Southeast Asian Fisheries Development Center

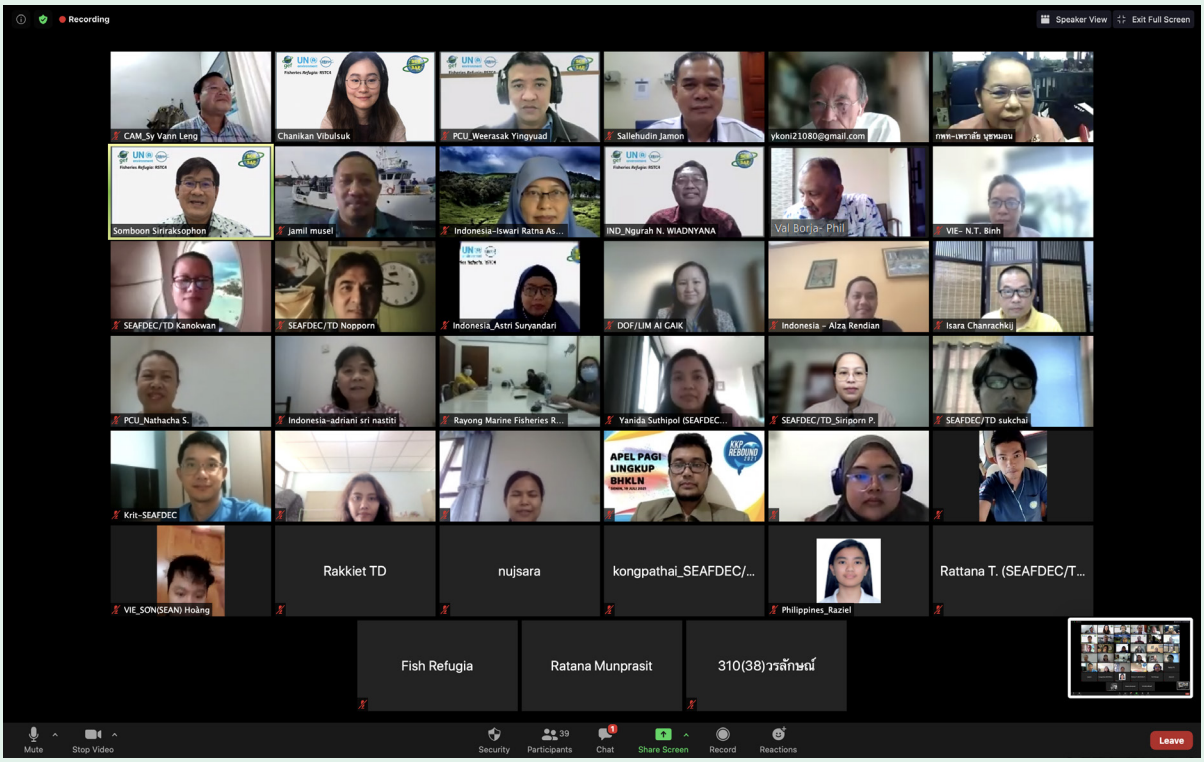
United Nations Environment

Global Environment Facility

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

REPORT
THE FORTH MEETING OF
THE REGIONAL SCIENTIFIC AND TECHNICAL COMMITTEE

VIRTUAL MEETING
22ND JULY 2021



SEAFDEC/UNEP/GEF
Fisheries *Refugia*

AUGUST 2021

Cover Graphic:
Somboon Siriraksophon

Copies of the report can be downloaded from:

Southeast Asian Fisheries Development Center

United Nations Environment

Global Environment Facility

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

REPORT

THE 4TH MEETING OF THE

REGIONAL SCIENTIFIC AND TECHNICAL COMMITTEE

VIRTUAL MEETING

22nd JULY 2021

SEAFDEC/UNEP/GEF
Fisheries *Refugia*
JULY 2021

First published in Phrasamutchedi, Samut Prakan, Kingdom of Thailand in August 2021 by the SEAFDEC/UNEP/GEF Fisheries Refugia Project, Training Department of the Southeast Asian Fisheries Development Center

SEAFDEC/UNEP/GEF
Project Co-ordinating Unit
Training Department
Southeast Asian Fisheries Development Center
Postal Address: P.O. Box 97, Phrasamutchedi, Samut Prakan, Kingdom of Thailand
Tel: (66) 2 425 6100
Fax: (66) 2 425 6110
https://fisheries-refugia.org

DISCLAIMER:

The contents of this report do not necessarily reflect the views and policies of the Southeast Asian Fisheries Development Center, the United Nations Environment Programme, and the Global Environment Facility.

For citation purposes, this document may be cited as:

SEAFDEC, 2021. Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand, Report of the 4th Meeting of the Regional Scientific and Technical Committee. Southeast Asian Fisheries Development Center, Training Department, Samutprakarn, Thailand. 136 p.

TABLE OF CONTENTS

ADOPTED REPORT

I. OPENING OF THE MEETING

1.1 WELCOME AND OPENING ADDRESS

1) Mr. Somboon Siriraksophon, the Project Director, welcomed all scientific and technical committee from participating countries and all participants to the 4th Regional Scientific and Technical Committee Meeting. He mentioned that the meeting had a gender balance as there were 55 percent male and 45 percent female from a total of 46 participants. Recalling the 3rd Regional Scientific and Technical Committee Meeting on 5th-7th February 2020 in Viet Nam, it has been almost one and a half year already. He compared it to nowadays as the meeting environment has changed due to the Covid19 situation. He believed the meeting would be successful due to the active participation, as well as, there would be a good lesson to learn from the countries' presentations.

2) Mrs. Praulai Nootmorn, Scientific and Technical Focal Point for Thailand and the previous chairperson for Recalling the 3rd Regional Scientific and Technical Committee Meeting, wished all the members are fine and healthy and be far away from Covid19. She hoped that the work can still go on even though we are facing the Covid19 pandemic.

1.2 INTRODUCTION OF MEMBERS

3) Representatives from each participating country and PCU were requested to introduce the members of their team to the meeting. The list of participants is attached as **Annex 1** to this report.

II. ELECTION OF CHAIRPERSON

4) The election of the chairperson to the RSTC4 has been done one week before the meeting started through the online survey. Mrs. Praulai Nootmorn announced the election result, which Mr. Ngurah N. Wiadnyana is the chairperson for the 4th Regional Scientific and Technical Committee Meeting.

5) After the announcement, the PCU requested all participants for the group photo session

III. ADOPTION OF THE MEETING AGENDA

6) Mr. Ngurah N. Wiadnyana, as a new chairperson, requested the members to review the provisional agenda for feedback. Everyone agreed with the provisional agenda. Hence, the agenda was adopted and attached as **Annex 2** to this report.

IV. REPORT OF THE PROJECT DIRECTOR ON PROGRESS WORKS

7) The Chairperson invited Mr. Somboon Siriraksophon, the Project Director, to present the report of the progress from 1 Jan 2020 to 30 June 2021. The report shows that there was a total of 70 activities conducted by six participating countries. Cambodia adopted two Fisheries Refugia sites. Other five refugia: one in Cambodia, two in Malaysia, and two in Thailand, are under adoption processes.

8) As many countries are already revising fisheries regulation, he would like to highlight that Cambodia adopted the 5-year Action Plan for Marine Fisheries Management Area, including management measures in KEP Province. Also, Cambodia adopted the Strategic Plan for Fisheries Conservation and Management from 2020 to 2029, as well as, Cambodia revised Fisheries Law by including Fisheries Refugia. Moreover, Thailand reformed the law, regulation, management of Fisheries Refugia, and create the Fisheries Refugia Web Portal in Thailand, while Malaysia started to evaluate and identify management measures based on scientific findings.

9) For stakeholder consultations, many countries worked well in this activity. Thus, he would only highlight some activities. Firstly, Cambodia conducted four (4) consultations and three (3) field surveys to finalize

the Marine Fisheries Management Area map of the Juvenile Grouper Refugia in Kampot province. Secondly, the Philippines conducted Stakeholder consultations in three priority Refugia sites which specifically aimed to inform and educate the coastal communities on the establishment of the fisheries refugia in each municipality; a total of 413 persons attended. Thirdly, there was a consultation meeting for establishing fisheries Refugia of Penaeid shrimp in West Kalimantan, Indonesia. Lastly, Thailand conducted two (2) stakeholder consultations to finalize the fisheries refugia boundary areas in Trat for short mackerel and Surat-thani for blue swimming crab.

10) Another essential target output is a Fisheries Refugia Profile. Currently, there are 6 Fisheries Refugia Profiles, namely

- ❖ Fisheries Refugia Profile for Short Mackerel in Trat, Thailand
- ❖ Fisheries Refugia Profile Short Mackerel in Koh Kong, Cambodia
- ❖ Fisheries Refugia Profile for Blue Swimming Crab in Surat Thani, Thailand
- ❖ Fisheries Refugia Profile for Blue Swimming Crab in Kep, Cambodia
- ❖ Fisheries Refugia Profile for Grouper in Kampot, Cambodia
- ❖ Profiles for the Philippines (draft): including three priority sites

11) For Regional Programs, there were three (3) main activities held from January 2020 to June 2021. For example, the 3rd Regional Scientific and Technical Committee Meeting (RSTC3) on 5th-7th February 2020 in Hai Phong, Viet Nam, the 3rd Project Steering Committee Ad-hoc Meeting (PSC3-Adhoc) on 16th June 2020 to adopt the proposed project extension for two (2) years, the 4th Project Steering Committee Ad-hoc Meeting on 6th October 2020 to adopt the budget revision and the cost Workplan for 2021-2022, Information and Knowledge dissemination, and updating Refugia Website.

12) Also, he presented the progress of each activity in percentage to show the overall activities. For cumulative expenditures to date, he noted that there were about 1.35 million USD for cumulative unspent balance as of 30 June 2021. Lastly, he presented the co-financing from executed partners as of 30 June 2021, which was around 10.1 million USD. However, there was a commitment with GEF, which was about 12.45 million USD. Thus, he thought that the goal is likely to be achieved as there are still 1.5 years left for the project. The working paper and presentation document is attached as **Annex 3a and 3b** of this report

13) The chairperson opened the floor for questions and comments

14) There was a question from Indonesia as Mr. Ngurah N. Wiadnyana would like to have a clarification on co-finance. Mr. Somboon Siriraksophon clarified that the co-finance is related to national activities ally with conservation and management of specific target species. This means that every activity related to/supporting the Fisheries Refugia project can be counted in co-finance, either in-kind or cash.

15) Mrs. Praulai Nootmorn requested Mr. Somboon Siriraksophon to provide the presentation files, and he agreed to do so.

16) All Committees supported the report. Hence, the project director report was adopted.

V. NATIONAL REPORT AS OF 30 JUN 2020, INCLUDING ISSUES, CHALLENGES, AND STRATEGIC PLAN TOWARDS ACHIEVING THE PROJECT TARGET GOALS BY 2022

5.1 CAMBODIA

17) Mr. Leng Sy Vann, the RSTC member for Cambodia, shared the national report at the meeting. So far, Cambodia adopted two (2) Fisheries Refugia areas, consisting of Blue Swimming Crab Fisheries *Refugia* at Koh Po, Kep province on 12 April 2018, and Mackerel *Refugia* at Peam Krosob, Koh Kong province on 16 September 2019. However, Grouper Fisheries *Refugia* site at Trapaing Ropaov, Kampot province is still in progress, and Cambodia plans to adopt it in December 2021. In terms of marine habitat linkage,

there are coral reefs, seagrass, and mangrove in three (3) sites. In Kep province, coral reef covers 52 ha, seagrass covers 2,790 ha, and mangroves covers 1,005 ha. In Koh Kong province, coral reef covers 602 ha, seagrass covers 3,993 ha, and mangroves covers 62,000 ha. In Kampot province, coral reef covers 953 ha, seagrass covers 25,000 ha, and mangroves i covers 1,900 ha.

18) Regarding the Refugia profile, Mr. Leng Sy Vann informed the meeting that Cambodia has completed three (3) Fisheries Refugia profiles in Kep, Koh Kong, and Kampot provinces. He further informed on the delay in the establishment of the Grouper Fisheries Refugia in Kampot due to the overlapped interest between Marine Fisheries Management Area (MFMA) and the Development Company as well as the COVID 19 Pandemic outbreak, the new boundary of MFMA has been revised and sent to Kampot Administration for further consideration and action. Cambodia expects to adopt Marine Fisheries Management Area, including Fisheries Refugia at Kampot province, by the end of 2021. Concerning the willingness of fisheries and environment sectors to agree on the Establishment of Fisheries Refugia, based on his observation, both sectors feel satisfied and happy in the establishment of fisheries refugia for the following purposes: 1) to manage sustainable marine fisheries resources, biodiversity, and ecosystem, 2) to ensure sustainable fish stock, 3) to ensure sustainable fishing to enhance community livelihood depending on the natural resources, and 4) to strengthen the adaptation of climate change.

19) In terms of community/stakeholder engagement in establishing Fisheries Refugia and implementing agreed management measures, he informed the meeting that there are several key community/stakeholders involved in this project including the national level, the provincial level, private sector and NGOs. For the national level, there is Fisheries Administration. For the provincial level, there are provincial governor, provincial deputy governor, relevant provincial line departments (i.e. provincial department of agriculture, forestry, and fisheries, provincial department of environment, provincial department of tourism, provincial department of land and construction, provincial department of public works and transports, and so on), provincial police, provincial military police, maritime police, district authorities, commune authorities, fisheries administration cantonment, and provincial hall administration. Moreover, there are private sector and NGOs (i.e. FFI, WCS, IUCN, WEA, and MCC) participating in the establishment of fisheries *Refugia* as well. However, some issues were occurring in the establishment. For example, in Kep province, it was hard to set times for meeting at the provincial level, especially meetings with provincial administration leaders and at the same time, changing provincial governor of Kep could affect the establishment of marine fisheries management area including Blue Swimming Crab *Refugia.* These led to the delay of the establishment process. For Koh Kong province, it was hard to set times for meeting at the province level, especially meetings with provincial administration leaders were delayed five times. In Kampot province, there was an issue in the overlap of the boundary between Marine Fisheries Management Area and Development Company in Grouper *Refugia* area. Thus, the new boundary of the marine fisheries management area, including grouper refugia sites, has been revised and sent to Kampot provincial administration for further action. Furthermore, there is COVID 19 outbreak in the Kampot province.

20) To achieve the establishment process, based on Mr. Leng Sy Vann's experiences in Cambodia, there were a few steps at the provincial level and national level. The provincial level did the technical part, including identifying sites, setting a boundary, size, specific waypoints, and preparing maps. Those who can participate at the provincial level are from Provincial Administration, Fisheries Administration, Relevant Provincial Line Departments, Provincial Police, Provincial Military Police, Maritime Police, District Authorities, Commune Authorities, Private Sector, NGOs, and Community Fisheries. On the other hand, the national level focused on the law part. Moreover, there are two levels within the national level which are FiA and MAFF level. At FiA level, the law team from FiA and provincial department of agriculture, forestry, and fisheries attend this national meeting to check and verify the format of proclamation. At the MAFF level, the law team from MAFF and provincial administration join this national meeting to verify and approve the format of the proclamation. In the last stage, the proclamation documents would be sent to the Minister of Agriculture, Forestry, and Fisheries for signature and stamp.

21) Regarding the reforming of national policy, legal and regulatory frameworks governing the management of fisheries refugia, he informed the meeting that 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, ten-year strategy plan for fisheries conservation, and five-year management plan for fisheries conservation, effectively ensure fisheries refugia management. In addition, two (2) proclamations on marine fisheries management areas, including Blue swimming crab Fisheries Refugia at Koh Po and Koh Tonsay Archipelago, Kep province and Mackerel Fisheries Refugia at Peam Krasob. Koh Kong province have been promulgated by Minister of Agriculture, Forestry, and Fisheries. Moreover, two (2) provincial management committees in Kep province and one (1) provincial management committee in Koh Kong province for marine fisheries resource management are formulated by provincial governors to facilitate and address all issues happening at Fisheries *Refugia* sites.

22) In terms of the status of enabling environment reform, including the extent of behavioral change among small-scale fisherfolk at refugia sites, he informed the meeting that after the Royal Government of Cambodia making the policy reform of decentralization, the Ministry of Agriculture, Forestry, and Fisheries (MAFF) made decentralization to sub-national to manage natural resources by themselves at the end of 2017. Coincidentally two proclamations on the establishment of marine fisheries management area including fisheries refugia in Kep and Koh Kong provinces are issued by MAFF in 2018 and 2019. In this connection, small-scale fisherfolk at fisheries refugia sites, especially fisheries community, have changed their attitudes in terms of participation in the management of marine fisheries recourse to ensure fish stock and sustainable fisheries resource utility. In particular, community fisheries took part in disseminating closed fishing during spawning season (i.e., mackerel and blue swimming crab), enforcing the law of fisheries and regulation, and patrolling to monitor illegal fishing action happening at refugia sites.

23) Fishing boats in Cambodia can be categorized into two (2) categories, which are fishing boats with engines and no engines, according to FiA's statistical data. For fishing boats with an engine, it was divided into four (4) categories depending on the power of their engine. These four (4) categories consisting of less than 10hp, 10-30hp, >30-50hp, and over 50hp. Generally, most fishers in Cambodia have Fishing boats with an engine power of less than 10 hp followed by 10-30hp and the small number of fishers practiced the fishing boats with engine power of 30-50hp and over 50hp. The working paper of Cambodia is attached as **Annex 4** of this report.

24) The chairperson opened the floor for questions and comments.

25) Mrs. Praulai Nootmorn had a question regarding the situation of the Short Mackerel in Cambodia. Mr. Leng Sy Vann answered that the current status of the Short Mackerel in Cambodia is better than in the past when mackerel refugia site in Koh Kong province was established. Mrs. Praulai Nootmorn thanked Cambodia for the answer.

26) In addition to the question section, Mr. Somboon Siriraksophon congratulates Cambodia for successfully implementing and establishing Fisheries Refugia in Cambodia. The critical point that he found was the engagement of stakeholders, as it is an essential key point that meets the target outputs and goals.

27) Lastly, Mr. Weerasak Yingyuad thanked Mr. Leng Sy Vann for the presentation. Also, he had a few questions regarding the Fisheries Refugia areas of Blue swimming crabs in Kep province. He would like to have a clarification on how to identify the location. Mr. Leng Sy Vann answered that firstly, we reviewed secondary information and the data related to spawning habitat of blue swimming crab. Then, we visited the site and discussed with Fisheries Administration Cantonment and fishermen about the crab spawning habitat and the piece of information collected. This was consulted and discussed at local level with Fisheries Administration, Fisheries Administration Cantonment, fishermen, community fisheries, local authorities, and NGOs to check and make sure that the site is really the crab spawning habitat. After that, stakeholder consultation meeting at provincial level was held to decide the blue swimming refugia site and its size.

5.2 INDONESIA

28) Mr. Ngurah N. Wiadnyana, the RSTC member for Indonesia, informed the meeting that Indonesia has two (2) Refugia sites located in West Kalimantan and Bangka Belitung. In West Kalimantan, Indonesia chose Shrimp (*Fenneropenaeus* spp) as a target species, while the type of Habitat linkage is Mangrove. In Bangka Belitung, Indonesia chose Squid (*Uroteuthis chinensis*) as a target species, while the types of Habitat linkage are coral and seagrass. Both sites are in process. Indonesia had surveyed in the Bangka Belitung area but not yet in West Kalimantan due to the situation.

29) In terms of indicators for the West Kalimantan site, the key community/stakeholder includes 1) Local fishing community in West Kalimantan 2) Fishery product collector, trader and exporter 3) Fishery Agency of West Kalimantan Province 4) Fishery Agency of Kubu Raya District 5) Fishery Agency of Kayong District 6) DG of Marine Spatial Planning 7) Local University in West Kalimantan. There were issues in terms of the establishment. This is because Indonesia lacks technical information on critical habitat, especially for the abundance and distribution of mature stage of Fenneropenaues shrimp. Moreover, operations of destructive gears around critical habitats of priority species are existing. Therefore, Indonesia needs to conduct the baseline survey to obtain detailed data and information. Also, Indonesia needs to collaborate with the local university and other institutions to collect data and information about the critical habitat and discuss it with them.

30) In terms of indicators for the Bangka Belitung site, the key community/stakeholder includes 1) Local fishing community in Manipur village (Bangka Belitung) 2) Fishery product collector, trader and exporter 3) Fishery Agency of Bangka Belitung Province 4) Fishery Agency of Bangka District 5) Fishery Agency of Bangka Selatan District 6) DG of Marine Spatial Planning 7) University of Bangka Belitung. There were issues in terms of the establishment as Indonesia lacks information on the critical habitat of squid during the spawning period, and there is tin mining in the waters of Bangka Belitung. Thus, the survey will be conducted in Q3 -2021 to obtain information on the critical habitat for the mature stage of squid. Also, an intensive study is needed to figure out the impact of the mining on the ecosystem in the waters of Bangka Belitung, especially on the critical habitat of squids.

31) In terms of statistical data, he said that there is no continuous data from the record. There are 9 types of fishing boats in West Kalimantan, including Set gill nets, Drift nets, Trammel nets, Seine nets, Bottom seine nets, Beach seine nets, Danish seine, Set net, and Trap. In Bangka Belitung, to catch Squid, the fishermen use Handline, Gillnet, Trap, and Boatlift net.

32) Project activities carried out in 2019-2020 were done to prepare and coordinate how to implement the project, while Indonesia postponed some project activities planned for 2021 due to the Covid19 outbreak situation.

33) Mr. Ngurah N. Wiadnyana showed the map of the critical habitat of Fenneropenaus shrimp during a juvenile stage in West Kalimantan in 2015 located in Teluk Batang, Padang Tikar and Ketapang District. Also, he explained the need for further discussion with local universities and local government to fix the sites. The important is to know where the habitat for the spawning ground. For Bangka Belitung, the survey activity was conducted in November 2020 to gain data and information on critical habitat, fisheries, coastal habitat conditions, and the biological aspects of squid (*Uroteuthis chinensis* in Bangka Belitung). The survey was conducted in two Districts: Tuning (Bangka District) and Lepar Pongok (South Bangka District).

34) Mr. Ngurah N. Wiadnyana showed the map of the squid fishing ground and its production in the Bangka District. However, he did not know why it was significantly increased and dropped in 2016-2020. The working paper and presentation of Indonesia are attached as **Annex 5a** and **5b** of this report.

35) The chairperson opened the floor for questions and comments.

36) There was a question from Mrs. Praulai Nootmorn, Thailand, about the type of fishing gear to catch squid. Mr. Ngurah N. Wiadnyana answered that mostly they were caught by handline. According to the presentation, Mrs. Praulai Nootmorn would like to confirm if the squids lay their eggs on the coral reef. Mr. Ngurah N. Wiadnyana answered that he thinks it is a coral reef as squid eggs were collected in 2 coral reef locations. Also, Indonesia would like to predict the spawning period for squids to decide the season for establishing refugia areas. The challenge is that no migration information of the squids.

37) Mr. Somboon Siriraksophon informed the meeting that Indonesia initiated the Fisheries Refugia Project in June 2019. Indonesia has faced the impact of the Covid19 situation from the early of 2020 until the present. It is the reason why the project was delayed. Also, Mr. Somboon Siriraksophon had some questions for Mr. Ngurah N. Wiadnyana. As the work plan for 2021 to 2022 was already revised, the project needs to be completed by 2022. Thus, Mr. Somboon Siriraksophon would like to ask for Mr. Ngurah N. Wiadnyana's opinion about the possibility of completing the project within 1.5 years and the strategies that Indonesia could come up with to finish the project on time. The second point is about the list of stakeholders participating in project implementation. He found that most of the participants came from the fishery sector only. To answer Mr. Somboon questions, Mrs. Astri Suryanda clarified that stakeholder engagement in the project is not only the fisheries sector alone; other agencies are also involving in the project implementation, such as the tin mining sector in Bangka Belitung islands. In this connection, Indonesia will update the list of stakeholders involving in the country report. Mr. Ngurah N. Wiadnyana added that to achieve this project by 2022, Indonesia plans to visit the field to discuss with the co-partners, local government, and the local community especially, fishers. After they have an initial draft of the demarcated Refugia areas for both sites, they will consult firstly with the local institutions because the local institutions have the authority to establish the areas. Relating to the central government, the responsible Directorate-General (DG) will decide whether the regulation should be released from the local government or central government.

38) Also, the local government is very important as the government can have a meeting with the local community, especially fishers. Mr. Somboon Siriraksophon understood that the local government is an important key institution that communicates with the local community. Therefore, he asked Mr. Ngurah N. Wiadnyana to consider the possibility for the central government to empower the local government to handle activities at the sites as the current Covid19 situation is unpredictable and the central government staff cannot travel to the project sites. Mr. Ngurah N. Wiadnyana stated that there are two (2) problems. The first problem is that the local institution requires support from the central. Secondly, travel restriction does not only have an impact on traveling across the region but also it applies to the inter-provincial level. Thus, as the distance between the local government office and the project sites is long and the restriction for traveling from town to the sites is still valid, it is hard to continue the work. So, he hopes that the situation would be better by September so that Indonesia can continue the work. Due to these, Mr. Somboon Siriraksopon will bilaterally discuss further with the Indonesia team.

