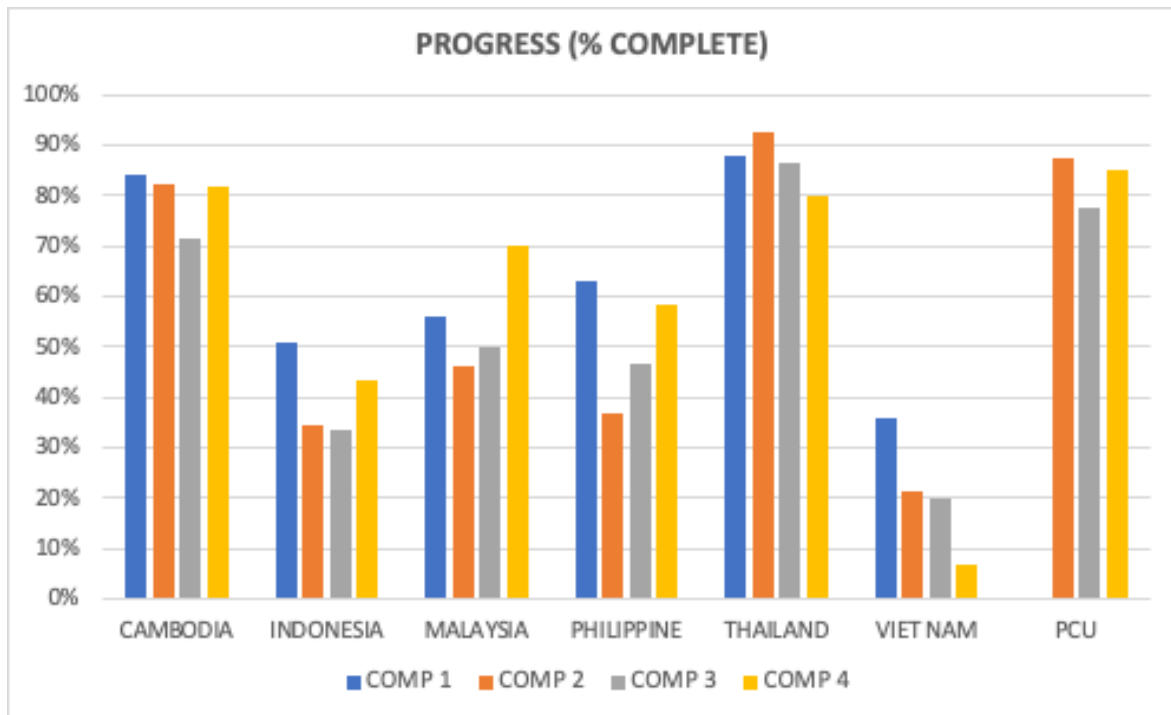
In 2021, the PCU continuously monitored and updated all planned outputs from country partners for further submission to the UNEP and SEAFDEC and publicized the achievements and activities done on the Refugia Websites. To update the partner achievements and discuss the project policy management, PCU conducted three regional meetings as follows:

- i. The 4th meeting of the Regional Scientific and Technical Committee (RTSC4), a virtual meeting held on 22 July 2021. the RTSC4 acknowledged the updated status of the project implementation from the country partners. The report is uploaded to the website.
- ii. The 5th Meeting of the Project Steering Committee (PSC5), a virtual meeting held on 3 September 2021. PSC5 endorsed the Term of Reference on Mid-Term Review to hire an external consultant by the end of 2021. The PSC5 also approved the expenditure reports and co-financing as of 30 June 2021. In addition, the PCU updated the PSC5 on the Project Extension Loa/Mou Between Seafdec and participating countries, ASEAN endorsement/support to the Regional Action Plan for Management of Transboundary Species, Indo-Pacific Mackerel (*Rastrelliger Brachysoma*) in the Gulf of Thailand Sub-Region, and status of the 2020 financial audit report.
- iii. The 6th Ad-hoc Meeting of the Project Steering Committee, a virtual meeting held on 30 November 2021 to discuss the 3rd Budget Revision as of 30 September 2021 and Cost Plans for 2022. The PSC6 Ad-hoc finally endorsed the proposed budget revision by each country partner and PCU. In addition, the meeting noted the proposed reduction of the allocated budget by Viet Nam and suggested a further discussion on the unspent budget from Viet Nam at the next RSTC6 and PSC7 in 2022 to ensure that the funding is utilized beneficially to the project target goal.