5.3 MALAYSIA

39) Mr. Sallehudin Bin Jamon, the Regional Scientific and Technical Committee for Malaysia, updated the status of the Fisheries Refugia project in Malaysia. There are two (2) Refugia Sites in Malaysia, located in Tanjung Leman, East Johor for Lobster and Kuala Baram, Sarawak for Tiger Prawn. His presentation focuses on the Spiny lobster site, and Mr. Jamil Bin Musel presents the Tiger prawn site.

40) For Tanjung Leman in East Johor, the target species is Spiny Lobster (*Panulirus polyphagus*), and the types of marine habitat linkage in this area are coral and seagrass. Malaysia expected to complete the project by the end of 2022 as there was travel restriction due to the Covid19 pandemic. For both sites, the estimated refugia size was agreeable among members. Malaysia would finalize the adoption process once the Refugia Management Plan is completed, assisted by the University of Malaya as a consultant.

41) For progress and status of project implementation in Tanjung Leman, fisheries and environment sectors were willing to agree on the Establishment of Fisheries Refugia. The following activities support the establishment as the results from stakeholder consultation in 2018, the results from the socio-economy survey done in 2020 (Norhanida *et al*., 2020), etc. The willingness of fisheries and environment sectors to agree on the Establishment of Fisheries Refugia were divided into 1) awareness, 2) the benefits of refugia, and 3) social and environmental protection. In conclusion, around 90 % of fishers agree on the spiny lobster refugia establishment. Therefore, the fishers suggested the Department of Fisheries Malaysia consult beforehand to ensure the consent of all stakeholders involved in this fishery.

42) There are three (3) main stakeholders involving in Tanjung Leman, namely East Johor traditional fishers (nearshore), Trawl net operators and fishers (commercial), and Island inhabitants/tourism operators. Moreover, problems in the establishment are unclear/lack of information about the implementation of refugia and its rules and compliance with the "no-take" regulation during specific refugia close season period. Thus, the team will raise stakeholder consultations and public awareness to solve this issue.

43) In terms of reforming national policy, legal and regulatory frameworks governing the management of fisheries refugia, DoF/Malaysia will draft the Regulations on the proposed refugia areas after obtaining approvals from State Government. Regulations will focus on regulating allowable and prohibited fishing gears, temporal closure during critical life stages in the areas, development or other activities within the refugia areas, and penalizing encroachment and illegal activities or illegal harvesting.

44) For the status of enabling environment reform, including the extent of behavioral change among small-scale fisherfolk at refugia sites in Tanjung Leman, Fishermen's participation in refugia management is vital and urgent. The high degree of trust and understanding between the Department of Fisheries and members of the fishing community may be strengthened and extended so that fishers can rest confident that the Department is truly committed to safeguarding the sustainability of fished resources. For the sustainable use of fisheries resources, the active participation of fishers and fishermen's communities is essential. It will pave the way for co-management that both resource users (fishers) and government agencies (Department of Fisheries) collaborate to address management concerns and share decision-making duties before taking action. The Department of Fisheries has also designed and implemented several educational programs for fisher groups and the public on the importance of working together to safeguard fisheries' resources and livelihood.

45) Three (3) types of fishing gears were used in Tanjung Leman in 2005-2019, including drift net, trawlers, and traps. The majority of fishing gear in this area was drift net, in which the number of it was the highest throughout the period.

46) The filed surveys show four (4) study locations where the lobster phyllosoma was found with an average of 0.27±0.05 individuals/1000m3. The distribution of lobster phyllosoma was more concentrated around the southeast Johor area near Sungai Rengit.

47) Mr. Sallehudin Bin Jamon handed over the presentation to Mr. Jamil Bin Musel to present the remaining part. For tiger prawn research at Kuala Baram, Miri, Sarawak.

48) Mr. Jamil Bin Musel, Alternate Regional Scientific and Technical Committee for Malaysia, proudly presented that the project implementation went well. Also, he confidentially informed the meeting that the DoF/Malaysia would complete the project by 2022. However, although Malaysia is also facing Covid19, they will try their best to finish it in time. Thus, after the staff is fully vaccinated, they will continue the pending activities. Continue with the presentation, the types of marine habitat linkage in this area are coral and mangrove. He updated that DOF/MY already drafted the Refugia profile for Tiger prawn and will submit it to the PCU soon.

49) For progress and status of project implementation, one consultation program was held with stakeholders and local fishers for Tiger Prawn Refugia in 2017. In 2018, two meetings with stakeholders and other local agencies, such as the Sarawak State Planning Unit, Miri Port Authority, and the Forestry Department, were held to provide information and explanations on the importance of tiger prawn resources and the fisheries department's proposal to make Kuala Baram a tiger prawn fishery refugia. In conclusion, around 90 % of fishers agree on the tiger prawn refugia establishment. Therefore, the fishers suggested the Department of Fisheries Malaysia to conduct consultation beforehand to ensure the consent of all stakeholders involved in this fishery.

50) The critical community and stakeholders for Tiger Prawn Refugia are fishermen and Miri Port Authority. There were some issues regarding the establishment due to the levels of awareness/understanding of the benefit of tiger prawn refugia and that there was usage conflict-overlap of refugia areas, and there was development for expansion of a shipping port in Kuala Baram. The above issues were raised and

discussed at the national seminar held in April 2021. To achieve this, there would be an explanation from the Department of Fisheries and a meeting with Miri Port to find a win-win situation.

51) In addition, reforming national policy, legal and regulatory frameworks governing the management of fisheries refugia is in progress.

52) In terms of the status of enabling environment reform, including the extent of behavioral change among small-scale fisherfolk at refugia sites, fishermen's participation in the management of refugia is vital and urgent. The situation in the tiger prawn site is similar to the spiny lobster refugia site. The high degree of trust and understanding between the Department of Fisheries and members of the fishing community may be strengthened and extended so that fishers can rest confident that the Department is genuinely committed to safeguarding the sustainability of fished resources.

53) Considering the statistical data in Kuala Baram, Miri, the proposed refugia area covering zone A (0-5 nm) where only traditional fishing gears which fishermen use mainly drift net. The situation was after Malaysia changing the policy by shifting trawlers to operate beyond 10 and 15 nautical miles. Currently, there is no trawl net in the area. The working paper and presentation of Malaysia are attached as **Annex 6a and 6b** of this report.

54) The chairperson opened the floor for questions and comments.

55) Mr. Somboon Siriraksophon sought more elaborations on the selection of the Refugia area for Spiny Lobster. He mentioned that the proposed refugia area is quite far from the coastal area, which stage of Spiny Lobster's life cycle that Malaysia wants to protect. Also, the survey results show many larvae of Spiny Lobster distributed near the coastal area, where it was not selected as the Refugia site. So, he would like to know, "is there any push net operating in the coastal area?"

56) To answer the questions, Mr. Sallehudin Bin Jamon identified that Malaysia focuses on Spiny Lobster in the spawn stage. Also, he explained why the Refugia area is far from the coastal area. It is because Spiny Lobsters (spawners) live in that area. He also explained why larvae had not been chosen. As they can move everywhere due to currents, so it is hard to identify the location. For push net, he explained that there is no push net operated in that area.

57) In addition to the questions for Mr. Sallehudin Bin Jamon, Mr. Somboon Siriraksophon wants to know the Miri Port Authority's role in establishing Tiger prawn Fisheries Refugia. So, he asked Mr. Jamil Bin Musel for explanation.

58) Mr. Jamil Bin Musel explained that as there is a shipping industry in the area, one of the key stakeholders. They are still in the discussion process; however, the process would be delayed due to the Covid19 situation. Thus, he could not confirm the role yet.

59) Mr. Ngurah N. Wiadnyana wanted to know why Malaysia considers only the spawn stage, not the entire life cycle. Mr. Sallehudin Bin Jamon explained that Spiny Lobster's life cycle is very long; it is hard to control fishing for the whole life cycle. Hence, choosing to protect the critical period, which is the spawn stage, would be a proper choice.

5.4 PHILIPPINES

60) Mr. Valeriano M. Borja, a Regional Scientific and Technical Committee for the Philippines, presented the national report to the meeting. Three (3) Fisheries Refugia sites in the Philippines are located in Bolinao, Coron, and Masinloc. For Bolinao, Siganidae is the target species, and the type of marine habitat linkage is seagrass. NFRDI already demarcated and marked the refugia area in Bolinao but did not calculate the size in ha.

61) It is still in the process for the Coron refugia site, which has *Casio cunning* and *Decapterus maruadsi* as the target species. The habitat in this area is mangroves.

62) For the Masinloc refugia site, *Auxis thazard*, *Pterocaesio teselleta*, and *Sardinella fimbriata* are the target species. The types of marine habitat linkage are coral reefs and seagrass.

63) The draft fisheries profiles for three refugia sites have been done; however, there would be an update for the profiles later.

64) Mr. Valeriano M. Borja expected to complete all work plans by the end of 2021, and NFRDI will conduct some meetings to finalize the reports in 2022.

65) Based on the past activities, such as committee meetings, on-site stakeholder consultations, and information-drive organized during 4 years in 2017 to 2021, the results reflected the willingness of the stakeholders engaged in the project implementation. Also, there is high acceptance as the local government units, including the coastal communities, environmental groups, and other stakeholders, have agreed and understood the importance of establishing Fisheries Refugia in 3 sites.

66) All three Refugia sites have similar stakeholder engagement, except for the Coron area with indigenous peoples involved in the project site. At the Bolinao site, with the support from Mr. Noel Barut as senior fishery expert, and consultant to the project, there are not many issues in implementation. For the Coron site, there was a problem in terms of arranging activities due to lockdowns. However, NFRDI will continue activities soon after the situation is getting better. For Masinloc, the issue was that the Local Government Unit (LGU) requested an LoA with NFRDI to enhance the effective collaboration in the establishment of fisheries refugia in the area. Thus, the NFRDI prepared an LoA for consideration and review by the LGU before the agreement.

67) In lieu with the experience on the change of fisherfolk attitude, there was positive feedback from the LGU, especially from the fishing community after introducing the fisheries refugia concept in three sites. Through the information drive and community consultations, the suggestions and questions from the coastal communities were addressed and answered. The fisherfolk had strong disagreements with the establishment of MPAs in their municipalities; however, through the workshops, they have understood the difference and the boon of establishing fisheries refugia for a more productive fishing stock. With proper guidance and continued technical support, the fisherfolk began to understand the importance of protecting the two (2) major life stages of fishes which could significantly improve the fishing stock of the community in the future.

68) In terms of fishing boats, Bolinao had the largest number of boats, while Coron was the lowest because most fishers in Coron are not using their boats for fishing anymore, but for tourist transportation instead. However, fishing boat numbers need to be updated.

69) Lastly, Mr. Borja showed the proposed maps for the Refugia site. The working document of the Philippines is attached as **Annex 7** of this report.

70) The chairperson opened the floor for questions and comments.

71) Mr. Somboon Siriraksophon congratulated Mr. Valeriano M. Borja for the map results of the fisheries refugia. He also requested the Philippines to calculate the Refugia area size in ha and update it in the country report for reference.

72) There was a question from Mr. Weerasak Yingyuad regarding selecting target species in Coron as the last meeting Mr. Valeriano M. Borja mentioned about Mangrove Jack. Mr. Weerasak would like to know more about it if there is extra information. The question was clarified by Ms. Raziel Ares, on changing the target species in Coron. She also informed the meeting that the issues would be discussed further at the site-based management board for finalizing.

5.5 THAILAND

73) Mrs. Praulai Nootmorn, the Regional Scientific and Technical Committee for Thailand, presented the country report to the meeting that Thailand has two (2) priority Refugia sites for two (2) species, namely short mackerel in Trat and Blue swimming crab in Surat Thani provinces.

74) The marine habitat linkages in Trat province are coral, mangroves, and seagrass. But in the Surat Thani site, the habitat linkages are only mangrove and seagrass.

75) At each project site, DOF/Thailand works with many partners from different inter-agency organizations, non-governmental organizations, universities, etc. To achieve the project in Trat, the DOF proposed

the proposal for short mackerel Fisheries Refugia to the Provincial Fisheries Management Committees. The committees have agreed to regulate and prohibit purse seine nets, pair trawls, and mackerel gill nets operating in the Fisheries Refugia area during the close seasons. However, further information from the Rayong Marine Fisheries Research and Development Center about the impacts of the prohibition of mackerel gill net's operation during the close seasons is needed. She also informed the meeting that the impact topic would be discussed further in the next NSTC meeting.

76) For Surat Thani, the DOF also proposes the Fisheries Refugia area for blue swimming crab to the provincial fisheries management committees for further consideration and action to prohibit fishing gears such as crab trap, shell fishing without engine in the conservation area. However, there were some delays in action in both areas due to the Covid19 situation.

77) In terms of national policy, legal and regulatory frameworks governing the management of fisheries refugia, Thailand has reformed many regulations; for example, In Royal Ordinance on Fisheries, B.E. 2558 (2015), Royal Ordinance on Fisheries (No. 2), B.E. 2560 (2017) and Marine Fisheries Management Plan of Thailand 2015 - 2019 (FMP).

78) For the Status of enabling environment reform, Thailand has followed the Fisheries Refugia Management Framework, which includes the coordination of national and local management committees and stakeholder consultation. In the meetings of site-based management boards and workshops for stakeholder consultation, the fishers showed their positive attitude in managing and conserving fisheries resources in their corresponding fishing grounds; they also relied on the technical information for any decision on management planning. The DOF/Thailand, thanks to the national fisheries management policy that there has been an urge for registration of the Local Fishing Community Organizations, which enhance the mechanism for fishers to share their opinions, comments, and attitudes. For Thailand, the activities of stakeholder participation in the fisheries refugia implementation have played a significant role in enhancing the excellent attitude of fishers on community-based management, resulting in the smooth adoption of the refugia concept, site boundaries, and management measures. Fishers also showed their obvious willingness to participate in technical data collection and at-sea surveys of geographic location for fisheries refugia boundary, contributing to their acceptance of the establishment of fisheries refugia in their corresponding areas.

79) Regarding statistical data on fishing vessels from 2005 to 2020, the fishing gears in Trat and Surat Thai provinces are mostly small-scale fisheries, but there are some commercial fishing gears. The working document of Thailand is attached as **Annex 8** of this report.

80) The chairperson opened the floor for questions and comments.

81) Mr. Somboon Siriraksophon congratulated Thailand for the achievement and added that Thailand has already developed the web portal for the national Fisheries Refugia project, and the web portal has been linked with the regional refugia website.

5.6 VIET NAM

82) Mr. Nguyen Thanh Binh, the Regional Scientific and Technical Committee for Viet Nam, informed on progress works and challenges during the past years. He did not follow the report template as other countries did because D-Fish would like to seek approval on the amendment of the project document to adjust what they have drafted for Fisheries Refugia sites in three (3) provinces. He then wanted to share information about preparing four (4) contracts for four (4) activities to be signed with consultants in 2020. There were four (4) activities that have been implementing. The first is that Viet Nam elaborated the profiles of fisheries and habitats for three (3) refugia sites, namely Bach Long Vy, Hon Cau, and Phu Quoc. Secondly, utilization of scientific and local knowledge was done to identify borders of fisheries Refugia sites. Moreover, new provisions of new Fisheries law was promulgated to support the fisheries refugia establishment. Lastly, Viet Nam elaborated national guidelines on procedures for the establishment and management of Fisheries Refugia.

83) Mr. Nguyen Thanh Binh also informed that the consultants had submitted the reports; however, with the change of financial management regulations promulgated by the Ministry of Finance, the payment could not be made, and the contracts were canceled.

84) Currently, Viet Nam is submitting the amendment and overall project implementation plan to the Ministry of Agriculture and Rural Development (MARD) for approval. The reasons for amendments are the new provisions of Fisheries Law relating to the management of fisheries resource protection sites which are equivalent to Fisheries Refugia sites; the status of resources and habitats at the sites compared to that in the project document elaborated over 10 years ago; the change of mandates of competent authorities to manage the Fisheries Refugia sites; the change of financial management regulations; and the project budget revision and extension of implementation.

85) To achieve the outcomes of the project within 1.5 years, Viet Nam came up with the following project implementation strategies:

- Viet Nam would include all sites in the master plan, which would be approved by Prime Minister, for fisheries resources protection and exploitation.
- Site selection would be made in close consultation with the provincial Department of Agriculture and Rural Development.
- Many activities would be implemented simultaneously, and D-fish is trying to put more implementations at the central level, where there are more capable human resources available for the assignment. This would be slightly different from the original plan as Viet Nam is trying to balance the works between local and central levels.
- More involvement from two main institutions, namely: RIMF and VIFEP, and others (IMER, VNIO, NGOs, and UNDP)
- There would be more active involvement from the local fisheries administration and fishing communities.

86) The chairperson opened the floor for questions and comments

87) Mr. Somboon Siriraksophon thanked Mr. Nguyen Thanh Binh for updating the situation and work progress in Viet Nam, including the implementation strategies. Also, he asked how long it takes for the approval process by MARD. Thus, he proposed to have further discussion with Viet Nam later to determine the support to Viet Nam. To answer Mr. Somboon's question, Mr. Nguyen Thanh Binh thought that it would soon get approval from MARD, and after that, it would go to the process of overall project implementation plan for the remaining time. Also, he agreed to have further discussions with PCU.

88) In addition, Mr. Ngurah N. Wiadnyana asked that has Viet Nam decided the target species? Mr. Nguyen Thanh Binh answered that there were candidate species for each site. However, areas planned for Fisheries Refugia overlapped with MPA. Thus, the new locations for Fisheries Refugia are needed, and the project will identify target species later.

89) The presentation of Viet Nam is attached as **Annex 9** of this report.

VI. OTHER MATTER

6.1. CONTENTS OF THE INDICATORS OF SUSTAINABLE MANAGEMENT OF FISHERIES REFUGIA

90) Mr. Somboon Siriraksophon introduced the background on developing the indicators of sustainable management of fisheries refugia by referring to the past regional workshop conducted in September 2019. He informed the meeting that the objectives of the indicator guidelines are to support the participating countries in selecting the indicators for the effective management of fisheries refugia established during the project implementation. After the project-end, the government shall continue and increase the number of fisheries refugia in their country. He reiterates the need to develop the 1st

draft guidelines by the end of 2021 for further consideration and adoption by both RSTC and the Project Steering Committee (PSC). He then proposed the contents of the guideline for information and review, suggestions by the Committee.

91) The main contents of the guidelines could be summarized as follows: Chapter 1 on introduction consists of three sub-chapters concerning the concept of sustainable development and how application to the management of fisheries refugia, including the purpose of the indicators. Chapter 2 on Sustainable Management of Fisheries Refugia System consists of developing and adopting the framework, including specifying criteria and objective-related indicators. Chapter 3 on indicators and target reference points is divided into five pillars of the indicators: ecosystem, social aspects, economic aspects, governance, and climate change and disaster. The working paper and presentation are attached as **Annex 10**.

92) The chairperson opened the floor for questions and comments

93) Mrs. Praulai Nootmorn seeked clarification from the PCU on one of the project outputs that indicated the need for a 50% reduction of fishing pressures in the established fisheries refugia area. Mr. Somboon Siriraksophon replied that based on the scientific-based management measures from the study will directly answer how to reduce the pressures from fishing activities. Referring to the Thailand presentation, DOF/TH will not allow mackerel gillnet to operate in the refugia areas due to its impact on the short mackerel spawner. It means DoF/Thailand can reduce 100% of fishing pressures from mackerel gillnet in the refugia area.

94) Mr. Ngurah N. Wiadnyana reiterated the same question that it is challenging to reduce fishing vessels in Indonesia. However, Mr. Somboon Siriraksophon responded that the establishment of fisheries refugia requires management measures linked to the findings from scientific data and local knowledge analysis. There are many approaches in reducing the fishing pressures to maintain and protect target species in the refugia areas.

95) After deliberation, the Committee took note of the proposed contents of the Regional Guidelines on Indicators for Sustainable Fisheries Refugia Management to be drafted by the PCU.

6.2 REGIONAL ACTION PLAN FOR MANAGEMENT OF TRANSBOUNDARY SPECIES, INDO-PACIFIC MACKEREL (RASTRELLIGER BRACHYSOMA) IN THE GULF OF THAILAND SUB-REGION

96) Mr. Somboon Siriraksophon updated the Regional Action Plan for Management of Transboundary Species, Indo-Pacific Mackerel in the Gulf of Thailand Sub-region (RAP-Mackerel) after it was drafted through the Regional Consultation in September 2019. He informed the Committee that SEAFDEC Council adopted the RAP-Mackerel and suggested to SEAFDEC to address this regional policy under the ASEAN policy framework. The RAP-Mackerel was later endorsed at the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) in November 2020 and further consideration by the ASEAN Sectoral Working Group on Fisheries (ASWGFi) in mid of 2021.

97) Considering the objective of the RAP-Mackerel is to enhance the improved management policy of critical habitats for fish stocks of transboundary significance, the PCU pointed out the RAP-Mackerel is not for only established refugia countries to implement. However, it is for all Southeast Asian countries. He then requests all participating countries to consider and apply the RAP-Mackerel to develop the National Action Plan for Indo-Pacific Mackerel. The working paper is attached as **Annex 11** to the report.

98) After deliberation, the Committee took note of the updated status of the RAP-Mackerel.

6.3. REGIONAL TRAINING/WORKSHOP FOR IDENTIFICATION OF FISH LARVAE AND EXPECTED OUTPUTS

99) Mr. Somboon Siriraksophon introduced the requests for capacity building on Larval Fish Identification and Fish Early Life History Science to support all participating countries in implementing and establishing fisheries refugia. SEAFDEC organized two Regional Training / Workshops in 2007 and 2008 under the GEF/UNEP project "Reversing Environment Degradation Trends in the SCS and GoT due to

the lack of researchers/experts on larval fish identification and fish early life history science in Southeast Asia. However, many countries are still facing the same issues on larval fish identification as well as a lack of crucial identification guide and fish early life history science. At the RTSC2 held in Cambodia, regional experts suggested that all participating countries present larval fish identification up to genus or species level rather than end with family level. Per this suggestion, the RSTC2 required Regional Training to support participating countries in keying and identifying larval fish samples to genus and species levels.

100) In collaboration with SEAFDEC/Training Department, the issues were considered: the program and syllabus were drafted with the support of Mr. Yoshinobu Konishi – fishery expert, and Mr. Sukchai Arnupapboon - Acting Head of Research and Development Division. The Refugia PCU prepared $10.45k to support the training. However, the Covid-19 pandemic situation has limited the traveling since 2020 until the present. The PCU cannot organize the proposed Regional Training / Workshop planned in 2020 until the present. The PCU also expects that no training /workshop would be conducted by the end of 2021.

101) The PCU wanted to consult with the RTSC4 to either cancel the proposed training program or continue the program after the covid-19 becomes a better situation. In case of cancellation of the training program, the PCU proposed to spend the budget for other activities such as producing the larval fish identification guide. The working paper and presentation are attached as **Annex 12.**

102) The chairperson opened the floor for questions, comments, and decisions on this issue.

103) Mr. Ngurah N. Wiadnyana thanked the PCU for introducing and raising the issues on conducting the Regional Training/Workshop; he hoped the PCU will continue the Regional Training Workshop before the project ends in 2022. But if the situation of Covid-19 is still bad as it is, he also supports the production of the larval fish identification guide because of the lack of larval fish identification guide and references in Indonesia.

104) Mr. Jamil Bin Musel, on behalf of the DOF/Malaysia, supports conducting the Regional/Workshop on Larval Fish Identification. He mentioned the lack of experts on this field in the DOF/Malaysia due to their retirement, while implementing and establishing fisheries refugia in-country requires experts to work on this field. He also considers the project to end by 2022 and hopes the covid-19 pandemic will be softened and over soon.

105) Mr. Valerianno M.Borja enquired views from the PCU; if the Regional Training /Workshop would be conducted in 2022, where the venue would be for this activity.

106) Mrs. Astri Suryandari, the Refugia team and senior researcher on larval fish identification from Indonesia, supports the Regional Training Workshop on larval fish identification to be conducted in 2022.

107) Mr. Somboon Siriraksophon responded to the chairperson, Mr. Jamil Bin Musel, and other speakers that he has consulted with the SEAFDEC Training Department, Mr. Sukchai Arnupapboon, and Mr. Yoshinobu Konishi on the possible period in Q2-Q4 2022. The appropriated period should be before November 2022 and before the project ends because the Regional Training Program is an independent activity on knowledge transferring, not relates to any policy matter. He then concluded to maintain the Regional Training/Workshop, would be conducted in 2022. He then suggests the meeting deciding again in the 1st quarter of 2022 on conducting the Regional Training/Workshop and how to move onward.

108) After deliberation, the Committee took note of the meeting decided to keep and revisit the proposed Regional Training/Workshop in Q1/2022.

6.4. MID-TERM REVIEWS

109) Mr. Somboon Siriraksophon updated the status of the Mid-term Review of the SEAFDEC/UNEP/GEF Project: “Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and the Gulf of Thailand. He informed the meeting that the PCU received comments and suggestions from SEAFDEC and UNEP Task Manager on the 1st draft Terms of Reference (ToR) of the Mid-Term

Review in mid-July 2021. The Mid-term Review consultant will be selected and recruited by SEAFDEC with UNEP task manager and project director support.

110) By signing the service contract with SEAFDEC, the consultant must certify that they have not been associated with the design and implementation of the FR Project in any way which may jeopardize their independence and impartiality towards project achievements and project partner performance. The period of mid-term review is three months. The schedule for the Mid-term Review is finalized soonest before the official announcement via the SEAFDEC Website. The working paper and presentation are attached as **Annex 13**

111) The participating countries are welcomed to share the TOR with national and regional experts to apply for this job.

112) Mr. Jamil Bin Musel seeked clarification on how to conduct the mid-term review for the project that some participating countries have implemented since the project was initiated in 2017, but some countries just started in 2019. Regarding this, Mr. Somboon Siriraksophon informed the meeting that it is not a matter of different time to initiate the project implementation by country. The evaluator should come up with overviews based on each country's outputs and outcomes. The results from the evaluator may include advice on ways forward in each country to ensure the final target goals.

6.5. OTHERS

113) Mr. Alza Rendian, the Cooperation Analyst from Indonesia, informed the meeting on the progress on preparation for the extension of LOA that after the related Division received the draft LOA from SEAFDEC Secretariat, they already communicated internally on this matter. He informed the meeting of the difficulty of having a meeting with responsible persons for finalizing the LOA. However, he promises that after this RSTC4 meeting, the responsible division will coordinate with the Alternate SEAFDEC Council Director to accelerate the process of the extension of LOA. Regarding this, the PCU noted the situation and progress on the extension of the LOA. The PCU will further report to SEAFDEC responsible persons.

114) Mr. Yoshinobu Konishi referred to the challenges on larval fish identification of some species targeted in the fisheries refugia project, such as *Rastrelliger* spp., *Siganus* spp., some species of Lutjanidae and so on. He informed the meeting that to date, most of them can be morphologically identified down to the genus level, but it is difficult to determine the species name. In this connection, the next Regional Training/Workshop will aim to classify the above-mentioned fish larvae and juveniles as low taxa as possible. He also informed the meeting that the past four training /workshops focused only on larval fish identification, but the next training will include the conduct of case studies on the "Fish Early Life History Science Study" with references.

115) Before the end of the agenda, Mr. Somboon Siriraksophon informed the meeting to consult with Mr. Yoshinobu Konishi and 6 participating countries on the numbers of attendees to the training workshop. If there are many attendees, the PCU will need to recalculate the required budget for this training/workshop and inform the next RSTC meeting and PSC meeting for consideration.

VII. DATE AND PLACE OF THE 5TH REGIONAL SCIENTIFIC & TECHNICAL COMMITTEE MEETING

116) The PCU proposed the RSTC5 in April 2022. For the meeting venue, the PCU will consider the covid-19 situation and consult with the committee later.

117) The meeting adopted the proposal made by the PCU to meet the next RSTC5 in April 2022.

VIII. CLOSURE OF THE MEETING

118) Mr. Ngurah N. Wiadnyana, a chairperson of the RSTC4, thanked all Committee and participants for active participation. He hopes the covid-19 situation in next year becomes better for the next meeting

to have a face-to-face meeting. After his speech, he invited Mr. Isara Chanrachkij to declare the meeting closure.

119) Mr. Isara Chanrachkij gave a closing remark on behalf of Madame Malinee Smithrithee, the SEAFDEC Secretary-General and concurrently the Chief of the Training Department. He conveyed her appreciation for all effort and hard work that all committee members have done for the project, including several target outputs that ensure sustainable management and habitat conservation at both national and regional levels. He believes the fisheries refugia concept will enhance the achievement of Regional common goals in sustainable fisheries management because the project component covers all five pillars of sustainable development: ecosystem, socioeconomic aspect, social aspects, governance, and emerging issues. Before the end of his closing remarks, He again conveyed madame Secretary-General message on sincere appreciation to the PCU staff for hard work preparing for the meeting. She wishes all are healthy and safe from Covid-19. He then declared the meeting close at 1.05 pm.

ANNEX 1 LIST OF PARTICIPANTS

CAMBODIA

No.	Name	Sex	Title	Organization	Email
1	Leng Sy Vann	M	Deputy Director	Department of Fisheries Conservation Fisheries Administration (FiA)	lengsyvann@gmail.com

INDONESIA

No.	Name	Sex	Title	Organization	Email
1	Prof. Ngurah Wiadnyana	M	National Scientific Focal Point	Ministry of Marine Affairs and Fisheries	ngurahwiadnyana14@gmail.com
2	Ir. Iswari Ratna Astuti	F	National Focal Point of Indonesia (Head of Research Institute for Fish Resources Enhancement)	Ministry of Marine Affairs and Fisheries	iswariastuti@yahoo.com
3	Astri Suryandari	F	Researcher	Ministry of Marine Affairs and Fisheries	suryandari.astri@gmail.com
5	Adriani Sri Nastiti	F	Researcher	Ministry of Marine Affairs and Fisheries	adrin0506@yahoo.co.id
6	Diah Ika Kusumaningtyas	F	Researcher	Ministry of Marine and Fisheries	pt.brpsi@gmail.com
7	Hendri Kurniawan	M	Cooperation Analyst	Ministry of Marine Affairs and Fisheries	Hendrikur16@gmail.com
8	Alza Rendian	M	Cooperation Analyst	Ministry of Marine and Fisheries	alzarendian@gmail.com
9	Ridho Rahmadi	M	Cooperation Analyst	Ministry of Marine Affairs and Fisheries	Ridhorahmadi94@gmail.com
10	Kiestiko sari	F	Cooperation Analyst	Ministry of Marine Affairs and Fisheries	ksbrsdm@gmail.com
11.	M. Yusuf	M	Cooperation Analyst	Ministry of Marine Affairs and Fisheries	ksbrsdmkp@gmail.com

MALAYSIA

No.	Name	Sex	Title	Organization	Email
1	Mr. Salleh Udin Bin Jamon	M	Director of Fisheries Research Institute, Kampung Acheh, Perak	Department of Fisheries	Sallehudin_jamon@dof.gov.my
2	Mr. Jamil Bin Musel	M	Director of Fisheries Research Institute Bintawa, Sarawak.	Department of Fisheries	jamilmusel@dof.gov.my
3	Ms. Lim Ai Gaik	F	Senior Fisheries Officer, Marine Park dan Resource Management Division	Department of Fisheries	aigaik@dof.gov.my

4	Ms. Nurashioin Sallih Udin	F	Fisheries Officer, Marine Park dan Resource Management Division	Department of Fisheries	nurashiqin@dof.gov.my
5	Mohd Nizam Ismail	M	Senior Fisheries Officer, Marine Park dan Resource Management Division	Department of Fisheries	nizamis@dof.gov.my

PHILIPPINES

No.	Name	Sex	Title	Organization	Email
1	Mr. Valerianno M. Borja	M	Science Research Specialist II	National Fisheries Research and Development Institute (NFRDI)	valborja1029@gmail.com
2	Ms. Raziel Ares	F	Science Research Specialist I	National Fisheries Research and Development Institute (NFRDI)	razielares22@gmail.com

THAILAND

No.	Name	Sex	Title	Organization	Email
1	Mrs. Praulai Nootmorn	F	Senior Expert in Marine Fisheries	Department of Fisheries of Thailand	nootmorn@yahoo.com
2	Mrs. Kamolrat Phuttharaksa	F	Fisheries Biologist, Senior Professional Level	Department of Fisheries of Thailand	emdec2003@yahool.com
3	Mrs. Jinda Petchkamnerd	F	Director of Chumporn Marine Fisheries Research and Development Center	Department of Fisheries of Thailand	tangjinda @yahool.com
4	Mr. Udom Khrueniam	M	Fisheries Biologist, Professional Level	Department of Fisheries of Thailand	emdec2003@yahool.com
5	Mr. Jirawut Kumpirod,	M	Fisheries Biologist, Practitioner Level	Department of Fisheries of Thailand	kumpirod.j06@gmail.com

VIET NAM

No.	Name	Sex	Title	Organization	Email
1	Mr. Nguyen Thanh Binh	M	National F and National Scientific and Technical Focal Point Focal Point and	Directorate of Fisheries (D-Fish)	ntbinh@mard.gov.vn
2	Mr. Hoang Ngoc Son	M	Fish Biologist	Marine Fisheries Resources Department, Research Institute for Marine Fisheries	sonhnrimf@gmail.com

SEAFDEC/TD

No.	Name	Sex	Title	Organization	Email
1	Mr. Isara Chanrachkij	M	Project Planning and Management Division Head	SEAFDEC/TD	isara@seafdec.org
2	Ms. Panitnard Weerawat	F	Senior Instructor/Researcher	SEAFDEC/TD	panitnard@seafdec.org
3	Mr. Sukchai Arnupapboon	M	Acting Research and Development Division Head	SEAFDEC/TD	sukchai@seafdec.org
4	Dr. Nopporn Manajit	M	Fishing Technology Section Head	SEAFDEC/TD	nopporn@seafdec.org
5	Dr. Taweekiet Amornpiyakrit	M	Special Departmental Coordinator	SEAFDEC/TD	taweekiet@seafdec.org
6	Mr. Kongpathai Saraphaivanich	M	Training and Information Section Head	SEAFDEC/TD	kongpathai@seafdec.org
7	Ms. Thanyalak Suasi	F	Fisheries Management Section Head	SEAFDEC/TD	thanyalak@seafdec.org
8	Ms. Siriporn Pangsorn	F	Fishing Ground Information Scientist	SEAFDEC/TD	psiriporn@seafdec.org
9	Ms. Suwanee Sayan	F	Senior Program Officer	SEAFDEC/TD	suwanee@seafdec.org
10	Ms. Kanokwan Thobphuk	F	Training and Extension Officer	SEAFDEC/TD	kanokwan@seafdec.org
11	Mr. Rakkiet Punsri	M	Fishery Oceanographer	SEAFDEC/TD	rakkiet@seafdec.org
12	Ms. Rattana Tiaye	F	Fisheries Management Scientist	SEAFDEC/TD	rattana@seafdec.org
13	Ms. Yanida Suthipol	F	Information Technology Officer	SEAFDEC/TD	yanida@seafdec.org
14	Mr. Krit Phusirimongkol	M	Training and Extension Officer	SEAFDEC/TD	krit@seafdec.org

REGIONAL EXPERT

No.	Name	Sex	Title	Organization	Email
1	Dr. Yoshinobu Konishi	M	Expert on larvae fish identification	Japan	ykoni21080@gmail.com

PROJECT COORDINATING UNIT

No.	Name	Sex	Title	Organization	Email
1	Dr. Somboon Siriraksopon	M	Project Director	SEAFDEC/TD	somboon@seafdec.org
2	Ms. Chanikan Vibulsuk	F	Project Officer	SEAFDEC/TD	chanikan.vibulsuk@gmail.com
3	Mrs. Nathacha Sornavaree	F	Administrative Officer	SEAFDEC/TD	natha@seafdec.org
4	Mr. Weerasak Yingyuad	M	Technical Coordinator	SEAFDEC/TD	weerasak@seafdec.org
5	Ms. Nujsara Somjit	F	Finance Officer	SEAFDEC/TD	nujsarasomjit@gmail.com

ANNEX 2 ADOPTED AGENDA

1. OPENING OF THE MEETING
- 1.1 WELCOME AND OPENING ADDRESS
- 1.2 INTRODUCTION OF MEMBERS

2. ORGANISATION OF THE MEETING
- 2.1 ELECTION OF OFFICERS FOR 2021

3. ADOPTION OF THE MEETING AGENDA

4. REPORT OF THE PROJECT DIRECTOR ON PROGRESS WORKS

5. NATIONAL REPORT AS OF 30 JUN 2020, INCLUDING ISSUES, CHALLENGES, AND STRATEGIC PLAN TOWARDS ACHIEVING THE PROJECT TARGET GOALS BY 2022

- 5.1 CAMBODIA
- 5.2 INDONESIA
- 5.3 MALAYSIA
- 5.4 PHILIPPINES
- 5.5 THAILAND
- 5.6 VIET NAM

6. OTHER MATTER
- 6.1 CONTENTS OF THE INDICATORS OF SUSTAINABLE MANAGEMENT OF FISHERIES REFUGIA
- 6.2 REGIONAL ACTION PLAN FOR MANAGEMENT OF TRANSBOUNDARY SPECIES, INDO-PACIFIC MACKEREL (RASTRELLIGER BRACHYSOMA) IN THE GULF OF THAILAND SUB-REGION
- 6.3 REGIONAL TRAINING/WORKSHOP FOR IDENTIFICATION OF FISH LARVAE AND EXPECTED OUTPUTS
- 6.4 MID-TERM REVIEWS
- 6.5 OTHERS

7. DATE AND PLACE OF THE 5TH REGIONAL SCIENTIFIC & TECHNICAL COMMITTEE MEETING

8. CLOSURE OF THE MEETING

ANNEX 3A REPORT OF THE PROJECT DIRECTOR ON PROGRESS WORKS

Executive Summary

The executive summary highlights the progress works during January 2020 to June 2021 by all executing partners including SEAFDEC. All 66 main activities were reported including the planned outputs such as 10 fisheries profiles, 3 revised regulations and fisheries management plans, drafting of the national action plan, two adopted fisheries refugia in Cambodia together with a total of 4 tentative fisheries refugia in Malaysia and Thailand, etc. The activities-based progress works are identified in percentage to indicate the status of works of each project activities. A total of expenditure incurred and co-financing from the executed partners as of 30 June 2021 are presented.

ACTIONS BY THE RSTC4 COMMITTEE:

- Take notes, consideration and suggestion to the executed partners and the PCU for further actions to achieve the target goals by end of 2022.
- To endorse this report.

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 achievements in 2020 until 30 June 2021, including 66 activities conducted by country partners and three regional meetings by SEAFDEC/PCU.

II. PROGRESS WORKS SUPPORT THE ESTABLISHMENT OF 15 REFUGIA SITES

1) CAMBODIA

Three priority fisheries *refugia* sites consist of 1) **Blue swimming crab** (*Portunus pelagicus*) *refugia site* locates in KEP Province, 2) **Juvenile groupers,** particularly Orange-spotted grouper (*Epinephelus coioides) refugia site* locates in KAMPOT Province, and 3) **short mackerel** (*Rastrelliger brachysoma*) *refugia* site locates in KOH KONG Province. The government approved two refugia sites in Koh Kong and Kep Provinces in 2019. During a period from January 2020 until June 2021, twenty-seven main activities were carried out to support the effective management of approved refugia sites in Koh Kong and Kep provinces, including the activities for establishing of Kampot Refugia sites. The highlight activities are as follows:

- Review and drafting of the 5 Year Management Plan for Marine Fisheries Management Area (Fisheries Refugia) in KEP Province through various activities including the stakeholder consultation, committee meetings. In June 2020, Government of Cambodia adopted the 5 year Action Plan for Marine Fisheries Management Plan in Koh Po and Koh Tonsay Archipelago, Kep Province. Two activities were

focused on the baseline/field surveys to support the drafting of Fisheries Profile for Blue swimming crab in Kep.

- Dissemination of MAFF's proclamation on the creation of short mackerel fisheries refugia at Peam Krasob, Koh Kong Province. Many activities to support the implementation such as: 1) develop and implement the enforcement program for the closing season of short mackerel at Peam Krasob, Koh Kong Province; 2) drafting the Action Plan for short mackerel refugia management at Peam Krasob, Koh Kong Province; and 3) continuing the baseline surveys, biological data samplings, mapping, waypoints collection at sea, mooring buoy installation, local consultations, and joining events against IUU Fishing, etc. A total of 14 activities were conducted during the period.
- In Kampot Fisheries Refugia Site, four stakeholder consultations and three field surveys were conducted with aimed to finalize and prepare the Marine Fisheries Management Area map of the Juvenile Grouper Refugia in Kampot province. The collective information from the filed survey is also used for drafting the Fisheries profile of the Grouper Refugia in Kampot Province.
- FiA, led by the Department of Fisheries Conservation (DFC) published the Fisheries Refugia Profiles:
    - for Indo-pacific mackerel in Koh Kong Province,
    - for Blue swimming crab in Kep Province and
    - for juvenile grouper in Kam Pot province.

Preparation for Action Plan for short mackerel refugia management in Koh Kong Provinces (Oct.20)

Buoy deploying and installation at the boundary of blue swimming fisheries refugia in Koh Po, Kep province from 30 Nov.- 2 December 2020

2) INDONESIA

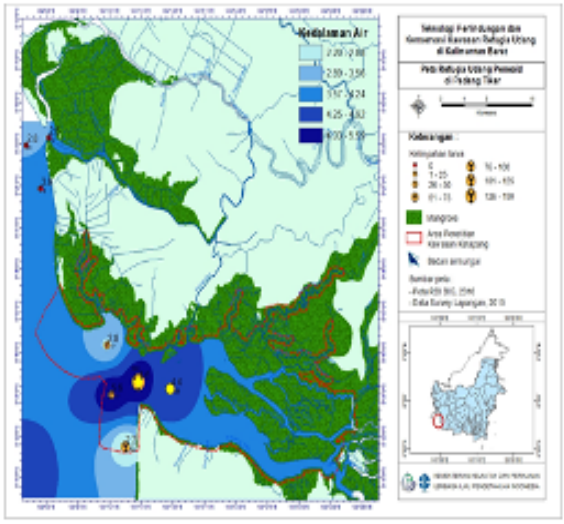
Two priority fisheries refugia sites selected in 2019 consist of 1) Mitre squid (*Uroteuthis chinensis*) refugia site locates in Bangka Belitung (islands) Province, and 2) Indian white shrimp (*Fenneropenaeus indicus*) refugia site locates in West Kalimantan Province. During a period from 2020 until 30 June 2021, the COVID-19 pandemic limited transportation across the provinces where the refugia sites are located. Regarding this, AMFRHR conducted seven activities (not included Q2 due to no reporting) as follows:

- The National Fisheries Refugia Committee Meeting (NFRC) was held in February to finalize the 2020 and onward work plan for several consultations and site surveys. The NFRC also discussed and agreed on hiring a consultant company as local project management supporting unit.
- The project team met with the Directorate General of Marine Spatial Management, MMAF, to discuss and the fisheries refugia characteristic in the MPA regulation.
- Conducted the outreaching scientific community and stakeholders through a virtual seminar on 'Fisheries Refugia for Sustainable Fisheries.' This seminar was part of public awareness to promote local social, economic, and environmental benefits from fisheries refugia implementation.

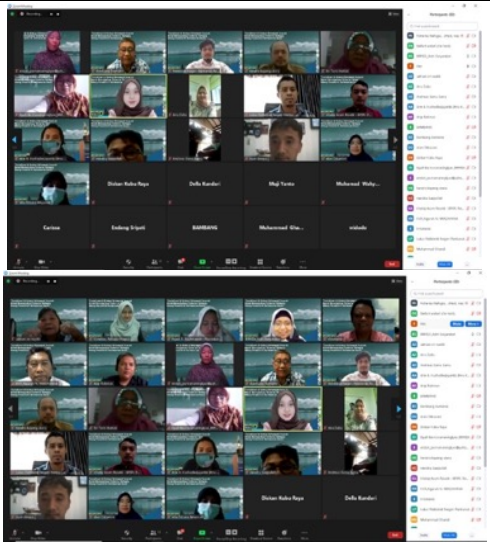
- The 1st National Scientific and Technical Committee (NSTC) Meeting in conjunction with the pre-survey meeting for fisheries refugia was conducted on August 18th, 2020, aiming to discuss fisheries profiles of both refugia sites and map the need for uncovered essential information. The technical plan for conducting a research survey in both Fisheries Refugia Candidates by considering COVID-19 pandemic also resulted. The meeting also synchronizes and accelerates progress among research teams in both locations by considering targeted output on the Fisheries Refugia Project.
- A coordination meeting was held on September 20th to establish a management team or site-based volunteer network in the Bangka Belitung refugia site.
- The Consultative meeting for establishing fisheries refugia of Penaeid shrimp in West Kalimantan were conducted through virtual meeting on 16th -17th February 202. The meeting was aimed to gather information and input from local governments, academics from university and other relevant institutions in West Kalimantan regarding the condition of shrimp fisheries, threats of shrimp stocks and their critical habitats, conservation areas that have been established in West Kalimantan and zoning plans for coastal areas in West Kalimantan.
- The NSTC2 was organized in March 2021 with aims to discuss the result of the survey trip in Bangka Belitung and to synchronize and accelerate progress among research teams in both locations under the coordination of NSTFP

Indonesia National Scientific and Technical Committee Meeting (18 Aug. 20)

Meeting DIRECTORATE GENERAL of Marine Spatial Management (29 May 20)



Critical habitat of shrimp juvenile phase in Padang Tikar Bay



Participants to the Consultative meeting for establishing fisheries refugia of Penaeid shrimp in West Kalimantan

3) MALAYSIA,

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. DOF/Malaysia conducted several research surveys in the coastal and offshore areas to identify the exacted location of spiny lobster and the tiger prawn refugia boundary during the past years. In 2020, DOF/MY finalized the survey results for a further consultation process with the fisheries community during the last Quarter of 2020. Unfortunately, the COVID-19 pandemic seriously affected the work plan; DOF/MY could conduct only two national committee meetings in the Third Quarter, such as National Scientific and Technical Committee and National Fisheries Refugia Committee. Nevertheless, DOF/MY published two scientific papers on P. monodon as a scientific-based fisheries management proposal. The scientific findings are based on studying the distribution, density, and biomass of tiger prawns in Pasu, Bakam, and Lutong Rivers in Miri, Sarawak, indicated essential nursery grounds. It is essential to preserve these nursery grounds to ensure the life cycle of *P. monodon* withstands.

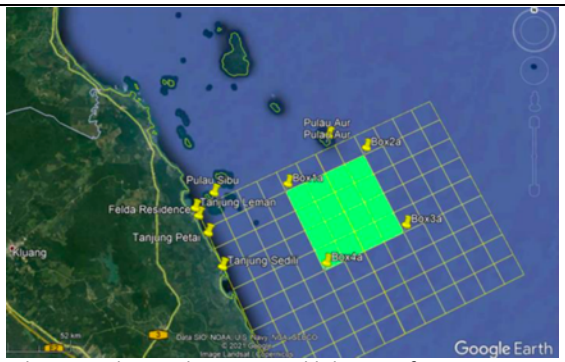
During a period of Q1 and Q2 of 2021, Malaysia conducted two activities:

1) the Online Meeting on Way Forward Fisheries Refugia Project in Malaysia with aims to update the project progress and consult on way forward project implementation to achieve the target goals; and

2) the seminar on the establishment of fisheries refugia for lobster in Tanjung Leman, Johor and tiger prawn in Kuala Baram, Sarawak. This seminar aims to a) discuss on the findings and recommendations of refugia's site selection, b) Information sharing platform between the expertise from Centre of excellence and the Department of Fisheries specifically on the site's characteristic and supporting technical data, c) Integrating research data to determine the boundaries of the refugia establishment area, d) determination of phase of the species life stage that needs to be managed and protected, e) evaluate and identify appropriate management measures based on the findings of the studies, and f) formulate further actions towards the management of refugia areas identified.

View of Sg. Lutong river, one of the nursery grounds for P. monodon.

Seminar on the establishment of fisheries refugia 30 March – 2 April 2021



The green box is the proposed lobster refugia site near Pulau Aur while the white box is the additional refugia site extension for the protection of juvenile spiny lobsters

Proposed site purple line for the fisheries refugia of tiger prawn (*Penaeus monodon)* in Kuala Baram, Sarawak

4) PHILIPPINES

Three priority fisheries *refugia* sites were selected: 1) **Rabbitfish** *refugia* site locates off Bolinao coastal area in Pangasinan Province; 2) **Frigate tuna** *refugia* site locates off the Masinloc coastal area in Zambales Province; and 3) **Mangrove jack** refugia site locates off Coron Islands, Palawan Province.

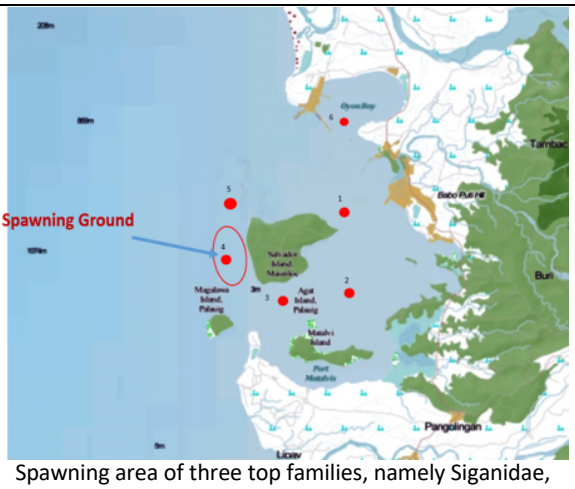
In 2020, references to the information drive from baseline surveys conducted by NFRDi in three refugia sites, the results were presented at the stakeholder consultations where about 413 persons attended (98 in Coron, 173 in Masinloc, and 142 persons in Bolinao). The information drive was successful. The participants supported and cooperated in suggesting activities to give them more knowledge in conserving and protecting the refugia site. One of the participants even voiced out that there concerns about the existing MPAs in the municipality. Most of the participants appreciated the discussion on the commonly essential species in their area.

Moreover, the additional knowledge stakeholders gained in learning the results of the fish eggs, and larvae sampling allowed them to comprehend the importance of protecting the spawning and nursery refugia of their priority species. Lastly, the good thing the project acknowledged is the honesty of the fisherfolk and other participants coming from the different sectors of the community to learn and understand more about fisheries refugia. As part of the project's critical activities, the project can allow the fisherfolk to allocate at least some time for information dissemination in all project activities in the project sites to empower and share the significance of fisheries management in the economic opportunity and habitat protection of the municipality.