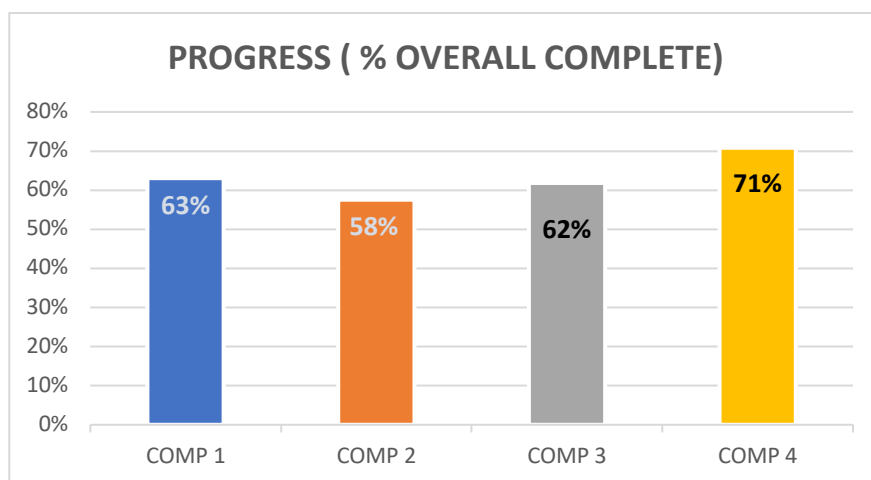
The PCU completed the final draft of Regional Guidelines on Indicators for Sustainable Management of Fisheries Refugia. Following the concept of sustainable development that has emerged as a key guiding principle and action agenda for all forms of environmental management, economic development, and social justice at international, regional, national, sub-national, and local levels; the structural frameworks together with criteria and indicators to enhance the effective management of fisheries refugia are defined by the 6 participating countries. The document will be addressed at the forthcoming RTSC5 and adopted by the PSC7 in 2022.

IV. PROGRESS (% COMPLETE) AS OF 31 DECEMBER 2021

Based on the quarterly reports from country partners as of 31 December 2021, the PCU calculates the progress in percentage of completion as shown in the below Figure A. The percent completion based on 4 project components are 63%, 58%, 62%, and 71%, respectively. The overall project completion is 63% as of 31 December 2021, in other words since the project started in 2016 till 31 December 2021, we completed only 63%, as shown in Figure B. The question is do we complete another 37% by 2022 as planned.



A) Progress in % completion by components in 6 country partners and PCU as of 31 Dec. 2021



B) Progress in % overall completion by Components

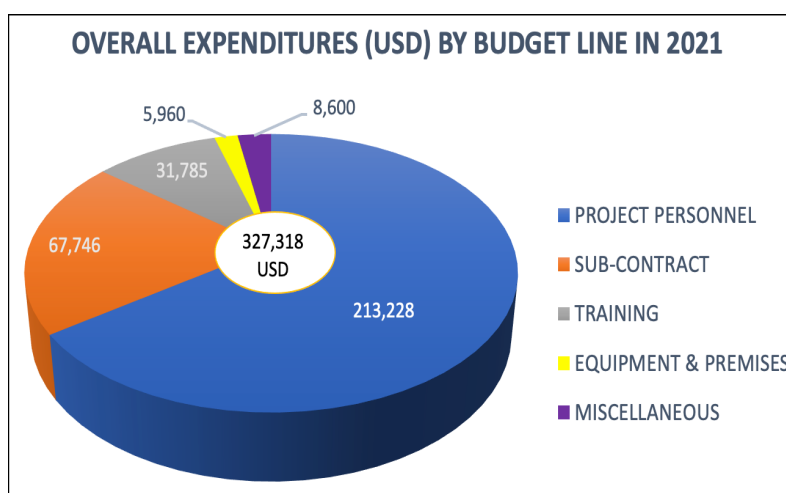
V. BUDGET AND EXPENDITURES BY PARTNERS AS OF 31 DEC 2021

Table 1. shows a total of expenditures since project started in 2016 till the present (as of 31 December 2021). In 2021, the expenditure incurred by all partner excluded Viet Nam is **US\$ 327,318.39**. The cumulative expenditures as of 31 December 2021 is US\$1,928,139. The balance for 2022 is US\$1,071,861. Figure C shows the overall expenditures in 2021, by five budget line: about 65%

of the expenditures represents by project personnel cost following by 20% and 9% of sub-contract and training costs, respectively.