NFRDi also conducted other activities in 2020 as follows:

- Refugia Site Management Committee meeting in Bolinao, Pangasinan Province
- Semi-progress meeting to update the project implementation
- Biological data samplings, ichthyoplankton survey and data validation
- At sea mapping for boundary delineation of the proposed refugia in Coron, Palawan Province
- Joining the partner events such as BFAR-USAID Fish Right Strategic Planning Program.

The activities in Q1 and Q2 of 2021 will be updated after receiving the progress from NFRDi.



Spawning area of three top families, namely Siganidae, Carangidae and Scrombidae in Masinloc, Zambales


One of the information drive activities in Bolinao, Pangasinan

5) THAILAND

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. Reference to the past technical works, research surveys, as well as the socio-economic survey, the achievements presented in 2020 are as follows:

- DOF/TH come up with critical scientific papers for further consultation with the stakeholders. The fisheries profiles for short mackerel in Trat province and the profiles for blue swimming crab in Surat Thani Province, and the reports of area context and socio-economic in both refugia sites are

published. These are the main achievements in 2020 for further consultations with relevant stakeholders.

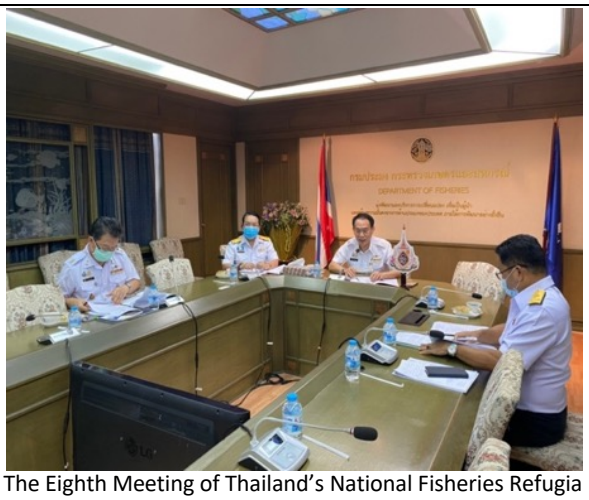
- Moreover, DOF/TH reforms the law, regulation, and fisheries management by including the progress in legislation on Fisheries Refugia in Trat and Surat Thani Provinces. In the Refugia establishment, the provincial-approved fisheries refugia site and management measures will be proposed to the Fisheries Resource Conservation Measure Determination Committee of the DOF/TH for approval before further consideration and adoption by the Ministry of Agriculture and Cooperatives. The notification on the fisheries refugia management measures can be issued later.
- DOF/TH conducted the Site-based Management Board in Surat Thani Refugia site to update and discuss further on Technical Information of Coastal Resources and Ecosystems including Boundary Delineation and Management Planning of Fisheries Refugia for Blue Swimming Crab in Koh Sed in Koh Sed, Ban Don Bay, Surat Thani Province.
- The Stakeholder Consultation Workshop for short mackerel refugia was conducted to discuss a critical period for short mackerel, prohibited fishing gears, and proposed refugia boundary area. The workshops were conducted at community levels in 5 Districts, 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 final decision on fisheries refugia boundary and management plan is based on the vote of fishers and relevant stakeholders.
- The fourth National Scientific and Technical Committee and the seventh National Fisheries Refugia Committee were held in November 2020 at the DOF headquarter in Bangkok. One of the meeting results is the proposed fisheries refugia boundary for Blue swimming crab around Koh Sed (2 x3 km2), Ban Don Bay, Surat Thani Province.

In 2021, there are two activities as follows:

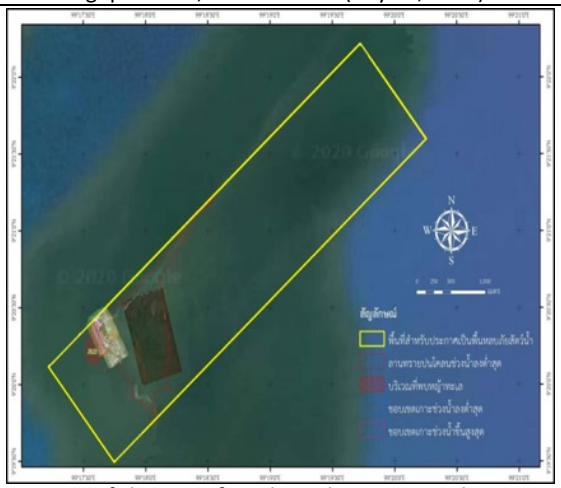
- Local Consultation Workshops on Fisheries Refugia Boundary and Management Planning in Surat Thani Site. The main activity aimed to enhance local stakeholder involvement in fisheries refugia boundary delineation and management planning in Surat Thani Site. A total number of 497 participants in 7 districts attended the workshops.
- The Eighth Meeting of Thailand's National Fisheries Refugia Committee was held as a virtual meeting on 19 April 2021. The solutions of the meeting are 1) Geographic location of fisheries refugia site at Koh Sed was to be prepared by Chumphon Fisheries Research and Development Center prior to submitting to Thailand's National Scientific and Technical Committee for approval, and 2) Notification for prescribing fisheries refugia site and its management measures to be drafted by Surat Thani Provincial Fisheries Office prior to certifying by the Law Division of the Department of Fisheries. The certified notification was subsequently to be proposed for approval at Surat Thani Provincial Fisheries Committee meeting.

Blue swimming crab refugia and seagrass habitat linkages around Koh Sed, Surat Thani Province.

Voting for the proposed Refugia boundary area in Laem Ngop District, Trat Province (July 15, 2020)



The Eighth Meeting of Thailand's National Fisheries Refugia Committee held on 19 April 2021 (virtual meeting)



Tentative fisheries *refugia* boundary in Surat Thani Site resulted from the stakeholder consultation.

6) VIET NAM

D-Fish planned to conduct four activities in 2020

1. Review existing information and data on fisheries and coastal habitats at sites, including needs;
2. Conduct consultations (including at-sea) to draft maps of fisheries refugia for priority species;
3. Review of policy and legal aspects on refugia (terminology, procedures, recommended reforms); and
4. National expert consultation to formulate agreed recommendations for policy and legal reforms.

Due to un circumstance condition, the activities are postponed to Q3/2021.

7) REGIONAL PROGRAM BY SEAFDEC/PCU

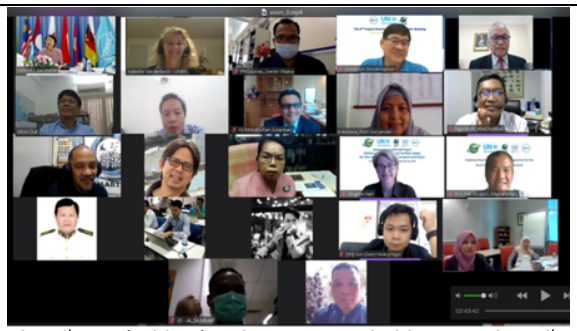
In 2020, the PCU continuously monitored and updates all planned outputs from country partners to the Refugia Websites. The PCU also conducted three regional meetings as follows:

- The meeting aimed to update the progress work and draft fisheries refugia profiles from six country partners and the regional program, particularly the Regional Action Plan status for short mackerel and the Regional guidelines on Indicators for management of fisheries refugia. The proposed Concept Note for SSFA on Improving Healthy Ocean Ecosystem through best practices and fishing gear

Innovations (or FishTrawl Project) was also discussed and finalized for further submission to the UNEP through SEAFDEC for further development of the full concept proposal.

- The Third Project Steering Committee Ad-hoc Meeting (PSC3-Adhoc) was held online on June 16th, 2020, to discuss the proposed cost Workplan and budget revision for project extension in 2021 and 2022. The Committee agreed and adopted two issues: 1) a two-year project extension with no extra cost from 2021-2022, and 2) a 10% reduction of the national unspent as of December 31st, 2019, to run the PCU an extended period.
- The Fourth Project Steering Committee Ad-hoc Meeting was also held online on October 6th, 2020, to finalize the proposed Workplan for Q3-Q4 2020 to 2022 and budget revision as of June 30th, 2020, to support a two-year extension (2021-2022). The Committee also discussed the arrangement for extending the Project Coordination Agreement (PCA) between SEAFDEC and UNEP and the Amendment of the Letter of Agreement between SEAFDEC and country partners.
- The Regional Training Workshop on Larval Fish Identification and Fish Early Life History Science planned in September 2020 was postponed due to the COVID-19 impact. The PCU, in collaboration with SEAFDEC/TD, is expected to organize in 2021.
- The PCU published eight Regional Program Reports: please learn more and download from our website: https://fisheries-refugia.org

The 2ND RSTC Meeting held in Hai Phong, Viet Nam on February 6th - 7th, 2020



The 4th PSC (Ad-hoc) Online Meeting held on October 6th, 2020

Publications of Regional Programs in 2020

III. ACTIVITY-BASED PROGRESS IN PERCENTAGE AS OF 30 JUN 2021

Outputs	CAMBODIA	INDONESIA	MALAYSIA	PHILIPPINE	THAILAND	VIET NAM	PCU	Average
Component 1 - Identification and management of fisheries and critical habitat linkages at priority fisheries refugia								as of 30/6/2021
Activity 1.1	70%	60%	100%	100%	100%	0%	N/A	86%
Activity 1.2	85%	40%	100%	50%	100%	0%	N/A	75%
Activity 1.3	70%	40%	30%	38%	80%	0%	N/A	52%
Activity 1.4	70%	40%	10%	25%	80%	0%	N/A	45%
Activity 1.5	70%	10%	0%	75%	80%	0%	N/A	47%
Average %	73%	38%	48%	58%	88%	0%		61%
Component 2 - Improving the management of critical habitats for fish stocks of transboundary significance								
Activity 2.1	80%	30%	30%	25%	100%	0%	N/A	53%
Activity 2.2	80%	30%	20%	10%	100%	0%	N/A	48%
Activity 2.3	80%	40%	20%	45%	70%	0%	N/A	51%
Activity 2.4	70%	0%	20%	25%	100%	0%	N/A	43%
Activity 2.5	20%	40%	100%	60%	80%	0%	N/A	60%
Activity 2.6	90%	40%	10%	50%	80%	0%	N/A	54%
Activity 2.7	50%	40%	40%	25%	100%	0%	N/A	51%
Activity 2.8	40%	40%	50%	25%	50%	0%	N/A	41%
Activity 2.9	N/A	N/A	N/A	N/A	N/A	N/A	100%	100%
Activity 2.10	N/A	N/A	N/A	N/A	N/A	N/A	60%	60%
Average %	64%	33%	36%	33%	85%	0%	80%	56%
Outputs	CAMBODIA	INDONESIA	MALAYSIA	PHILIPPINE	THAILAND	VIET NAM	PCU	
Component 3 - Information Management & Dissemination in support of national-level implementation of fisheries refugia concept								
Activity 3.1	50%	30%	30%	10%	80%	0%	N/A	40%
Activity 3.2	80%	30%	60%	40%	100%	0%	N/A	62%
Activity 3.3	60%	40%	60%	40%	80%	0%	N/A	56%
Activity 3.4	N/A	N/A	N/A	N/A	N/A	N/A	75%	75%
Activity 3.5	N/A	N/A	N/A	N/A	N/A	N/A	65%	65%
Average %	63%	33%	50%	30%	87%	0%	70%	60%
Component 4 - National and Regional coordination for integrated fish stock and critical habitat management								
Activity 4.1	70%	40.00%	100%	50%	80%	40%	N/A	76%
Activity 4.2	80%	50%	100%	50%	80%	40%	N/A	80%
Activity 4.3	70%	30%	50%	67%	80%	40%	N/A	67%
Activity 4.4	N/A	N/A	N/A	N/A	N/A	N/A	75%	75%
Activity 4.5	N/A	N/A	N/A	N/A	N/A	N/A	80%	80%
Activity 4.6	N/A	N/A	N/A	N/A	N/A	N/A	85%	85%
Average %	73%	40%	83%	56%	80%	40%	80%	77%
Completion	68%	36%	54%	44%	85%	10%	77%	

IV. EXPENDITURE INCURRED AS OF 30 JUN 2021

Appendix13_Expenditure Report for Q2-2021

Annex 13 - QUARTERLY EXPENDITURE STATEMENT and UNLIQUIDATED OBLIGATIONS REPORT (US$)*

Project title:	Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand
Project number:	
Project implementing agency/organization:	Southeast Asian Fisheries Development Centre (SEAFDEC)
Project implementation period:	From: Jan. 2017 To: Dec. 2022
Reporting period:	From: 01-Apr-21 To: 30-Jun-21

UNEP Budget Line		UNEP approved budget		Actual expenditures incurred**							
		Total project budget	Current YEAR budget	Cumulative expenditures for current YEAR	Disbursements for current QUARTER	Budget Line Adjustment	Total expenditures for current QUARTER	Total expenditures for current YEAR	Cumulative expenditures for previous YEARS	Total cumulative expenditures to date	Cumulative unspent balance to-date
		A	B	C	D	E	F=D+E	G=C+F	H	I=G+H	J=A-I
1100	Project personnel	238,998	86,397.00	8,456.80	15,408.51		15,408.51	23,865.31	123,642.62	147,507.93	91,490.07
1200	Consultants	1,315,005	316,227.41	14,721.14	16,221.15		16,221.15	30,942.29	771,075.96	802,018.25	512,986.75
1300	Administrative support	-	-	-	-	-	-	-	-	-	-
1600	Travel on official business	273,779	17,820.00	3,657.25	951.25	-	951.25	4,608.50	231,405.45	236,013.95	37,765.05
2100	Sub-contracts (UN entities)	-	-	-	-	-	-	-	-	-	-
2200	Sub-contracts (supporting organizations)	274,064	142,328.95	2,000.00	2,100.00		2,100.00	4,100.00	93,952.41	98,052.41	176,011.59
2300	Sub-contracts (for commercial purposes)	81,129	28,351.32	499.28	770.00		770.00	1,269.28	36,712.99	37,982.27	43,146.73
3200	Group training	293,418	49,976.00	6,194.61	1,847.83		1,847.83	8,042.44	131,348.79	139,391.23	154,026.77
3300	Meetings/Conferences	316,330	98,278.42	954.32	1,023.04		1,023.04	1,977.36	157,186.19	159,163.55	157,166.45
4100	Expendable equipment	5,336	1,249.00	254.93	52.00		52.00	306.93	2,817.91	3,124.84	2,211.16
4200	Non-expendable equipment	43,761	5,469.77	-	5,068.60		5,068.60	5,068.60	38,415.22	43,483.82	277.18
4300	Premises	18,585	-	-	-		-	-	13,766.00	13,766.00	4,819.00
5100	Operation and maintenance of equipment	877	880.00	70.00	45.00		45.00	115.00	437.00	552.00	325.00
5200	Reporting costs	30,489	18,348.42	816.12	669.08		669.08	1,485.20	7,221.96	8,707.16	21,781.84
5300	Sundry	8,229	2,236.15	133.57	272.59		272.59	406.16	5,862.01	6,268.17	1,960.83
5400	Hospitality and entertainment	-	-	-	-		-	-		-	-
5500	Evaluation	100,000	40,000.00	-	-		-	-		-	100,000.00
99	GRAND TOTAL	3,000,000 1)	807,562.44	37,758.02	44,429.05	-	44,429.05	82,187.07	1,613,844.51	1,696,031.58	1,303,968.42

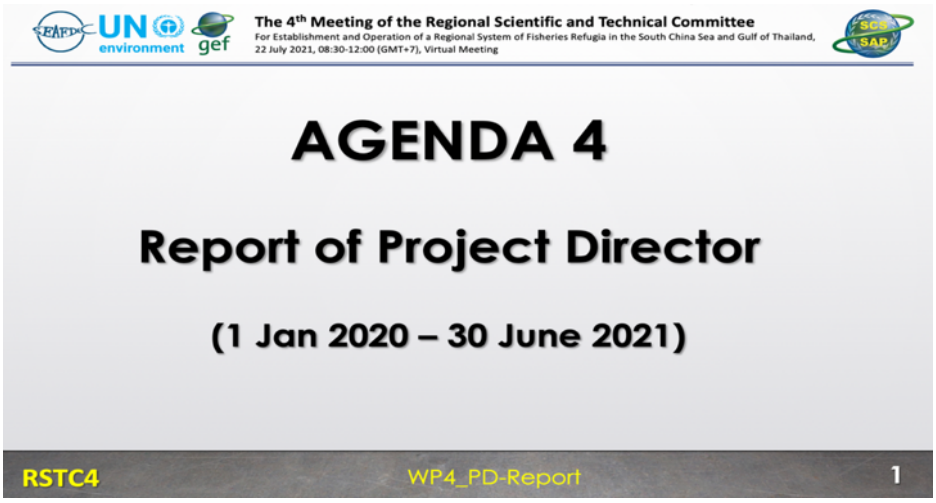
Notes New Budget Revision

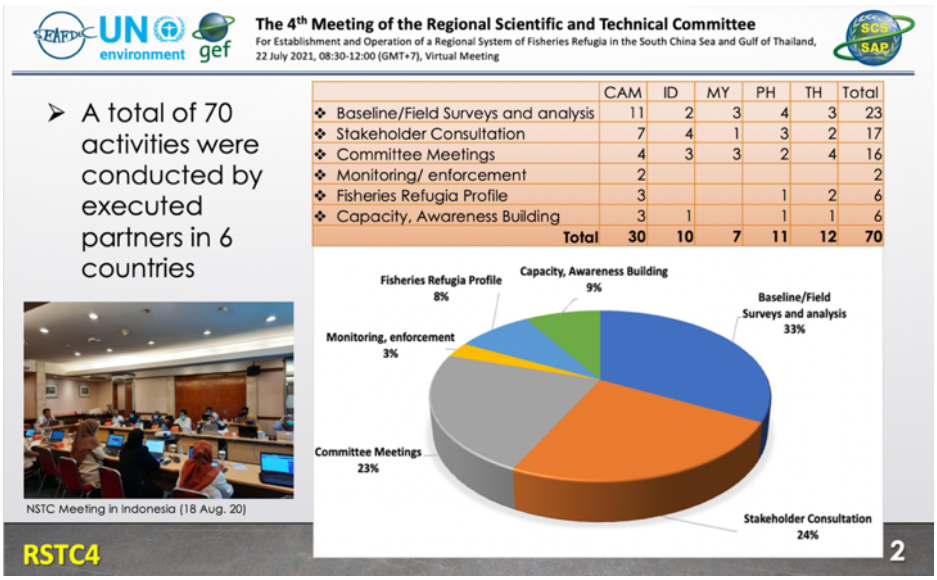
V. CO-FINANCING AS OF 30 JUN 2021

COFINANCE REPORT AS OF 30 JUN 2021 (Q2/2021)

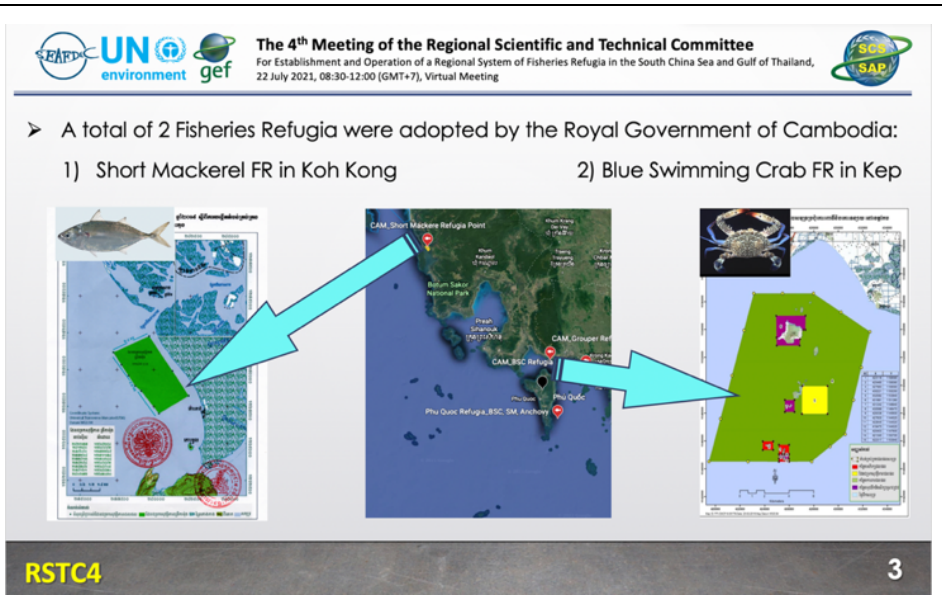
		CAMBODIA	INDONESIA*	MALAYSIA	PHILIPPINES	THAILAND	VIET NAM*	ALL COUNTRY	SEAFDEC	TOTAL
Co-finance COMMITTED (A)	In-kind	1,473,235	609,107	443,424	647,300	783,888	1,079,852	5,036,806	2,456,000	7,492,806
	Cash	65,488	581,776	92,500	203,880	129,800	7,520	1,080,964	3,876,400	4,957,364
	Sub-Total (A)	1,538,723	1,190,883	535,924	851,180	913,688	1,087,372	6,117,770	6,332,400	12,450,170
2017 Actual Co-finance	In-kind	253,632	-	160,736	199,392	98,016	-	711,776	209,344	
	Cash	1,850	-	32,500	7,326	22,922	-	64,598	122,360	
	Sub-Total (B1)	**255,482**		**193,236**	**206,718**	**120,938**		**776,374**	**331,704**	
2018 Actual Co-finance	In-kind	247,392	-	412,192	191,712	200,512	-	1,051,808	668,096	
	Cash	1,248	-	79,423	19,119	132,050	-	231,840	425,075	
	Sub-Total (B2)	**248,640**		**491,615**	**210,831**	**332,562**		**1,283,648**	**1,093,171**	
2019 Q1-Q2 Actual Co-finance	In-kind	161,920	-	183,296	218,656	108,096	-	671,968	99,968	
	Cash	5,320	-	41,474	5,947	-	-	52,741	48,706	
	Sub-Total (B2)	**167,240**	-	**224,770**	**224,603**	**108,096**	-	**724,709**	**148,674**	
2019 Q3-Q4 Actual Co-finance	In-kind	174,496	115,936	162,576	434,656	99,296	-	986,960	242,528	
	Cash	890	-	66,487	53,045	95,804	-	216,226	192,118	
	Sub-Total (B2)	**175,386**	**115,936**	**229,063**	**487,701**	**195,100**		**1,203,186**	**434,646**	
2020 Q1+Q2 Actual Co-finance	In-kind	140,096	85,536	94,816	338,496	101,376		760,320	80,288	
	Cash	3,800		5,802	3,430	-		13,032	21,600	
	Sub-Total (B2)	**143,896**	**85,536**	**100,618**	**341,926**	**101,376**	-	**773,352**	**101,888**	
2020 Q3 Actual Co-finance	In-kind	140,528	120,528	51,618	144,048	127,728		584,450	50,784	
	Cash	1,950	-	-	4,563	-		6,513	14,500	
	Sub-Total (B2)	**142,478**	**120,528**	**51,618**	**148,611**	**127,728**	-	**590,963**	**65,284**	
2020 Q4 Actual Co-finance	In-kind	101,168	48,208	66,618	144,848	65,488	42,768	469,098	281,184	
	Cash	1,500	-	41,914	4,563	-	500,000	547,976	99,600	
	Sub-Total (B2)	**102,668**	**48,208**	**108,532**	**149,411**	**65,488**	**542,768**	**1,017,074**	**380,784**	
2021 Q1 Actual Co-finance	In-kind	95,568	57,488	45,618	42,768	122,288	42,768	406,498	140,464	
	Cash	1,950	-	1,816	-	-	-	3,766	16,092	
	Sub-Total (B2)	**97,518**	**57,488**	**47,434**	**42,768**	**122,288**	**42,768**	**410,264**	**156,556**	
2021 Q1 Actual Co-finance	In-kind	95,248	47,888	46,768	217,968	60,528	42,768	511,168	107,744	
	Cash	1,100	-	1,848	10,096	-	-	13,044	8,807	
	Sub-Total (B2)	**96,348**	**47,888**	**48,616**	**228,064**	**60,528**	**42,768**	**524,212**	**116,551**	640,763
Total Co-finance as of 30 March 2021	In-kind (US$)	**1,410,048**	**475,584**	**1,224,238**	**1,932,544**	**983,328**	**128,304**	**6,154,046**	**1,880,400**	**8,034,446**
	Cash (US$)	**19,608**	-	**271,264**	**108,088**	**250,776**	**500,000**	**1,149,736**	**948,858**	**2,098,594**
Grand Total Co-finance as of 31 March 2021		**1,429,656**	**475,584**	**1,495,502**	**2,040,632**	**1,234,104**	**628,304**	**7,303,782**	**2,829,258**	**10,133,040**

ANNEX 3B PRESENTATION OF THE PROJECT DIRECTOR ON PROGRESS WORKS





	CAM	ID	MY	PH	TH	Total
Baseline/Field Surveys and analysis	11	2	3	4	3	23
Stakeholder Consultation	7	4	1	3	2	17
Committee Meetings	4	3	3	2	4	16
Monitoring/ enforcement	2					2
Fisheries Refugia Profile	3			1	2	6
Capacity, Awareness Building	3	1		1	1	6
Total	**30**	**10**	**7**	**11**	**12**	**70**



The 4th Meeting of the Regional Scientific and Technical Committee
For Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand,
22 July 2021, 08:30-12:00 (GMT+7), Virtual Meeting

- Five Fisheries Refugia are in processing for adoption:
  1) In Trat, Thailand for Short Mackerel
  2) In Surat Thani, Thailand for Blue Swimming Crab
  3) In Tanjung Leman, Malaysia for Spiny Lobster
  4) In Miri, Malaysia for Tiger Prawn
  5) In Kampot, Cambodia for Juvenile Grouper

RSTC4 4

The 4th Meeting of the Regional Scientific and Technical Committee
For Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand,
22 July 2021, 08:30-12:00 (GMT+7), Virtual Meeting

- **Revision of fisheries law, regulation, fisheries management plan, Strategic plan:**

1) Cambodia adopted the 5-year Action Plan for Marine Fisheries Management Area, including management measures in KEP Province
2) Cambodia also adopted the Strategic Plan for Fisheries Conservation and Management 2020 – 2029, (includes FMA: Fisheries Management Area/FR)
3) Cambodia revised Fisheries Law by including FR
4) Thailand reformed the law, regulation, and management of Fisheries Refugia
5) Malaysia evaluate and identify management measures based on scientific findings.