Table 1: a total of expenditures since project started in 2016 till 31 Dec. 2021

Code	Description	Budget Revision as at 30 JUN 2020	ALL Expenditures by Partners (6 Countries + PCU)							Cumulative Expenditures as of 31 DEC 2021	Balance as at 31 DEC 2021
			2016	2017	2018	2019	2020	2021	###		
10	PROJECT PERSONNEL COMPONENT	(A)	Audit	Audit	Audit	Audit	Audit	Not yet Audit		(B)	(A-B)
1100	Project Personnel w/m	238,997.23	-	7,267.90	27,792.12	38,318.28	51,043.00	46,928.96	-	171,350.26	67,646.97
1200	Consultants w/m	1,315,005.25	62,328.00	168,348.35	154,697.63	179,306.64	208,146.00	159,505.53	-	932,332.15	382,673.10
1600	Travel on official business (above staff)	273,779.05	8,305.95	51,774.09	48,854.59	97,394.50	23,579.00	6,793.13	-	236,701.26	37,077.79
1999	Component Total	1,827,781.53	70,633.95	227,390.34	231,344.34	315,019.42	282,768.00	213,227.62	-	1,340,383.67	487,397.86
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)	274,063.49	5,730.00	9,818.59	-	14,440.38	51,710.00	54,454.26	-	136,153.23	137,910.26
2300	Sub-contracts (commercial purposes)	81,129.28	21.96	-	11,188.20	10,073.11	15,799.00	13,291.86	-	50,374.13	30,755.15
2999	Component Total	355,192.77	5,751.96	9,818.59	11,188.20	24,513.49	67,509.00	67,746.12	-	186,527.36	168,665.41
30	TRAINING COMPONENT										
3200	Group training (study tours, field trips, workshops, seminars, etc)	293,417.77	-	12,194.20	28,705.17	66,002.95	41,600.00	10,529.89	-	159,032.21	134,385.56
3300	Meetings/conferences (give title)	316,330.18	19,285.60	104.00	28,208.12	63,138.63	29,469.00	21,254.91	-	161,460.26	154,869.92
3999	Component Total	609,747.95	19,285.60	12,298.20	56,913.29	129,141.58	71,069.00	31,784.80	-	320,492.47	289,255.48
40	EQUIPMENT & PREMISES COMPONENT										
4100	Expendable equipment (items under \$1,500 each, for example)	5,336.12	-	257.89	489.38	1,793.77	194.00	891.67	-	3,626.71	1,709.41
4200	Non-expendable equipment (computers, office equip, etc)	43,760.99	9,226.12	11,604.14	3,822.73	3,388.04	10,405.00	5,068.60	-	43,514.63	246.36
4300	Premises (office rent, maintenance of premises, etc)	18,585.28	-	-	5,376.00	7,496.00	894.00	-	-	13,766.00	4,819.28
4999	Component Total	67,682.39	9,226.12	11,862.03	9,688.11	12,677.81	11,493.00	5,960.27	-	60,907.34	6,775.05
50	MISCELLANEOUS COMPONENT										
5100	Operation and maintenance of equip.	876.60	-	-	-	161.60	-	631.72	-	793.32	83.28
5200	Reporting costs (publications, maps, newsletters, printing, etc)	30,489.29	-	117.00	-	521.86	3,581.00	2,907.77	-	7,127.63	23,361.66
5300	Sundry (communications, postage, freight, clearance charges, etc)	8,229.49	-	758.23	1,308.42	2,830.69	1,950.00	1,460.09	-	8,307.43	77.94
5400	Hospitality and entertainment	-	-	-	-	-	-	-	-	-	-
5500	Evaluation (consultants fees ETC)	100,000.00	-	-	-	-	-	3,600.00	-	3,600.00	96,400.00
5999	Component Total	139,595.38	-	875.23	1,308.42	3,514.15	5,531.00	8,599.58	-	19,828.38	119,767.00
99 9999	GRAND TOTAL	3,000,000.00	104,897.63	262,244.39	310,442.36	484,866.45	438,370.00	327,318.39	-	1,928,139.22	1,071,860.79



C) Overall expenditures by budget line in 2021

VI. CO-FINANCING FROM PARTNERS AS OF 31 DEC 2021

The Co-financing by executed country partners and SEAFDEC as of 31 December 2021 is summarized as shown in Table 2. The overall co-financing from 6 country partner as of 31 December 2021 is about 8.98 million USD consisted of 7.35 million USD In-kind and 1.63 million USD cash co-financing. The Co-financing from SEAFDEC as of 31 December 2021 is about 10.86 million USD consisted of 6.74 million USD In-kind and 4.12 million USD cash co-financing.