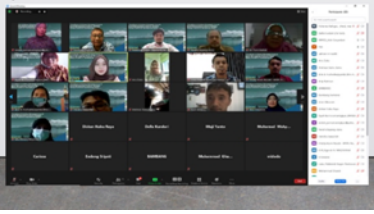
Preparation for Action Plan for short mackerel refugia management in Koh Kong Provinces (Oct.20)

RSTC4 5

The 4th Meeting of the Regional Scientific and Technical Committee
For Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand,
22 July 2021, 08:30-12:00 (GMT+7), Virtual Meeting

- **Stakeholder Consultations:**

1) Cambodia conducted 4 consultations and 3 field surveys to finalize the Marine Fisheries Management Area map of the Juvenile Grouper Refugia in Kampot province.
2) Philippines conduct Stakeholder consultations in three priority Refugia sites, a total of 413 persons attended.
3) Consultation Meeting for establishing fisheries refugia of Penaeid shrimp in West Kalimantan, Indonesia



RSTC4 6

The 4th Meeting of the Regional Scientific and Technical Committee
For Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand,
22 July 2021, 08:30-12:00 (GMT+7), Virtual Meeting

- **Stakeholder Consultations (Continued):**

4) Thailand conducted 2 Stakeholder Consultation to finalize the fisheries refugia boundary areas:
   1. At Trat for short mackerel: five meetings in 5 districts. A total of 400 stakeholders engaged in the discussion
   2. At Surat-thani for blue swimming crab: covering 7 Districts where 497 stakeholders engaged in the discussion

Voting for the proposed Refugia boundary area in Trat, Thailand (July 15, 2020)

RSTC4 7

The 4th Meeting of the Regional Scientific and Technical C
For Establishment and Operation of a Regional System of Fisheries Refugia in the South Chi
22 July 2021, 08:30-12:00 (GMT+7), Virtual Meeting

Updates Available
Do you want to restart to install these updates now or try tonight?

- **Fisheries Refugia Profiles:**

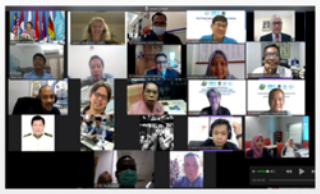
1) Profile for Short Mackerel in Trat, Thailand
2) Profile for Short Mackerel in Koh Kong, Cambodia
3) Profile for BSC in Surat Thani, Thailand
4) Profile for BSC in Kep, Cambodia
5) Profile for Grouper in Kampot, Cambodia
6) Profiles for Philippines: including three priority sites

RSTC4 8

The 4th Meeting of the Regional Scientific and Technical Committee
For Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand,
22 July 2021, 08:30-12:00 (GMT+7), Virtual Meeting

- **Regional Programs:**

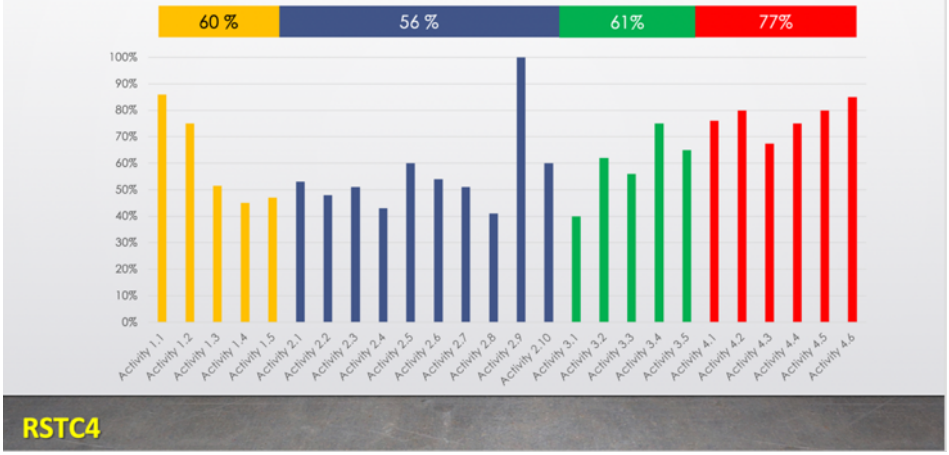
1) The Third Regional Scientific and Technical Committee Meeting (RSTC3) was held on February 5th-7th, 2020, in Hai Phong, Viet Nam.
2) The Third Project Steering Committee Ad-hoc Meeting (PSC3-Adhoc) was held online on June 16th, 2020,
3) The Fourth Project Steering Committee Ad-hoc Meeting was also held online on October 6th, 2020
4) Information and Knowledge dissemination
5) Refugia Website updated.



RSTC4 9

The 4th Meeting of the Regional Scientific and Technical Committee
For Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand,
22 July 2021, 08:30-12:00 (GMT+7), Virtual Meeting

Progress in Percentage (by activities)



RSTC4

The 4th Meeting of the Regional Scientific and Technical Committee
For Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand,
22 July 2021, 08:30-12:00 (GMT+7), Virtual Meeting

Cumulative Expenditures To-date (As of 30 June 2021

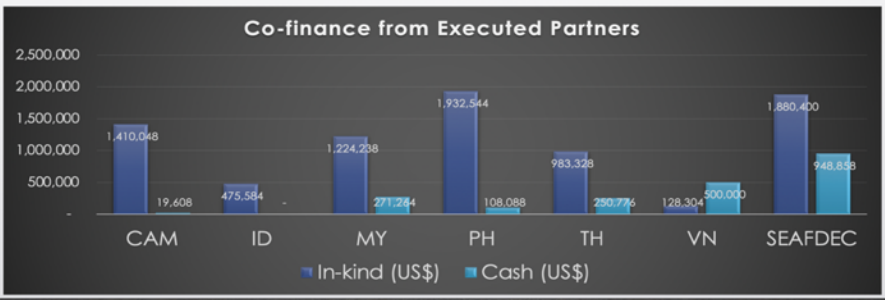
UNEP Budget Line		Budget Allocation (2nd Revision)	Total cumulative expenditures to date	Cumulative Unspent balance to date
1100	Project personnel	238,998	132,099	106,899
1200	Consultants	1,315,005	785,797	529,208
1300	Administrative support	-	-	-
1600	Travel on official business	273,779	235,063	38,716
2100	Sub-contracts (UN entities)	-	-	-
2200	Sub-contracts (supporting organizations)	274,064	95,952	178,112
2300	Sub-contracts (for commercial purposes)	81,129	37,212	43,917
3200	Group training	293,418	137,543	155,875
3300	Meetings/Conferences	316,330	158,141	158,189
4100	Expendable equipment	5,336	3,073	2,263
4200	Non-expendable equipment	43,761	38,415	5,346
4300	Premises	18,585	13,766	4,819
5100	Operation and maintenance of equipment	877	507	370
5200	Reporting costs	30,489	8,038	22,451
5300	Sundry	8,229	5,996	2,233
5400	Hospitality and entertainment	-	-	-
5500	Evaluation	100,000	-	100,000
	GRAND TOTAL	**3,000,000**	**1,651,603**	**1,348,397**

RSTC4

The 4th Meeting of the Regional Scientific and Technical Committee
For Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand,
22 July 2021, 08:30-12:00 (GMT+7), Virtual Meeting

Co-financing from Executed Partners as of 30 June 2021

	CAM	ID	MY	PH	TH	VN	SEAFDEC	TOTAL
In-kind (US$)	1,410,048	475,584	1,224,238	1,932,544	983,328	128,304	1,880,400	8,034,446
Cash (US$)	19,608	-	271,264	108,088	250,776	500,000	948,858	2,098,594
	1,429,656	475,584	1,495,502	2,040,632	1,234,104	628,304	2,829,258	10,133,040



RSTC4 12

ANNEX 4 NATIONAL REPORT OF CAMBODIA

PART 1: Progress and status of project implementation

Indicators	Name/Location/Province	Target Species	Status		Estimated Refugia Size (Hectares)	Marine Habitat linkage		Refugia Profile (done/not yet)
			Adopted	*In process* (expected date)		**Type** (coral, seagrass, mangrove)	**Estimated Size (ha)**	
Fisheries Refugia Adoption	Marine Fisheries Management Area including Fisheries Refugia at Koh Po, Kep province	Blue Swimming Crab (*Portunus pelagicus*)	12 April 2018		417 ha	- Coral reef, - Sea grass - Mangrove	Coral reef = 52ha Sea grass= 2790ha Mangrove= 1005ha	Done
	Fisheries Refugia at Peam Krosob, Koh Kong province	Short Mackerel (*Rastrelliger brachysoma*)	16 Sept. 2019		1283 ha	- Coral reef, - Sea grass - Mangrove	Coral reef = 602ha Sea grass= 3993ha Mangrove= 62000ha	Done
	Marine Fisheries Management Area including Fisheries Refugia at Trapaing Ropaov, Kampot province	Grouper *(Epinephelus coioides)*		Processing	N/A	- Coral reef, - Sea grass - Mangrove	Coral reef = 953ha Seagrass= 25000ha Mangrove= 1900ha	Finalizing process
	If not yet achievement, give a reason and strategic workplan including expected date for completion: - Due to overlapping between Marine Fisheries Management Area (MFMA) including grouper refugia and Development Company as well as COVID 19 Pandemic outbreak. However the new boundary of MFMA has been revised and sent to Kampot Administration for further action. We expect to adopt Marine Fisheries Management Area including Fisheries Refugia at Kampot province in December 2021. - Fisheries refugia profile will be completed in September 2021							
	Willingness of fisheries and environment sectors to agree on Establishment of Fisheries Refugia: Both sectors feel satisfied and happy in the establishment of fisheries refugia in following purposes: – To manage sustainable marine fisheries resources, biodiversity, and ecosystem,							

	– To ensure sustainable fish stock, – To ensure sustainable fishing in order to enhance community livelihood depending on the natural resources, and – To strengthen the adaptation of climate change.

Indicators	***Site***	***List of the key community/stakeholder***	***Issues/problems in the establishment***	***How to achieve?***
community / stakeholder engagement in establishing of Fisheries Refugia and implementation of agreed management measures	**Kep**	• Governor of Kep Province • Deputy Governor of Kep Province • Fisheries Administration • Provincial Department of Agriculture, Forestry, and Fisheries • Provincial Police • Provincial Military Police • Maritime Police No.430 • Provincial Department of Economy and Finance • Provincial Department of Planning • Provincial Department of Environment • Provincial Department of Tourism • Provincial Department of Public Works and Transports • Department of Land and Construction • Governor of Kep district • Governor of Damnak Chorng Ore district • Kep Fisheries Administration Cantonment/DoA • Kep Provincial Administration • Private Sector • IUCN • MCC (local NGO based in Koh Arch Ses in Kep province)	• Hard to set times for meeting at provincial level, especially meetings with provincial administration leader were proponed for many times • Changing Deputy Governor of Kep province responsible in the preparation of establishment of marine fisheries management area including blue swimming crab refugia. • Thus, establishment process of marine fisheries management area including blue swimming crab was delayed for long time	– Stakeholder consultation meeting at local level, conducted to identify sites, prepare map and boundary, size, and set certain way points. Participants are from FiA, provincial department of agriculture, forestry, and fisheries, fisheries administration cantonment, local authorities, community fisheries, fishermen, private sector, and NGO involved, – Provincial stakeholder consultation meeting with provincial administration (chair person of meeting by provincial deputy governor), FiA, relevant provincial departments, provincial police, provincial military police, district authorities, local authorities, private sector, and NGOs involved to check, verify, finalize the map, boundary, size, and way points, – Stakeholder consultation meeting at nation level with FiA's Law team to check the format of proclamation preparation on the establishment of marine fisheries management area including fisheries refugia sites, – Stakeholder consultation meeting at nation level with MAFF's law team, FiA, provincial administration, provincial department of agriculture, forestry, and fisheries, and fisheries administration cantonment to check and finalize the format of proclamation on the establishment of marine fisheries management area including fisheries refugia sites, and – Signed and stamped on the proclamation by Minister of Agriculture, Forestry, and Fisheries.

		• Local Authorities (Head of 5 Commune Council) • Head of 5 Community Fisheries		
	Koh Kong	• Deputy Governor of Koh Kong Province • Fisheries Administration • Provincial Department of Agriculture, Forestry, and Fisheries • Provincial Police • Provincial Military Police • Maritime Police No.269 • Provincial Department of Environment • Provincial Department of Tourism • Provincial Department of land and construction • Mondol Sema district authority • Koh Kong district authority • Kep Fisheries Administration Cantonment/DoA • Kep Provincial Administration • Private Sector • IUCN • WCS • FFI • Local Authorities • Community Fisheries	Hard to set times for meeting at province level, especially meetings with provincial administration leader were delayed for five times	– Stakeholder consultation meetings at local, conducted to identify sites, prepare map and boundary, size, and set certain way points. Participants were from FiA, provincial department of agriculture, forestry, and fisheries, fisheries administration cantonment, local authorities, community fisheries, fishermen, private sector, and NGOs involved, – Stakeholder consultation meetings at provincial level, conducted to check, verify, finalize the map, boundary, size, and way points. Participants are from provincial administration (chairperson of meeting by provincial deputy governor), Fisheries Administration, relevant provincial departments, provincial police, provincial military police, district authorities, local authorities, private sector, and NGOs involved, – Stakeholder consultation meeting at nation level with FiA's Law team to check the format of proclamation preparation on the establishment of marine fisheries management area including fisheries refugia sites, – Stakeholder consultation meeting at nation level with MAFF's law team, FiA, provincial administration, provincial department of agriculture, forestry, and fisheries, and fisheries administration cantonment to check and finalize the format of proclamation on the establishment of marine fisheries management area including fisheries refugia sites, and – Signed and stamped on the proclamation by Minister of Agriculture, Forestry, and Fisheries.

	Kampot	• Deputy Governor of Kampot Province • Fisheries Administration • Provincial Department of Agriculture, Forestry, and Fisheries • Provincial Police • Provincial Military Police • Maritime Police No.241 • Provincial Department of Environment • Provincial Department of Tourism • Provincial Department of land and construction • Tek Chhou district authority • Kep Fisheries Administration Cantonment/DoA • Kep Provincial Administration • Private Sector • WEA • Prek Thnaot Commune • Tro Paing Ropaov Community Fisheries • Prek Thnaot Community Fisheries • Chhorn Horn Community Fisheries	– Site of establishment of marine fisheries management area including fisheries refugia overlapped with Development Company, so the new boundary of marine fisheries management area including grouper refugia sites has been revised and sent to kampot provincial administration for further action. – COVID 19 outbreak in the province	– Stakeholder consultation meeting at local, conducted to verify and approve new boundary of marine fisheries management area including grouper refugia site and development company – Stakeholder consultation meeting at provincial level to finalize new boundary and development company – Stakeholder consultation meeting at nation level with MAFF's law team, provincial administration, provincial department of agriculture, forestry, and fisheries, and fisheries administration cantonment to check and finalize the proclamation on the establishment of marine fisheries management area including fisheries refugia sites, and Signed and stamped on the proclamation by Minister of Agriculture, Forestry, and Fisheries.

Indicators	***Progress and status***	***Remarks***
Reform of national policy, legal and regulatory frameworks governing the management of fisheries refugia	– 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. – Marine Fisheries Management Area including Blue swimming crab Fisheries Refugia at Koh Po and Koh Tonsay Archepelago, Kep province is officially promulgated by the Minister of MAFF on 12 April 2018, which covers the total area of 11307 including 417ha for blue swimming crab	Amendment of fisheries law in Cambodia has not been adopted yet

	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. – Mackerel Fisheries Refugia 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. – 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. New boundary of marine fisheries management area including grouper refugia site has been revised and sent to Kampot Administration to take further action.	Marine fisheries management area including grouper refugia site will be adopted in December 2021

Indicators	***Sharing country experience on changing of fisherfolk attitude***	***Remarks***
Status of enabling environment reform including extent of behavioural change among small-scale fisherfolk at refugia sites	After the Royal Government of Cambodia making the policy reform of decentralization, Ministry of Agriculture, Forestry, and Fisheries made decentralization to sub-national to manage natural resources by themselves at the end of 217. Coincidentally two proclamations on the establishment of marine fisheries management area including fisheries refugia in Kep and Koh Kong provinces are issued by Minister of Agriculture, Forestry, and Fisheries in 2018 and 2019. In this connection, small scale fisherfolk at fisheries refugia sites, especially community fisheries has been observed that they have changed their behaviors in term of participation in management of marine fisheries recourse in order to ensure fish stock and sustainable fisheries resource utility. In particular, community fisheries took part in disseminating closed fishing during spawning season (i.e. mackerel and blue swimming crab), enforcing law of fisheries and regulation, and patrolling to monitor illegal fishing action happening at refugia sites.	

PART 2: Statistical Data

Indicators	*Type of Boat*	2005	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
Number of fishing boat at refugia sites from 2005 - 2020 in Kep province	Fishing boats without engine											93	134	134	134	134	134
	Fishing boats with engine in <10hp	**Kep province was separated from Kampot province in 2015**										193	460	460	0	0	290
	Fishing boats with engine in 10-30hp											20	42	42	0	227	304
	Fishing boats with engine in >30-50hp											0	0	0	520	367	0
	Fishing boats with engine in >50hp											0	0	0	74	0	0
Number of fishing boat at refugia sites from 2005 - 2020 in Koh Kong province	Fishing boats without engine				239	239	0	215	215	215	31	49	49	0	1	1	1
	Fishing boats with engine in <10hp				2972	2942	1519	2241	2241	2241	1528	1647	1647	2099	2099	2424	2613
	Fishing boats with engine in 10-30hp				1204	1204	779	595	595	595	1467	1471	1471	473	479	895	706
	Fishing boats with engine in >30-50hp				88	88	387	155	155	155	69	69	69	87	87	67	67
	Fishing boats with engine in >50hp				71	71	251	93	93	93	150	148	148	155	155	10	10
Number of fishing boat at refugia sites from 2005 - 2020 in Kampot province	Fishing boats without engine				498	498	498	507	335	335	335	335	335	242	242	13	13
	Fishing boats with engine in <10hp				895	895	895	686	456	456	456	456	456	263	601	410	410
	Fishing boats with engine in 10-30hp				198	198	198	226	176	176	176	176	176	156	0	623	623
	Fishing boats with engine in >30-50hp				0	0	0	2	2	2	2	2	2	2	452	6	6
	Fishing boats with engine in >50hp				0	0	0	0	0	0	3	3	3	0	0	0	0

ANNEX 5A NATIONAL REPORT OF INDONESIA

PART 1: Progress and status of project implementation

Indicators	Name/Location/Province	Target Species	Status		Estimated Refugia Size (Hectares)	Marine Habitat linkage		Refugia Profile (done/not yet)
			Adopted	*In process* (expected date)		**Type** (coral, seagrass, mangrove)	**Estimated Size (ha)**	
Fisheries Refugia Adoption	Site 1: West Kalimantan	Shrimp (Fenneropenaeus spp)		√	in process	Mangrove	in process	in process
	Site 2: Bangka Belitung	Squid (*Uroteuthis chinensis)*		√	in process	Coral, seagrass	in process	in process
	Site 3: (if appropriated)							
	If not yet achievement, give a reason and strategic workplan including expected date for completion. : The collection of data and information on fisheries and coastal habitats for proposed fisheries refugia sites, both West Kalimantan and Bangka Belitung, has been carrying out since the project started but still needs to be enriched to provide a fisheries refugia profile. Some of important data and information that should be provided are the spawning habitat for the target species, so that the coverage of fisheries refugia area can be determined. The observations and surveys on site to enrich data and information on refugia profiles cannot be carried out due to the covid19 outbreak since March 2020 where there are restrictions on visits and mobility to the location. Several efforts have been made to overcome these obstacles are desk studies and collaborating with universities and related institutions in both site to complete data and information that are not available yet for establishing fisheries refugia. However, without on-site observations and surveys, the profile of the refugia area will be difficult to be completed. The survey to enriched the critical data and information on sites is planning to be carried out in Q3 2021 by implementing strict controls of health protocols during the survey.							
	Willingness of fisheries and environment sectors to agree on Establishment of Fisheries Refugia:							

	Based on observations and previous assessments that have been carried out, it showed that the fisheries sector, including fishing communities and other stakeholders supports the establishment of fisheries refugia in Bangka Belitung and West Kalimantan.

Indicators	***Site***	***List of the key community/stakeholder***	***Issues/problems in the establishment***	***How to achieve?***
community / stakeholder engagement in establishing of Fisheries Refugia and implementation of agreed management measures	West Kalimantan	• Local fishing community in West Kalimantan • Fishery product collector, trader and exporter • Fishery Agency of West Kalimantan Province • Fishery Agency of Kubu Raya District • Fishery Agency of Kayong District • DG of Marine Spatial Planning • Local University in West Kalimantan	• The lack of technical information on critical habitat especially for mature species (Fenneropenaues shrimp), including abundance of the species in the mature stage. • There is still the operation of destructive gears around critical juvenile stage habitats of priority species	The survey will be conducted to obtain detail data and information Developing collaborations with the local university and others institutions to collect data and information about the critical habitat and discuss with them.
	Bangka Belitung	• Local fishing community in Mapur village (Bangka Belitung) • Fishery product collector, trader and exporter • Fishery Agency of Bangka Belitung Province • Fishery Agency of Bangka District • Fishery Agency of Bangka Selatan District • DG of Marine Spatial Planning • University of Bangka Belitung •	• The lack of information on critical habitat of squid during the spawning period • The existence of tin mining in the waters of Bangka Belitung	• The survey to obtain information on critical habitat for mature stage of squid will be conducted in Q3 -2021 • An intensive study to figure out the impact of the mining on the ecosystem in the waters of Bangka Belitung, especially on the critical habitat of squids

Indicators	***Progress and status***	***Remarks***
Reform of national policy, legal and regulatory frameworks governing the management of fisheries refugia	Will be updated at the next RSTC	

Indicators	***Sharing country experience on changing of fisherfolk attitude***	***Remarks***
Status of enabling environment reform including extent of behavioural change among small-scale fisherfolk at refugia sites	Will be updated at the next RSTC	

PART 2: Statistical Data

Indicators	***Type of Boat***	2005	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
Number of fishing boat at refugia sites from 2005 - 2020 Site 1: West Kalimantan	Set gill nets	-	-	-	-	-	242	-	662	472	1.237		-	967	-	-	-
	Drift nets	-	-	-	-	-	1,084	-	716	696		961	-	1,321	-	-	-
	Trammel nets						1,279		462	392	1,644	1,470	-	1,860			
	Seine nets	-	-	-	-	-	639	-			2.687		-	-	-	-	-
	Bottom seine nets	-	-	-	-	-	1,149	-	235	240			-	-	-	-	-
	Beach seine nets	-	-	-	-	-	323	-	176	173			-	-	-	-	-
	Danish seine	-	-	-	-	-		-			812	1336	-	-	-	-	-
	Set net	-	-	-	-	-		-	47	46	214		-	-	-	-	-
	Trap	-	-	-	-	-		-	472	461	853		-	-	-	-	-
Number of fishing boat at refugia sites from 2005 - 2020 Site 2: Bangka Belitung	Hand line	318	246	271	242	316	326	348	424	403	410		356		375	452	460
	Gill net	23	155	108	152	63	76	102	126	236	243	201	147	72	141	100	42
	Trap	24	24	39	60	64	66	73	127	110	110	95	82	70	78	114	115
	Boat lift net	39	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1
Number of fishing boat at refugia sites from 2005 - 2020 Site 2:																	

ANNEX 5B NATIONAL REPORT OF INDONESIA (PRESENTATION)

Project Activities carried out in 2019-2021

Year	Actvity	Venue	Output
2019 (July)	The First National Coordination Meeting	Jakarta	Term of reference and NFRC meeting report
2019 (Sept 19th)	Inception meeting for Preparation for Implementaion of Fisheries Refugia Project	Bogor	The work plan for implementing activities includes research plans and dissemination of research results
2019	Compiling and reviewing data and information on fisheries and coastal habitat for establishing fisheries refugia in West Kalimantan	Bogor	Refugia profile for West Kalimantan
2019	Compiling and reviewing data and information on fisheries and coastal habitat for establishing fisheries refugia in Bangka Belitung	Bogor	Refugia profile for Bangka Belitung
2020	NFRC meeting	Jatilhur	NFR meeting report and consolidation of the 2020 activity plan

Project Activities carried out in 2019-2021

Year	Actvity	Venue	Output
2020	Establishing database system for fisheries refugia	Jatiluhur	Fisheries refugia database: early information on the critical habitat, species distribution and abundance,
2020 (July 1st)	Webinar "Fisheries Refugia for Sustainable Fisheries"	Zoom meeting	Materials on the concept of fisheries refugia, the establishment and management of fisheries refugia
2020 (August 18th)	NSTC meeting in conjunction with pre-survey meeting for collecting data and information in Bangka Belitung and West Kalimantan	Bogor	The detailed technical plan for survey both in Bangka Belitung and West Kalimantan
2020 (November)	Coordination meeting with Government of Bangka Belitung Province (Agency of Marine and Fisheries of Bangka Belitung) and academics from Bangka Belitung university for implementation of the fisheries refugia project	Bangka Belitung	Developing collaboration with the local government to support on establishing fisheries refugia of squid in Bangka Belitung.

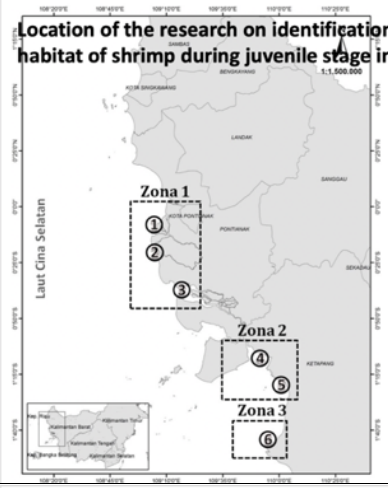
Project Activities carried out in 2019-2021

Year	Actvity	Venue	Output
2020	Establishing database system for fisheries refugia	Jatiluhur	Fisheries refugia database: early information on the critical habitat, species distribution and abundance,
2020 (July 1st)	Webinar "Fisheries Refugia for Sustainable Fisheries"	Zoom meeting	Materials on the concept of fisheries refugia, the establishment and management of fisheries refugia
2020 (August 18th)	NSTC meeting in conjunction with pre-survey meeting for collecting data and information in Bangka Belitung and West Kalimantan	Bogor	The detailed technical plan for survey both in Bangka Belitung and West Kalimantan
2020 (November)	Coordination meeting with Government of Bangka Belitung Province (Agency of Marine and Fisheries of Bangka Belitung) and academics from Bangka Belitung university for implementation of the fisheries refugia project	Bangka Belitung	Developing collaboration with the local government to support on establishing fisheries refugia of squid in Bangka Belitung.

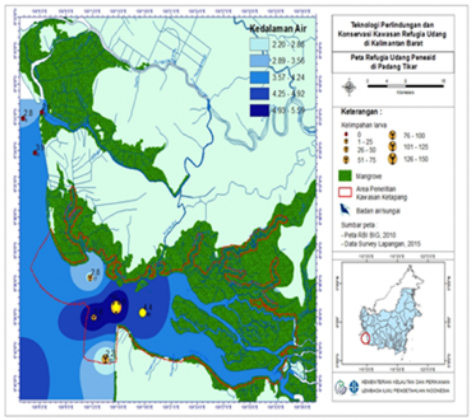
Site 1: West Kalimantan

Critical habitat of Fenneropenaus shrimp during juvenile stage in west Kalimantan

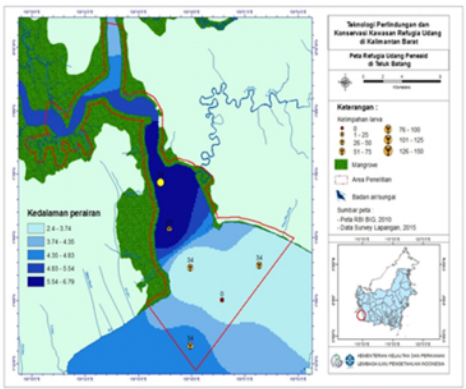
Location of the research on identification of critical habitat of shrimp during juvenile stage in 2015



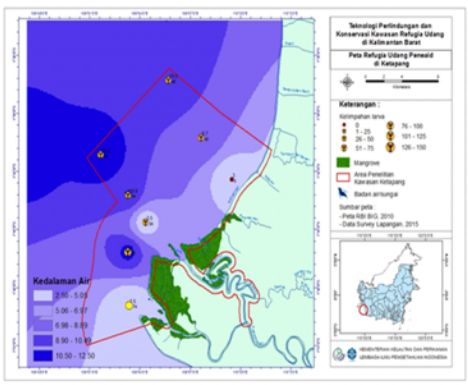
Critical habitat of shrimp juvenile phase in Padang Tikar Bay



Critical habitat of shrimp juvenile in Teluk Batang



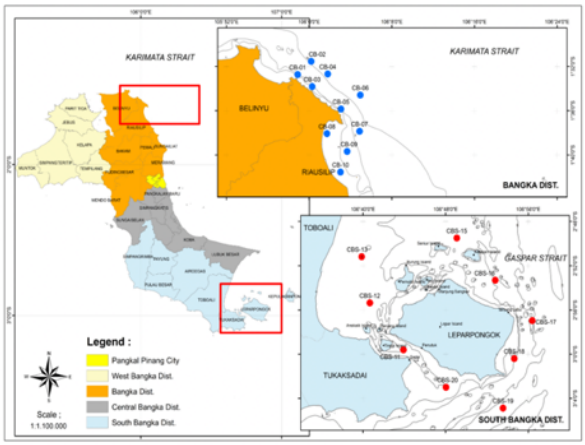
Critical Habitat of shrimp juvenile in Ketapang



Site 2: Bangka Belitung

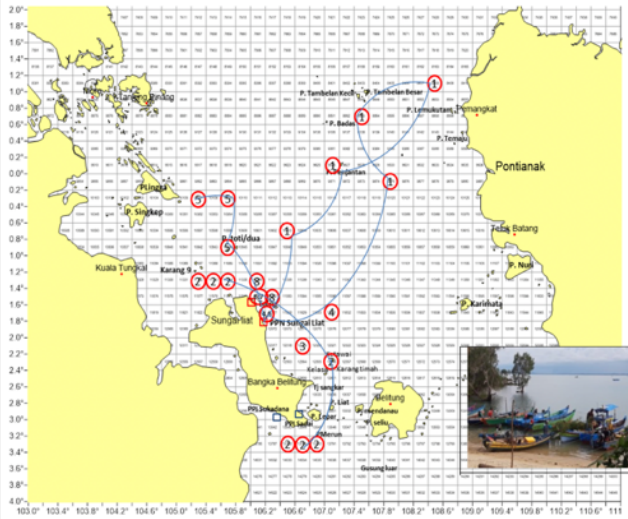
Survey and observation in Bangka Belitung

- The survey activity was conducted in November 2020 in order to gain data information on critical habitat, fisheries and coastal habitat condition and biological aspects of squid (*Uroteuthis chinensis* in Bangka Belitung)



Observation site: Tuing (Bangka District) and Lepar Pongok (South Bangka District)

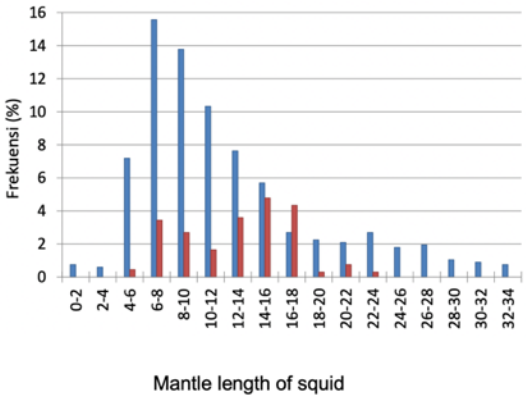
Fishing ground of squids



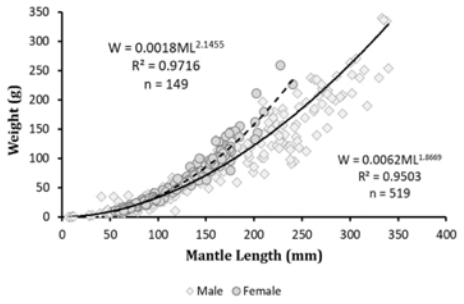
Production of squids in Bangka District

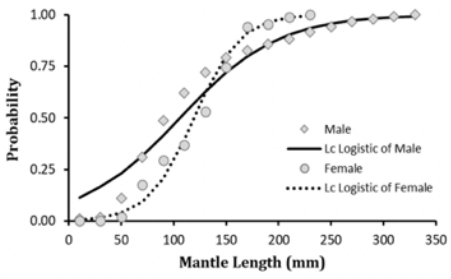
Habitat for eggs attachment of squid

Length distribution of squid

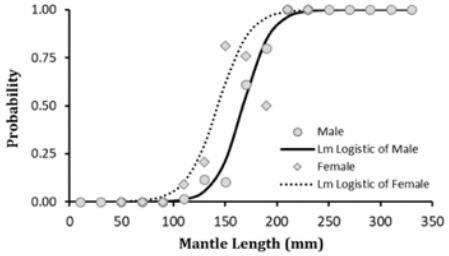


Mantle length of squid

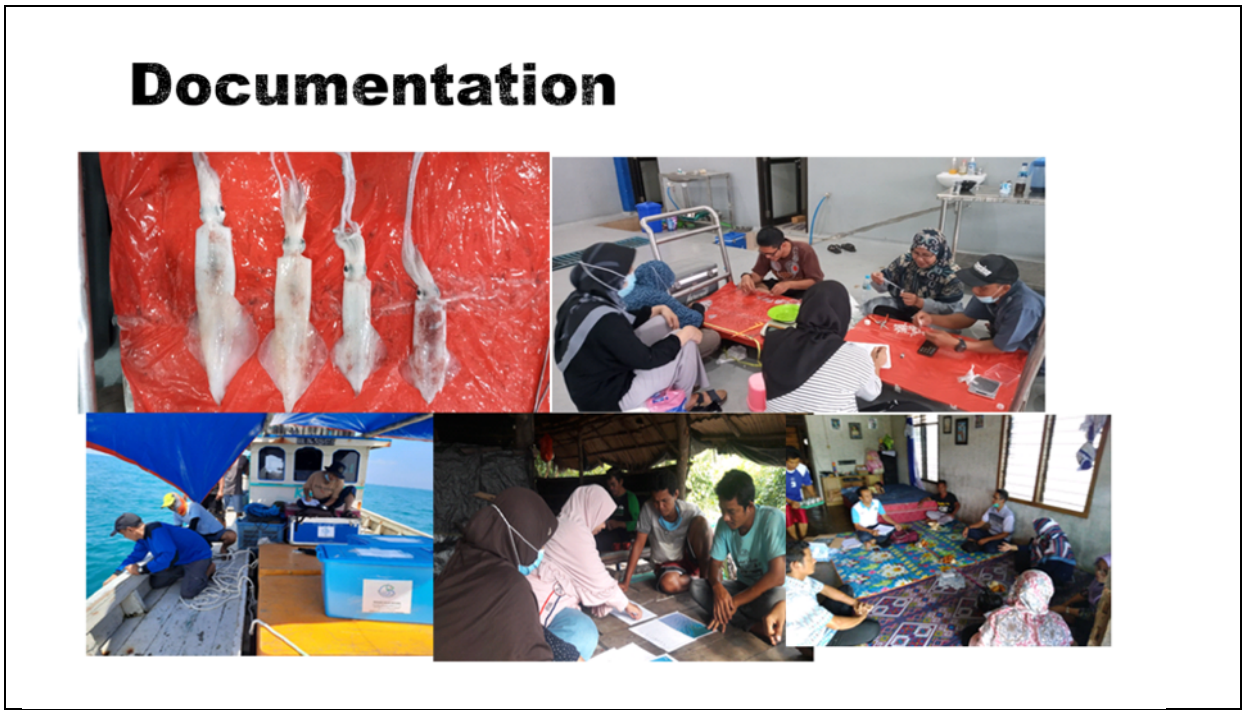




Length at first capture (L_{c50}) of male and female
Uroteuthis chinensis



Length at first mature (L_{m50}) of male and female
Uroteuthis chinensis


Documentation

ANNEX 6A NATIONAL REPORT OF MALAYSIA

PART 1: Progress and status of project implementation

Indicators	Name/Location/Province	Target Species	Status		Estimated Refugia Size (Hectares)	Marine Habitat linkage		Refugia Profile (done/not yet)
			Adopted	*In process (expected date)*		**Type** (coral, seagrass, mangrove)	**Estimated Size (ha)**	
Fisheries Refugia Adoption	Site 1: Tanjung Leman, East Johor, Malaysia	Spiny Lobster (*Panulirus polyphagus*)		2022	140,023 ha	Coral, seagrass	Johor Marine Park: 76,565 ha Seagrass : 706 ha	Done
	Site 2: Kuala Baram, Miri, Sarawak, Malaysia	Tiger Prawn (*Penaeus monodon*)		2022	85200	Coral, mangrove	Miri-Sibuti Coral reefs National Park-186,930 ha	Done
	Site 3: (if appropriated)							
	If not yet achievement, give a reason and strategic workplan including expected date for completion.: For both sites, the estimated refugia size was agreeable among members. The process of adoption will be finalized once the Refugia Management Plan is completed, assisted by the University of Malaya as a consultant. The expected date of completion will be the end of 2022. This is due to limited mobilization of staff to conduct stakeholder consultation due to pandemic, Covid-19 (Movement Control Order-MCO).							
	Willingness of fisheries and environment sectors to agree on Establishment of Fisheries Refugia:							

	According to socio-economy survey done in 2020 (Norhanida *et al.,* 2020), willingness of fisheries and environment sectors to agree on Establishment of Fisheries Refugia were divided into, (1) awareness, (2) the benefits of refugia and (iii) social and environmental protection. As a conclusion, around 90 % fishers agree on the tiger prawn and spiny lobster refugia establishment. Therefore, the fishers suggested the Department of Fisheries Malaysia do consultation beforehand to ensure consent of all stakeholders involved in this fishery. In 2017, one consultation program was held with stakeholders and local fishermen for Tiger Prawn Refugia while for spiny lobster the consultation program with local fishermen has been conducted in 2018. In 2018, two meetings with stakeholders and other local agencies, such as the Sarawak State Planning Unit, Miri Port Authority, and the Forestry Department, were held to provide information and explanations on the importance of tiger prawn resources and the fisheries department's proposal to make Kuala Baram a tiger prawn fishery refugia.

Indicators	***Site***	***List of the key community/stakeholder***	***Issues/problems in the establishment***	***How to achieve?***
community / stakeholder engagement in establishing of Fisheries Refugia and implementation of agreed management measures	• Refugia 1	• East Johor traditional fishers (near shore) • Trawl net operators and fishers (commercial) • Island inhabitants/tourism operators	• Unclear/lack of information about the implementation of refugia and its rules Compliance with “no-take” rule during specific refugia close season period	Stakeholder consultations and public awareness
	• Refugia 2	• Fishermen • Miri Port Authority	• Level of awareness/understanding the benefit of tiger prawn refugia • usage conflict- overlap of refugia areas, more development to expand Kuala Baram to a larger shipping port	• Explanation and consultation by Department of Fisheries • Meeting and discussion with Miri Port (win-win situation)

Indicators	***Progress and status***	***Remarks***
Reform of national policy, legal and regulatory frameworks governing the management of fisheries refugia	Regulations on the proposed areas will be drafted after obtaining approvals from State Government. Regulations will focus on: • regulating allowable and prohibited fishing gears • regulating temporal closure during critical life stages in the areas • regulating development or other activities within the areas • penalties for encroachment and illegal activities or illegal harvesting	

Indicators	***Sharing country experience on changing of fisherfolk attitude***	***Remarks***
Status of enabling environment reform including extent of behavioural change among small-scale fisherfolk at refugia sites	1. Fishermen's participation in the management of refugia's is vital and urgent. The high degree of trust and understanding between the Department of Fisheries and members of the fishing community may be strengthened and extended throughout the Department so that fishers can rest certain that the Department is truly committed to safeguarding the sustainability of fished resources. 2. For the sustainable use of fisheries resources, active participation of fishermen's communities is essential. It will pave the way for co-management, in which both resource users (fishers) and government agencies (Department of Fisheries) collaborate to address management concerns and share decision-making duties before taking action. 3. The Department of Fisheries has also designed and implemented several educational programs for fishers and the public on the importance of working together to safeguard fisheries resources and livelihood.	

PART 2: Statistical Data

Indicators	***Type of Boat***	2005	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
Number of fishing boat at refugia sites from 2005 - 2020 Site 1: East Johor, Malaysia	Trawlers	277	275	264	262	256	270	277	275	280	260	251	249	242	199	199	
	Drift nets	1157	900	1122	1183	1524	1539	1836	1485	1415	1459	1575	1581	1572	1525	1525	
	Traps	20	13	15	12	18	15	15	21	23	21	23	25	25	17	17	
Number of fishing boat at refugia sites from 2005 - 2020 Site 2: Kuala Baram,Miri,Sarawak	Traditional Zone A boat										54	42	59	55	53	49	43
Number of fishing boat at refugia sites from 2005 - 2020 Site 2:																	

ANNEX 6B NATIONAL REPORT OF MALAYSIA (PRESENTATION)

SEAFDEC/UN ENVIRONTMENT/GEF
Fisheries Refugia Project
Progress Report
By
Department of Fisheries Malaysia

The 4th 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 Gulf of Thailand, 22 July 2021 (online)

Refugia Sites in Malaysia

1. Tanjung Leman, East Johor – Lobster (*Panulirus polyphagus*)
2. Kuala Baram, Sarawak – Tiger Prawn (*Penaeus monodon*)

Proposed Spiny Lobster Refugia at East Johor

Proposed Tiger Prawn Refugia at Kuala Baram, Miri, Sarawak

Lobster Research in South Pahang-East Johor

PART 1: Progress and status of project implementation

Indicators	Name/Location/Province	Target Species	Status	Estimated Refugia Size (Hectares)	Marine Habitat linkage		Refugia Profile (done/not yet)
			In process (expected date)		Type (coral, seagrass, mangrove)	Estimated Size (ha)	
Fisheries Refugia Adoption	Site 1: Tanjung Leman, East Johor, Malaysia	Spiny Lobster (*Panulirus polyphagus*)	2022	140,023 ha (20x20nm)	Coral, Seagrass	Johor Marine Park: 76,565 ha Seagrass: 706 ha	Done
	If not yet achievement, give a reason and strategic work plan including expected date for completion: • For both sites, the estimated refugia size was agreeable among members. • The process of adoption will be finalized once the Refugia Management Plan is completed, assisted by the University of Malaya as a consultant. • The expected date of completion will be the end of 2022. • This is due to limited mobilization of staff to conduct stakeholder consultation due to pandemic, Covid-19 (Movement Control Order-MCO).						

PART 1: Progress and status of project implementation

Willingness of fisheries and environment sectors to agree on Establishment of Fisheries Refugia:

- A spiny lobster the consultation program with local fishermen has been conducted in 2018.

- According to socio-economy survey done in 2020 (Norhanida *et al.,* 2020), willingness of fisheries and environment sectors to agree on Establishment of Fisheries Refugia were divided into, (1) awareness, (2) the benefits of refugia and (3) social and environmental protection.
- As a conclusion, around 90 % fishers agree on the spiny lobster refugia establishment. Therefore, the fishers suggested the Department of Fisheries Malaysia do consultation beforehand to ensure consent of all stakeholders involved in this fishery.

Spiny Lobster Refugia

Indicators	Site	List of the key community/stakeholder	Issues/problems in the establishment	How to achieve?
community / stakeholder engagement in establishing of Fisheries Refugia and implementation of agreed management measures	Refugia 1 •	• East Johor traditional fishers (near shore) • Trawl net operators and fishers (commercial) • Island inhabitants/tourism operators	• Unclear/lack of information about the implementation of refugia and its rules • Compliance with "no-take" rule during specific refugia close season period	Stakeholder consultations and public awareness

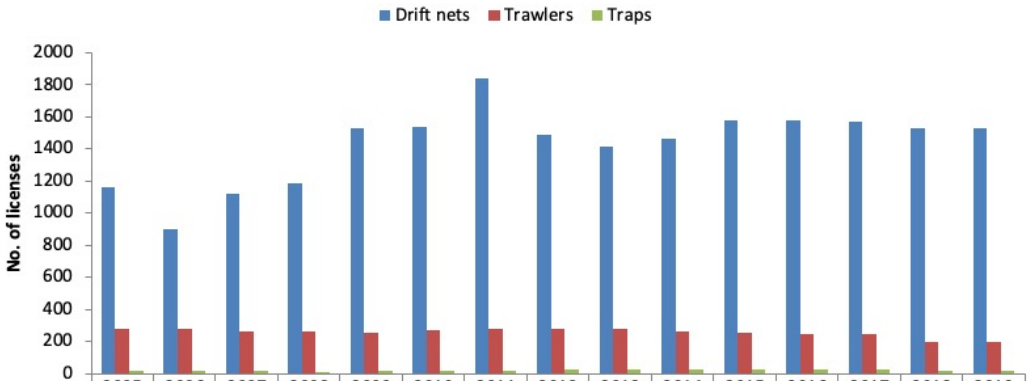
Reform of national policy, legal and regulatory frameworks governing the management of fisheries refugia

Indicators	Progress and status	Remarks
Reform of national policy, legal and regulatory frameworks governing the management of fisheries refugia	Regulations on the proposed areas will be drafted after obtaining approvals from State Government. Regulations will focus on: • regulating allowable and prohibited fishing gears • regulating temporal closure during critical life stages in the areas • regulating development or other activities within the areas • penalties for encroachment and illegal activities or illegal harvesting	

Indicators	Sharing country experience on changing of fisherfolk attitude	Remarks
Status of enabling environment reform including extent of behavioural change among small-scale fisherfolk at refugia sites	1. Fishermen's participation in the management of refugia's is vital and urgent. The high degree of trust and understanding between the Department of Fisheries and members of the fishing community may be strengthened and extended throughout the Department so that fishers can rest certain that the Department is truly committed to safeguarding the sustainability of fished resources. 2. For the sustainable use of fisheries resources, active participation of fishermen and fishermen's communities is essential. It will pave the way for co-management, in which both resource users (fishers) and government agencies (Department of Fisheries) collaborate to address management concerns and share decision-making duties before taking action. 3. The Department of Fisheries has also designed and implemented several educational programs for fishers and the public on the importance of working together to safeguard fisheries resources and livelihood.	

PART 2: Statistical Data

Number of fishing boat (licenses) at Spiny Lobster Refugia, East Johor
Year 2005 - 2019



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Drift nets	1157	900	1122	1183	1524	1539	1836	1485	1415	1459	1575	1581	1572	1525	1525
Trawlers	277	275	264	262	256	270	277	275	280	260	251	249	242	199	199
Traps	20	13	15	12	18	15	15	21	23	21	23	25	25	17	17

Lobster Larvae Sampling, November 2020

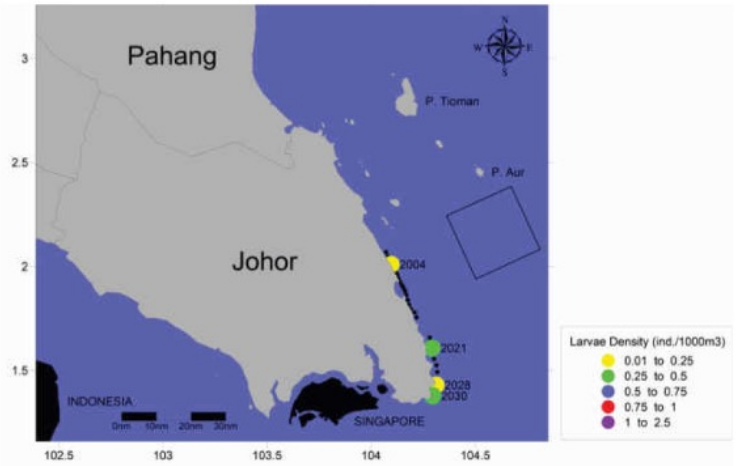


Figure 3: The density of spiny lobster phyllosoma (individuals/1000m^3) ranged from 0.2 to 0.4 individual/1000m^3. The proposed refugia area is marked with a square line and is located south of Pulau Aur

The results showed, that the lobster phyllosoma were found in four study locations with the average 0.27±0.05 individual/1000m3.

The distribution of lobster phyllosoma were more concentrated around the southeast Johor area near Sungai Rengit

PART 1: Progress and status of project implementation

Indicators	Name/Location/Province	Target Species	Status	Estimated Refugia Size (Hectares)	Marine Habitat linkage		Refugia Profile (done/not yet)
			In process (expected date)		Type (coral, seagrass, mangrove)	Estimated Size (ha)	
Fisheries Refugia Adoption	Site 2: Kuala Baram, Miri, Sarawak, Malaysia	Tiger Prawn (*Penaeus monodon*)	2022	85,200 ha	Coral, mangrove	Miri-Sibuti Coral reefs National Park-186,930 ha	Done
	If not yet achievement, give a reason and strategic workplan including expected date for completion: • For both sites, the estimated refugia size was agreeable among members. • The process of adoption will be finalized once the Refugia Management Plan is completed, assisted by the University of Malaya as a consultant. • The expected date of completion will be the end of 2022. • This is due to limited mobilization of staff to conduct stakeholder consultation due to pandemic, Covid-19 (Movement Control Order-MCO).						

PART 1: Progress and status of project implementation

Willingness of fisheries and environment sectors to agree on Establishment of Fisheries Refugia:

- In 2017, one consultation program was held with stakeholders and local fishermen for Tiger Prawn Refugia.
- In 2018, two meetings with stakeholders and other local agencies, such as the Sarawak State Planning Unit, Miri Port Authority, and the Forestry Department, were held to provide information and explanations on the importance of tiger prawn resources and the fisheries department's proposal to make Kuala Baram a tiger prawn fishery refugia.
- As a conclusion, around 90 % fishers agree on the tiger prawn refugia establishment. Therefore, the fishers suggested the Department of Fisheries Malaysia do consultation beforehand to ensure consent of all stakeholders involved in this fishery.

Tiger Prawn Refugia

Indicators	Site	List of the key community/stakeholder	Issues/problems in the establishment	How to achieve?
community / stakeholder engagement in establishing of Fisheries Refugia and implementation of agreed management measures	Refugia 2 •	• Fishermen • Miri Port Authority	• Level of awareness/understanding the benefit of tiger prawn refugia • usage conflict-overlap of refugia areas, more development to expand Kuala Baram to a larger shipping port	• Explanation and consultation by Dept. of Fisheries • Meeting and discussion with Miri Port (win-win situation)

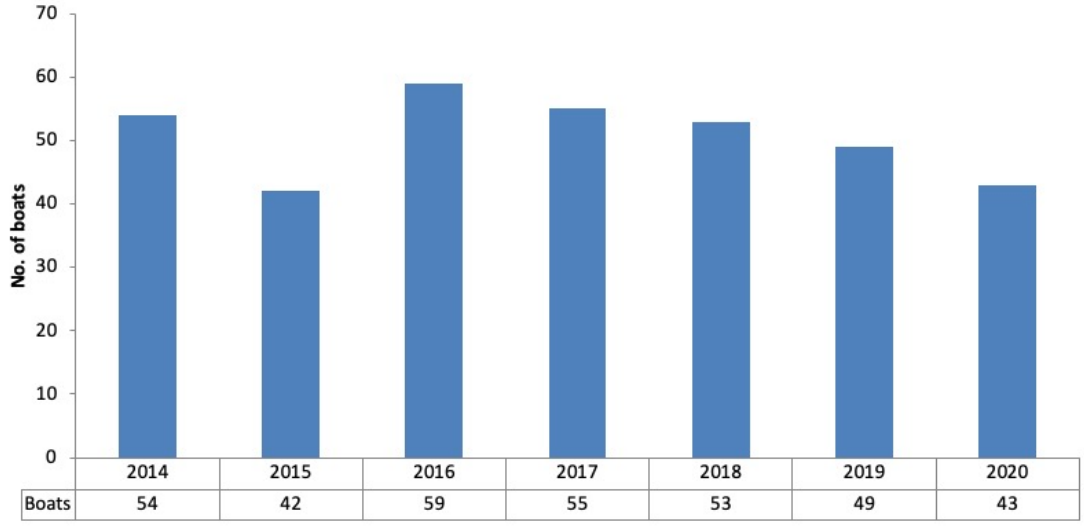
Reform of national policy, legal and regulatory frameworks governing the management of fisheries refugia

Indicators	Progress and status	Remarks
Reform of national policy, legal and regulatory frameworks governing the management of fisheries refugia	In progress	

Indicators	Sharing country experience on changing of fisherfolk attitude	Remarks
Status of enabling environment reform including extent of behavioural change among small-scale fisherfolk at refugia sites	1. Fishermen's participation in the management of refugia's is vital and urgent. The high degree of trust and understanding between the Department of Fisheries and members of the fishing community may be strengthened and extended throughout the Department so that fishers can rest certain that the Department is truly committed to safeguarding the sustainability of fished resources. 2. For the sustainable use of fisheries resources, active participation of fishermen and fishermen's communities is essential. It will pave the way for co-management, in which both resource users (fishers) and government agencies (Department of Fisheries) collaborate to address management concerns and share decision-making duties before taking action. 3. The Department of Fisheries has also designed and implemented several educational programs for fishers and the public on the importance of working together to safeguard fisheries resources and livelihood.	

PART 2: Statistical Data

Number of Traditional Zone A –Drift Net (Less than 5 nautical miles) Boats at Tiger Prawn Refugia, Kuala Baram, Miri



	2014	2015	2016	2017	2018	2019	2020
Boats	54	42	59	55	53	49	43

Refugia Mini Seminar, Kuala Terengganu
30 Mac – 2 April 2021

ANNEX 7 NATIONAL REPORT OF PHILIPPINES

PART 1: Progress and status of project implementation

Indicators	Name/Location/Province	Target Species	Status		Estimated Refugia Size (Hectares)	Marine Habitat linkage		Refugia Profile (done/not yet)
			Adopted	*In process* *(expected date)*		**Type** (coral, seagrass, mangrove)	**Estimated Size (ha)**	
Fisheries Refugia Adoption	Site 1: **Bolinao, Pangasinan**	Siganids	✓			Seagrass		✓
	Site 2: **Coron, Palawan**	*Caesio cunning*, *Decapterus maruadsi*		✓		Mangroves		✓
	Site 3: **Masinloc, Zambales**	*Auxis thazard*, *Pterocaesio teselleta*, *Sardinella fimbriata*	✓			Coral Reef and Seagrass		✓
	If not yet achievement, give a reason and strategic workplan including expected date for completion. :							
	Willingness of fisheries and environment sectors to agree on Establishment of Fisheries Refugia: The Local Government Units including the Coastal Communities and other stakeholders have agreed and understood the importance of establishing Fisheries *Refugia* in 3 sites. Their willingness could be reflected in the results of a number of committee meetings, on-site stakeholder consultations and information-drive organized during 2017-2021.							

Indicators	*Site*	*List of the key community/stakeholder*	*Issues/problems in the establishment*	*How to achieve?*
community / stakeholder engagement in establishing of Fisheries Refugia and implementation of agreed management measures	• Refugia 1	• Local Government Unit • Bureau of Fisheries and Aquatic Resources – Region I • Department of Environment and Natural Resources • PNP Maritime • Philippine Coast Guard • Bolinao School of Fisheries • MPA Network • People's Organization		
	• Refugia 2	• Local Government Unit • Provincial Fisheries Office– Region III • Department of Environment and Natural Resources • PNP Maritime • Philippine Coast Guard • Coron School of Fisheries • MPA Network • People's Organization	The LGU is requesting for a LoA between NFRDI and the site in order to have a more effective collaboration in the establishment of fisheries refugia in the area.	The NFRDI prepared a LoA for the site and the LGU is currently reviewing the LoA prior to agreement.
	• Refugia 3	• Local Government Unit • Bureau of Fisheries and Aquatic Resources – Region IV • Department of Environment and Natural Resources • PNP Maritime • Philippine Coast Guard • Academe - PRMSU • MPA Network • People's Organization	One of the problems in this site is the difficulty in arranging activities due to community lockdowns.	The Team will conduct activities within the timeline as soon as the pandemic protocol hasten.

Indicators	*Progress and status*	*Remarks*
Reform of national policy, legal and regulatory frameworks governing the management of fisheries refugia		All activities will be conducted and completed by the end of 2021.

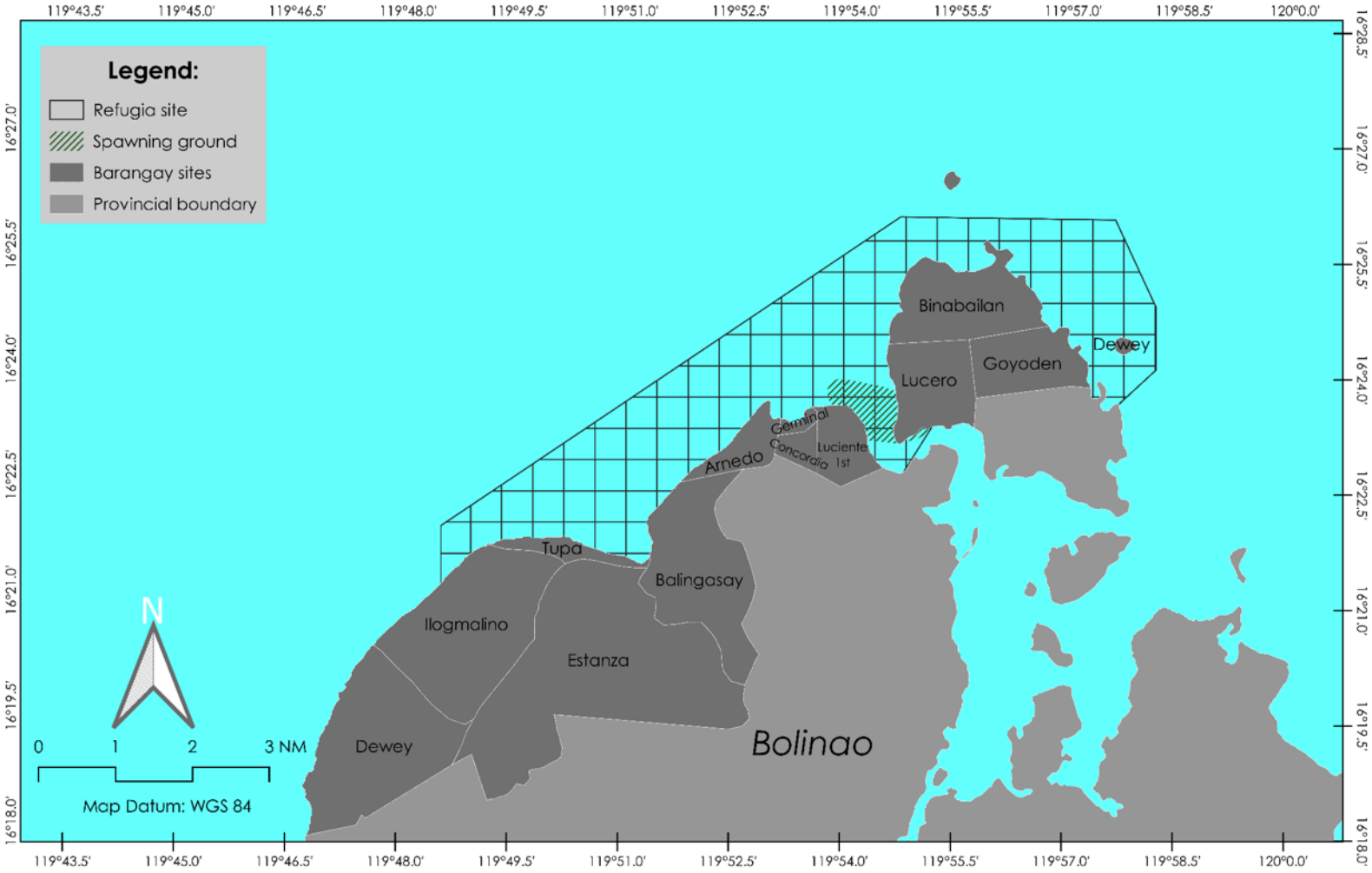
Indicators	*Sharing country experience on changing of fisherfolk attitude*	*Remarks*
Status of enabling environment reform including extent of behavioural change among	For project implementation, Philippines followed the Fisheries *Refugia* Management Framework including the conduct and coordination of the National Fisheries Refugia, Scientific and Technical Committee Meetings, Site-board committee meetings, and workshops and consultation for the LGU and the stakeholders. A positive feedback from the LGU especially from the fishing community with the introduction of the fisheries refugia in the 3 sites. Through the information-drive and community consultations, the suggestions and questions from the	

small-scale fisherfolk at refugia sites	coastal communities were addressed and answered. The fisherfolk have strong disagreements with the establishment of MPAs in their municipalities, however, through the workshops they have understood the difference and the boon of establishing fisheries refugia for a more productive fishing stock. With proper guidance and continued technical support, the fisherfolk began to understand the importance of protecting the 2 major life stages of fishes which could greatly improve the fishing stock of the community in the future.	

PART 2: Statistical Data

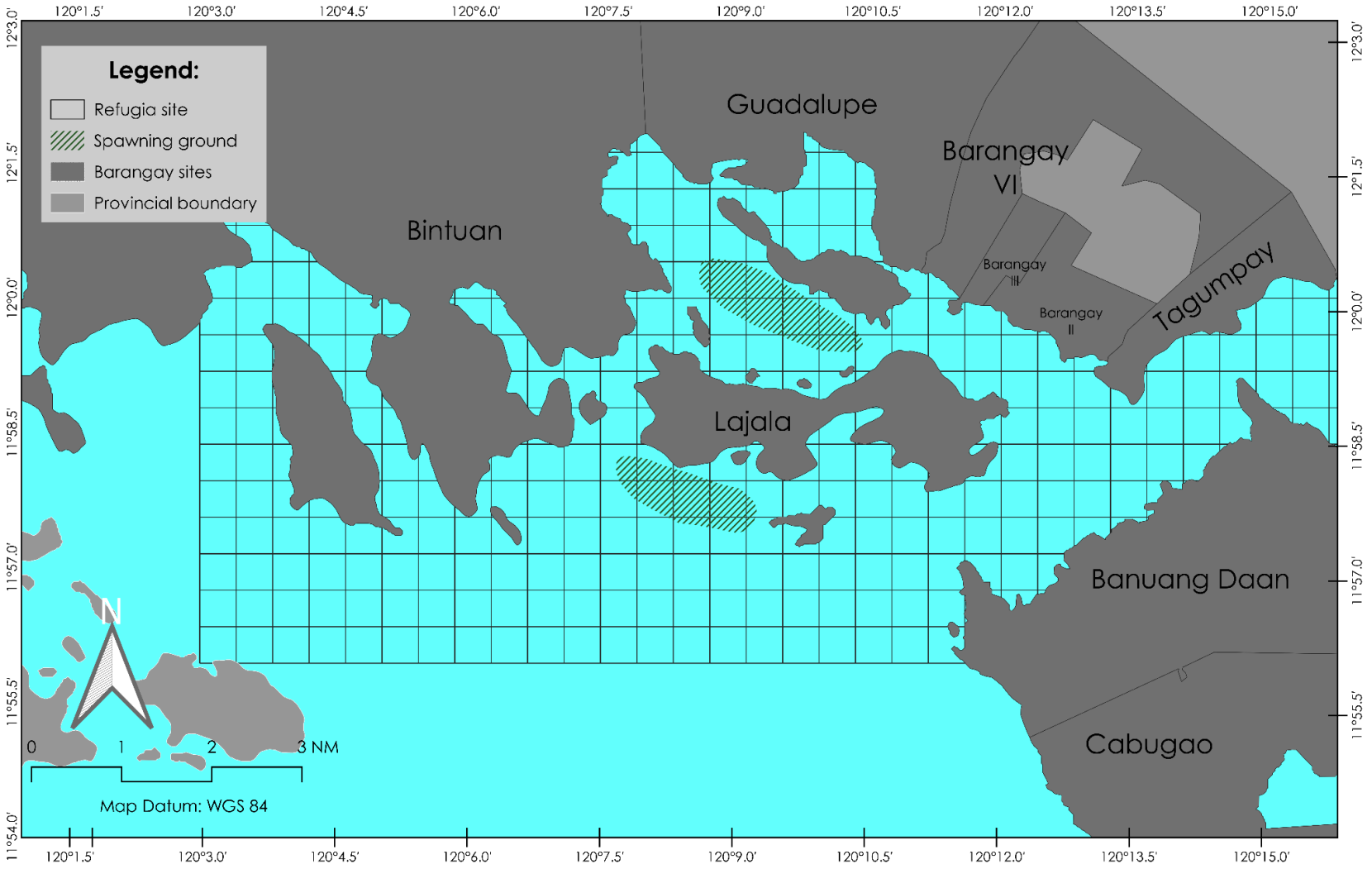
Indicators	***Type of Boat***	17	18	19	20
Number of fishing boat at refugia sites from 2017 - 2020 Site 1: Bolinao	Bottom set gillnet			159	
	Handline			40	
	Multiple handline			39	
	Spear gun			35	
	Drift long line			17	
	Surface set gillnet			9	
	Fish lift net (Basing)/Bagnet			5	
	Octopus/Squid luring device/			4	
	Crab lift net (Bintol)/pot			2	
	Squid pot			2	
	SUBTOTAL			**312**	
Number of fishing boat at refugia sites from 2017 - 2020 Site 2: Coron	Bagnet				2
	Gillnet				1
	Handline				29
	Spear Gun				2
	SUBTOTAL				**34**
Number of fishing boat at refugia sites from 2017 - 2020 Site 2: Masinloc	Bagnet				1
	Gillnet				38
	Hook and Line				77
	Multiple Handline				2
	Scoop Net				5
	Spear Gun				4
	SUBTOTAL				**127**

PROPOSED REFUGIA SITE: Bolinao, Pangasinan



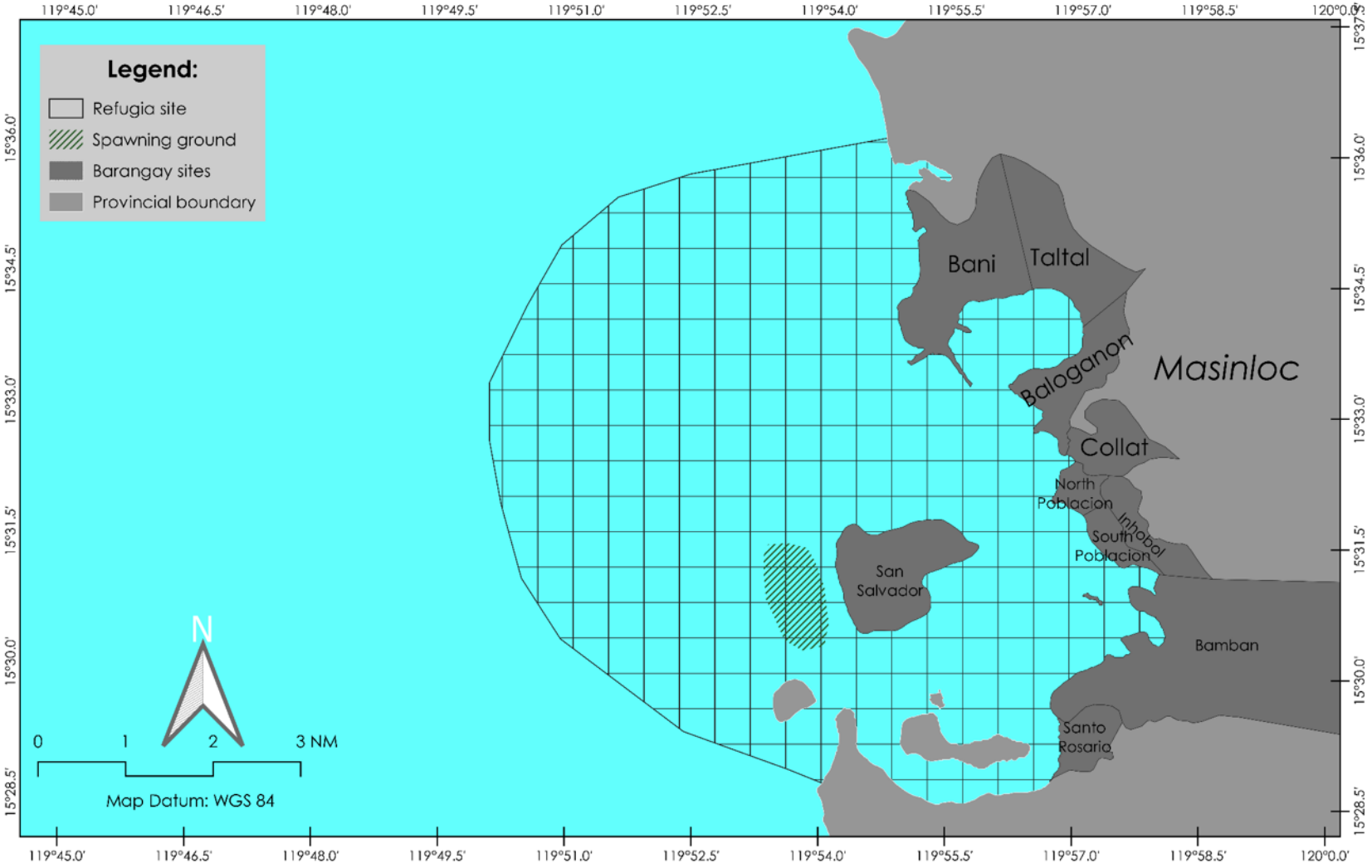
Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand

PROPOSED REFUGIA SITE: Coron, Palawan



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

PROPOSED REFUGIA SITE: Masinloc, Zambales



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

ANNEX 8 NATIONAL REPORT OF THAILAND

PART 1: Progress and status of project implementation

Indicators	Name/Location/Province	Target Species	Status		Estimated Refugia Size (Hectares)	Marine Habitat linkage		Refugia Profile (done/not yet)
			Adopted	*In process* *(expected date)*		**Type** (coral, seagrass, mangrove)	**Estimated Size (ha)**	
Fisheries Refugia Adoption	Site 1: Trat	Short mackerel	✓		154,600 ha	coral, mangrove, seagrass	coral = 2,841 ha mangrove = 9,553 ha seagrass = 1,016 ha **Total** = 13,410 ha	done
	Site 2: Surat Thani	Blue swimming crab	✓		900 ha	mangrove, seagrass	mangrove = 2.94 ha seagrass = 8.13 ha **Total** = 11.07 ha	done
	If not yet achievement, give a reason and strategic workplan including expected date for completion. :							
	Willingness of fisheries and environment sectors to agree on Establishment of Fisheries Refugia: Fisheries and environment sectors including fishing communities and other stakeholders have agreed on establishment of fisheries *refugia* in both Trat and Surat Thani Sites. Their willingness could be realized in the results of a number of committee meetings and on-site stakeholder consultations organized during 2017-2021.							

Indicators	*Site*	*List of the key community/stakeholder*	*Issues/problems in the establishment*	*How to achieve?*
community / stakeholder engagement in establishing of Fisheries Refugia and implementation of agreed management measures	• Trat	• Local Fishing Community Organizations in Trat Province • Small-scale Fishing Groups in Trat Province • Trat Fisheries Association • Sustainable Development Foundation • Department of Provincial Administration • Department of Local Administration • Department of Fisheries • Department of Marine and Coastal Resources • Department of National Parks, Wildlife and Plant Conservation • Burapha University • Rambhai Barni Rajabhat University • Navy • Representatives from commercial and small-scale fishers	There has been a disagreement on management planning regarding the restriction of gill net fishing during the critical period in Trat Fisheries *Refugia* Site.	• Additional technical data collection for catch composition of gill net fishing in Trat Site was undertaken by Fisheries Research Center; • The findings were raised for consideration and recommendation in the meeting of National Scientific and Technical Committee; and • Management planning regarding the disagreement issue will be revised based on the technical guidance of National Scientific and Technical Committee and policy guidance of National Fisheries *Refugia* Committee.
	• Surat Thani	• Local Fishing Community Organizations in Surat Thani Province • Small-scale Fishing Groups in Surat Thani Province • Surat Thani Trawl Fisheries Association • Surat Thani Fisher Association • Food Processing Enterprises • Thai Frozen Food Association • Department of Provincial Administration • Department of Local Administration • Department of Fisheries • Department of Marine and Coastal Resources • Walailak University • Representatives from commercial and small-scale fishers • Representatives from aquaculture farmers • Seafood venders • NGOs (Forest and Sea for Life Foundation)	There has been a lack of technical information focusing on the critical area (Koh Sed), including ecosystem and abundance of the priority species (blue swimming crab) in their young stages.	• Subcontract was done with academe in the area (Walailak University) for surveys of ecosystem and abundance of priority species in the critical area; • The findings were raised for consideration and recommendation in the meeting of National Scientific and Technical Committee, and site-based fisheries *refugia* management board in Surat Thani Province; and • Such the technical information was presented as the key component for management planning consideration at the on-site stakeholder consultations.

Indicators	***Progress and status***	***Remarks***
Reform of national policy, legal and regulatory frameworks governing the management of fisheries refugia	National policy, legal and regulatory frameworks in Thailand have been dramatically reformed in 2015 by the repeal of Fisheries Act B.E. 2490 (1947) (latest amended in B.E. 2558 (2015)) and the enactment of the Royal Ordinance on Fisheries, B.E. 2558 (2015). In Royal Ordinance on Fisheries, B.E. 2558 (2015), there are 11 Chapters with 176 Sections which provide fundamental fisheries legal framework aiming to reorganize fisheries in Thailand with a view to preventing IUU fishing in order to preserve aquatic animal resources as a sustainable source of food for humanity and preserve the environment in an appropriate state along the line of approaches, criteria and standards recognized internationally, as well as to protect the welfare of seamen and prevent all forms of forced labor in the fisheries sector. In 2017, Royal Ordinance on Fisheries (No. 2), B.E. 2560 (2017) has been additionally enacted in order to fulfill more controls on transshipment vessels and supporting vessels, strengthening enforcement of administrative sanctions and other issues that need cooperation across government agencies. In the context of fisheries *refugia*, those reforms can serve as its regulatory fundamental by applying the relevant Sections in the Royal Ordinance on Fisheries to the management planning at fisheries *refugia* sites. According to the latest stakeholder consultations, it was agreed that Section 71(1) in Chapter 5 – Conservation and Management Measures – in the Royal Ordinance on Fisheries, B.E. 2558 (2015) shall be applied as the regulatory framework for fisheries *refugia* management. Contents of Section 71(1) are: The Minister or the provincial fisheries committee shall have the power to issue notifications regarding the following: (1) fishing gears according to their forms, fishing methods, fishing areas, the size of fishing vessels used in fishing operation and other conditions that are prohibited from fishing operations in fishing grounds.	

Indicators	***Sharing country experience on changing of fisherfolk attitude***	***Remarks***
Status of enabling environment reform including extent of behavioural change among small-scale fisherfolk at refugia sites	For project implementation, Thailand has followed the Fisheries *Refugia* Management Framework which includes the coordination of national and local management committees as well as stakeholder consultation. In the meetings of site-based management boards and workshops for stakeholder consultation, the fishers showed their positive attitude in the management of fisheries resources in their corresponding fishing grounds; they also relied on the technical information for any decision on management planning. Thanks to the national fisheries management policy that there has been an urge for registration of the Local Fishing Community Organizations, which enhance the mechanism for fishers to share their opinions, comments, and attitudes. For Thailand, the activities of stakeholder participation in the fisheries *refugia* implementation have played the significant role in enhancing good attitude of fishers on community-based management, resulted in the smooth adoption of *refugia* concept, site boundaries, and management measures. Fishers also showed their obvious willingness to participate in technical data collection and at-sea surveys of geographic location for fisheries *refugia* boundary, which contribute to their acceptance of the establishment of fisheries *refugia* in their corresponding areas.	

PART 2: Statistical Data

Indicators	***Type of Boat***	2005	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
Number of fishing boat at refugia sites from 2005 - 2020 *Site 1: Trat*	Otter board trawls	296	291	241	203	171	158	153	141	118	112	107	98	89	135	133	121
	Pair trawls	8	8	8	8	8	6	2	2	4	4	4	4	4	4	4	4
	Beam trawls	0	0	0	0	0	0	0	0	0	0	0	63	61	55	52	49
	Surrounding nets	80	48	66	42	53	24	57	49	59	55	25	27	25	31	29	24
	Anchovy surrounding nets	55	53	27	50	39	26	28	27	27	21	29	35	28	17	14	14
	Spanish mackerel gill nets	7	6	4	5	10	36	38	40	45	62	49	0	0	4	4	0
	Indo-Pacific mackerel gill nets	11	11	11	11	12	95	90	55	79	124	81	12	10	32	32	35
	Crab gill nets	482	457	460	342	488	404	518	481	540	701	623	300	280	351	351	401
	Shrimp trammel nets	746	834	722	593	711	600	758	729	777	1011	1130	420	390	511	511	512
	Other gill nets	742	312	307	299	330	73	287	296	415	369	404	300	290	393	393	826
	Squid falling nets	373	360	362	460	431	551	367	365	381	454	276	201	160	144	141	91
	Anchovy falling nets	129	133	107	95	104	205	225	225	229	223	216	302	270	288	262	238
	Other lift nets	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	51
	Push nets	63	5	4	23	21	11	1	1	1	1	1	0	0	40	40	18
	Other nets	0	0	0	0	0	0	0	0	0	0	0	40	39	41	39	50
	Long line	84	84	84	9	6	9	34	34	55	85	105	48	47	29	27	47
	Other gear	7	14	0	0	0	34	63	53	43	47	48	120	116	286	384	173
	trap	322	372	372	418	410	405	463	396	414	343	343	435	429	200	235	505
	dredges	18	18	18	18	18	18	18	18	18	18	18	15	5	39	35	18
	Handline and hook & lines	100	100	100	100	100	99	224	224	224	220	220	224	224	792	776	937

Indicators	***Type of Boat***	2005	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
Number of fishing boat at refugia sites from 2005 - 2020 Site 2: Surat Thani (Ban Don Bay)	Otter board trawls	121	92	53	38	36	48	36	30	29	25	99	21	17	18	18	12
	Pair trawls	44	58	46	36	32	38	36	34	34	32	42	30	30	30	32	30
	Beam trawls	5	5	6	7	4	3	6	6	6	8	12	17	16	67	69	75
	Surrounding nets	5	4	3	4	2	2	1		1	5	6	1	1	0	0	0
	Anchovy surrounding nets	12	14	14	8	12	13	9	9	10	10	14	12	12	11	11	9
	Spanish mackerel gill nets	2	4	2	2	3	3	1	2	2	3	0	0	0	5	5	0
	Indo-Pacific mackerel gill nets	19	23	19	20	21	62	51	54	52	60	50	35	28	294	294	294
	Crab gill nets	1,182	992	887	893	899	1,004	855	913	985	1,125	1,232	450	410	399	399	560
	Shrimp trammel nets	482	463	232	232	232	232	200	204	212	232	267	75	75	104	104	200
	Other gill nets	418	318	417	392	431	491	725	674	586	670	801	485	405	734	734	1,415
	Squid falling nets	194	190	302	276	278	278	243	260	294	328	351	161	160	94	91	150
	Anchovy falling nets	0	0	2	1	1	1	1	1	1	3	2	0	0	0	4	1
	Other lift nets	18	0	0	0	0	1	1	1	2	0	0	1	1	2	2	11
	Push nets	143	81	149	90	84	97	115	115	121	121	121	1	0	2	2	1
	Other nets	0	0	0	0	0	0	0	0	0	0	2	75	74	97	97	91
	Long line	89	89	42	42	42	42	24	26	25	23	39	22	22	13	12	19
	Other gear	155	198	166	162	3	174	62	62	63	31	38	34	34	192	192	183
	trap	284	284	201	215	106	236	268	268	287	268	206	362	326	378	373	481
	dredges	20	20	20	20	20	20	20	20	20	20	20	38	28	25	23	23
	Handline and hook & lines	105	105	105	105	111	111	329	329	329	300	300	300	300	573	568	666

ANNEX 9 NATIONAL REPORT OF VIET NAM

Ministry of Agriculture and Rural Development
DIRECTORATE OF FISHERIES

Fisheries Refugia Project

4th Regional Scientific and Technological Committee Meeting
22 July 2021

Project Activities

04 activities have been implementing:

- Elaborate the profiles of fisheries and habitats for 3 fisheries *refugia* sites at Bach Long Vy, Hon Cau and Phu Quoc
- Utilization of scientific and local knowledge to identify borders of fisheries *refugia*.
- Review and assess legal basis and policy for the establishment of fisheries *refugia*
- Elaborate national guideline on procedures for the establishment and management of fisheries *refugia*

Project Document Amendment

- Propose project document amendment to MARD
- Propose overall project implementation plan
- Reason for amendments:
  - Fisheries Law 2017: provisions on fisheries resource protection area (Fisheries *Refugia*).
  - Status of fish resources and habitats at sites
  - Mandates of competent authorities to manage the fisheries *refugia* site
  - Financial management regulations of ODA project Capture Fisheries
  - Total project budget (-10%) and project implementation extension until 2022

ANNEX 10 CONTENTS OF THE REGIONAL GUIDELINES ON INDICATORS FOR SUSTAINABLE MANAGEMENT OF FISHERIES *REFUGIA*

Executive Summary

The list of Indicators (Appendix 1) for sustainable management of Fisheries Refugia was developed at the 1st Regional Meeting held on 9-11 September 2019 at A-One the Royal Cruise Hotel, Pattaya City, Chonburi Province, Thailand. The development of the Regional Guidelines is aimed to support the participating countries on the effective management of fisheries refugia established during the project implementation and to ensure that after project-end, country shall continue and increase number of fisheries refugia in their country. SEAFDEC PCU plans to complete the Draft Regional Guidelines by end of 2021. In this connection, the PCU prepares the Contents of the Regional Guideline for consideration and comments.

ACTIONS BY THE RSTC4:

- Take notes, consideration and suggestion to the PCU on the Contents of the Regional Guidelines for development further.

CONTENTS OF THE GUIDELINE ON INDICATORS FOR SUSTAINABLE MANAGEMENT OF FISHERIES *REFUGIA*

Appendix 1:
RESULTS OF THE BRAINSTROMING SESSION ON
INDICATORS FOR LONG TERM MANAGEMENT OF FISHERIES *REFUGIA*

Dimensions	Sub-dimensions	Criteria	Indicators
1) Ecosystem	**Fisheries Resources**	Abundance stock / Distribution / Fishing Effort	Biomass Estimation (ton)
			Level of MSY (ton)
			Level of MEY (ton)
			Level of CPUE (Kg/…)
			CPUA (Kg/Area)
			Catch landing (ton or Kg)
		Biological Parameter	Length at first capture (Lc)
			Length at first mature (Lm)
			Sex ratio
			Spawning Potential Ratio
			Length frequency
			Exploitation rate
			GSI (Gonadosomatic Index)
		Species composition / Catch structure	Percentage of dominance species
			Number of species
			% Main economic/commercial species
			Percentage of Bycatch
	Habitat (mangrove, coral, seagrass, and other critical habitats)	Healthy/ condition/ Area	Size Coverage (Percent)
			Healthy Index
			Target habitat density (IUCN reference)
	Environment (Impact from human act.)	Pollution	Standard Water Quality (e.g. COD, BOD)
		Eutrophication	Phytoplankton Abundance
			Phosphate, Nitrate Concentration (Nutrient loading)
		Anthropogenic (Human activity)	Coastal reclamation area
			Level of maritime activity (If appropriated)

Dimensions	Sub-dimensions	Criteria	Indicators
		Erosion	Level and distribution of sedimentation
			Loss of area/habitat
2) Social	Livelihoods	Choice of Occupation	Number of option/ Occupation/ work (Alternative, Permanent work, Subsistence work)
		Fish consumption	Fish consumption per capita per year
		Nutrition	% animal protein (if appropriate)
	Stakeholder Participation (Indigenous People, Gender, etc.)	Participation	Ratio of Number of participations (gender and IP)
		Local Organization	Number of organizations,
			Number of Best practices applied
		Networking	Number of networking
			Type /way of direct or indirect communication
			Number of agreements
	Education (Local knowledge, Local wisdom)	Awareness program (e.g. information center, information education campaign (IEC))	Number of information center or similar.
			Number of consultations
			Number of best practices
			Number of awareness program
			Number of understanding by stakeholder
		Capacity building	Number of training/Extension
3) Economic	Economic Condition (to community)	Poverty incident	Poverty Index
		Capital accessibility	Number of financial accessible
		Income	Income per household
	Fisheries Production, Fishing Efforts	Contribution of target species / Availability	Value of contribution/production
	Innovative Fisheries Technology	Effectiveness fishing gear	level of CPUE
		Cost effectiveness	Cost reduction, time, human power
		Environment friendly (Green technology)	Reduce of fuel consumption
			Reduce bycatch
		Investment	Number of investment (for e.g. fishing fleet, processing, ship builder, management tools/software, etc.)

Dimensions	Sub-dimensions	Criteria	Indicators
			New domestic product
4. Governance	**Fisheries management policy (Fishing/User Right, Precautionary approaches/Science-based management, and Synergistic Way/Strategy)**	Legal framework	Number of law and regulation
		Harvest strategy/ Limit of fishing effort	Fishing close, (area and seasonal closure, Zoning
			Number of Input control (Number, mesh size, length of fishing gear, Licensing control, Capacity (e.g. Gross tonnage, horsepower, etc.)
			Number of output control (TAC, Quota, Target species)
		Fisheries management plan/ strategy/ framework	Available/not available
			Management plan of Fisheries refugia in place,
			Habitat rehabilitation, protection and stock enhancement.
		Efficiency fishing gear	Length limit (e.g. crab fishery)
	Stakeholder Cooperation/Coordination (Regional / national levels)	Management mechanism	Management board/ committee, transboundary committee, RPOA for refugia in place
			Linkage to the existing management/conservation framework (e.g. MPAs)
	Enforcement	Coordination mechanism	Inter-agency coordination in place, Number of joint operations
		Fishery Law enforcement	Level of enforcement
			Frequency of regular patrol
			Number of violation prosecution
	Capacity Building	Best Practice	Adoption of best practice in place
		Maritime policy and regulation/ International policy	Number of training/workshops
	Funding (Infrastructure, Enforcement, etc.)	Sustainability	Long term commitment of Government on finance
		Source of funding (incentive, soft loan, donation/CSR)	Number of donors
			Type of funds

Dimensions	Sub-dimensions	Criteria	Indicators
		incentive	Type of incentive
			Number of activities
			Number of best practices
5) Climate Change and Disaster	**Fish Stock**	Impact to Fish Stock	Availability/levels of knowledge abundance, distribution, genetic diversity, recruitment
			Update information impact to fish stock
	Impact to Habitat	Coral bleaching	Area
			Incident/ frequency
			Recovery Rate
		Destruction of mangrove	Area coverage
			Recovery Rate
		Destruction of sea grass	Area coverage
			Recovery Rate
	Impact to Environment	Sea level rise	Saline intrusion
			Mean sea level annual
			Coastal Erosion (Area)
		Physical/chemical parameters (T, Salinity, PH, DO)	Level of physical and chemical parameters
		Precipitation (rainfall) Ocean acidification	Level of Precipitation PH level

ANNEX 11 REGIONAL ACTION PLAN FOR MANAGEMENT OF TRANSBOUNDARY SPECIES, INDO- PACIFIC MACKEREL (RASTRELLIGER BRACHYSOMA) IN THE GULF OF THAILAND SUB-REGION

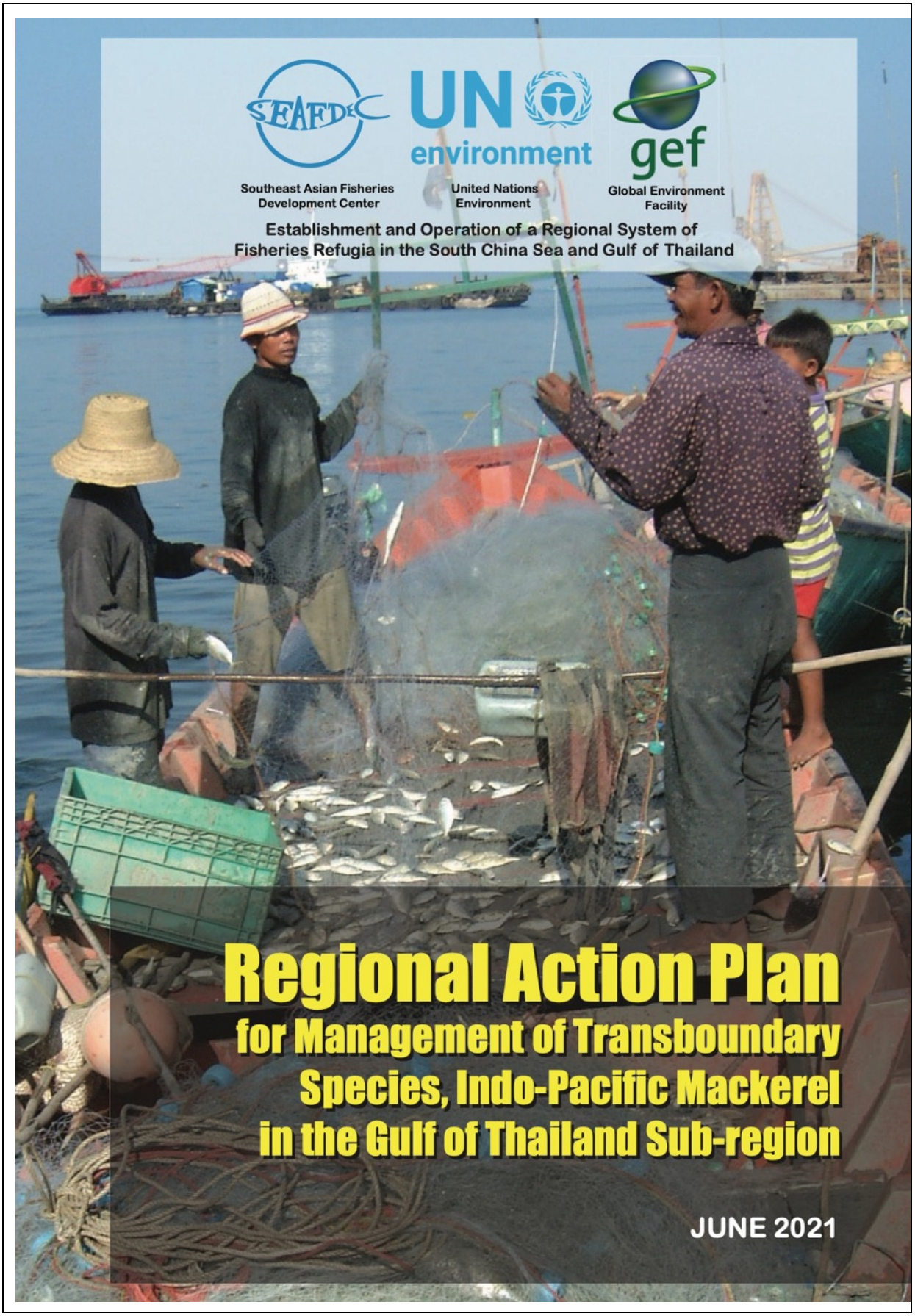
REGIONAL ACTION PLAN FOR MANAGEMENT OF TRANSBOUNDARY SPECIES, INDO-PACIFIC MACKEREL (RASTRELLIGER BRACHYSOMA) IN THE GULF OF THAILAND SUB-REGION

Executive Summary

Concerning the improved management policy of critical habitats for fish stocks of transboundary significance, The Regional Action Plan for Management transboundary species, Indo-pacific Mackerel in the Gulf of Thailand Sub-Region where the results are the extent to the South China Sea sub-region was drafted in September 2019, and adopted by the SEAFDEC Council in May 2020. The ACTION PLAN was later endorsed at the FCG/ASSP in November 2020 and further addressed to the ASWGFi in the 2nd Quarter of 2021 for further support under the ASEAN Policy Framework. The PCU presents the published Action Plan for further distribution.

ACTIONS BY THE RSTC4:

- Take notes, consideration and apply it for further development of the national action plan as appropriate.


SEAFDEC
Southeast Asian Fisheries Development Center
UN environment
United Nations Environment
gef
Global Environment Facility
Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand
Regional Action Plan
for Management of Transboundary Species, Indo-Pacific Mackerel in the Gulf of Thailand Sub-region
JUNE 2021

Cover Graphic and Photo:
Somboon Siriraksophon

Copies of the report can be downloaded from:

Southeast Asian Fisheries Development Center

United Nations Environment

Global Environment Facility

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

REGIONAL ACTION PLAN
FOR
MANAGEMENT OF TRANSBOUNDARY SPECIES, INDO-PACIFIC MACKEREL (*Rastrelliger brachysoma*) IN THE GULF OF THAILAND SUB-REGION

SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER
TRAINING DEPARTMENT

JUNE 2021

Page 1 of 20

Southeast Asian Fisheries Development Center

United Nations Environment

Global Environment Facility

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

REGIONAL ACTION PLAN

FOR

MANAGEMENT OF TRANSBOUNDARY SPECIES, INDO-PACIFIC MACKEREL (*Rastrelliger brachysoma*) IN THE GULF OF THAILAND SUB-REGION

SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER
TRAINING DEPARTMENT

JUNE 2021

First published in Phrasamutchedi, Samut Prakan, Kingdom of Thailand in June 2021 by the SEAFDEC/UNEP/GEF Fisheries Refugia Project, Training Department of the Southeast Asian Fisheries Development Center

SEAFDEC/UNEP/GEF
Project Co-ordinating Unit
Training Department
Southeast Asian Fisheries Development Center
Postal Address: P.O.Box 97, Phrasamutchedi, Samut Prakan, Kingdom of Thailand
Tel: (66) 2 425 6100
Fax: (66) 2 425 6110
https://fisheries-refugia.org

For citation purposes this document may be cited as:

SEAFDEC, 2021. Regional Action Plan for Management of Transboundary Species: Indo-Pacific Mackerel (*Rastrelliger brachysoma)* in the Gulf of Thailand Sub-Region. Southeast Asian Fisheries Development Center, Training Department, Samutprakan, Thailand. 20p.

Table of Contents

CHAPTER-1: INTRODUCTION

Mackerels (Family Scombridae), particularly the Indo-Pacific mackerel (*Rastrelliger brachysoma*), also known as short mackerel, are among the most economically important small pelagic fishes in the Southeast Asian region, contributing to approximately 38% of the region's total small pelagic fisheries production or 11% of total capture fisheries production in 2010. Comparing mackerel species, in 2016, Indo-Pacific mackerel contributed to 78% of the total mackerel production with an average price of 1,492 USD/MT, decreasing from the production reported in 2015. (SEAFDEC, 2018).

On the production of Indo-Pacific mackerel by countries, Indonesia was the major catcher in the region, reporting the highest production at 283,106 MT in 2016, followed by the Philippines at 38,339 MT (SEAFDEC, 2018). As for Thailand, the mackerel production was not segregated by species, but the total production of all mackerel species was reported to be 81,017 MT in 2016. Nevertheless, the country's total mackerel production had drastically reduced from those of 194,845 MT in 2012. Like Thailand, the Philippines also reported declining trends in its Mackerel production through the period (SEAFDEC, 2018).

The Gulf of Thailand Sub-region (GoT) is one of the critical ecosystems for Indo-Pacific mackerel, where the peak of highest catch using purse seine and the falling net reported in 1996 at 328,955 MT; while the low catch appeared during three periods, in 1999, 2005 and 2010 at 289,285 MT, 283,984 MT, and 259,354.56 MT, respectively. Moreover, the catch has never reached 300,000 MT as recorded in 1996 (SEAFDEC, 2018).

In general, various types of fishing gears were used to harvest Indo-Pacific mackerel in the GoT; and the three significant types recorded in 2008 were purse seines (45%), driftnets (31%), trawls (18%). The landings show declining trends indicating that the Indo-Pacific mackerel stocks in the South China Sea and GoT were overexploited. For instance, in 2016, Thailand reported the catch production of Indo-Pacific mackerel by three main fishing gears, purse seine at 3,008 MT, trap at 691.6 MT, and trawl at 630.3 MT (SEAFDEC, 2018).

Short mackerel is considerable inexpensive but contains high protein, making the species popular for consumption in the Southeast Asia.

CHAPTER 2: STOCK STATUS OF INDO-PACIFIC MACKEREL

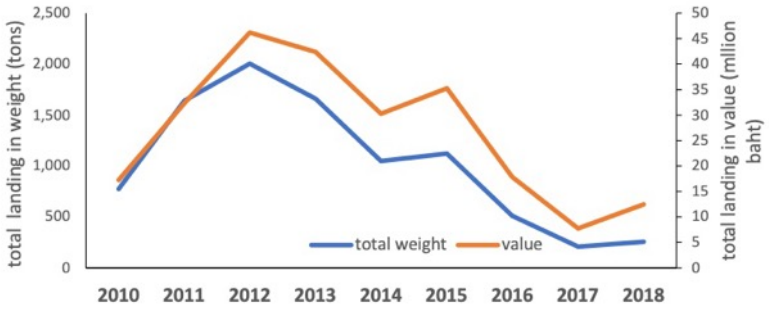
Indo-Pacific mackerel is considerably inexpensive but contains high protein, making the species popular for consumption in Southeast Asian countries such as Cambodia, Indonesia, Thailand, and Malaysia. However, with a drastic increase in the production of canned mackerels to replace the decreasing sardines, the catch of Indo-Pacific mackerel has recently been declining due to overfishing and unregulated fishing operations in several countries. Such a situation has become a significant concern by countries in the Southeast Asian region.

Several fish species, including mackerels, were reported to be in the overexploitation state in the Gulf of Thailand (Puthy, 2007). His study using the Schaefer and Fox models indicated that mackerel stocks are both biologically and economically overexploited. However, there were still opportunities to increase the mackerel stocks by reducing fishing efforts, allowing the stocks to recover.

Thailand also reported that the species was under an overexploitation state throughout the past years. The species also had to change population patterns, which could be due to the environmental impacts. Furthermore, the distribution of fish larvae could also be influenced by changes in phytoplankton, water current, and temperature (SEAFDEC, 2017).

In Indonesian waters, over-exploitation of marine fishery resources, including Indo-Pacific mackerel, has been highlighted in the Java Sea and other Indonesian waters. However, the recent population dynamic study by Zamroni, A.& Ernawati, T. (2019) showed that Indo-Pacific mackerels in Northern Coast Java of Indonesia water were still under fully exploitation state, and the recruitment process has not been disturbed. Although the species has yet to reach the heavy exploitation state, the suggestion was made that fishing efforts should be reduced, while fishing permits, such as the number of units, size of the fishing fleet, fishing gear dimensions, and fishing technology pressure, should also be controlled. Nevertheless, due to limited biological information of Indo-Pacific mackerel, genetic diversity study of the species, including in Java Island, was conducted (Indaryanto *et al*. 2015).

Meanwhile, the decline of Indo-Pacific mackerel due to changes in environmental condition and water quality, modification, and loss of critical habitats, has been documented in several countries and reported by the media.



Total weights and values of short mackerel landed in Trat fisheries refugia site (Munprasit et.al.2020)

CHAPTER 3: ISSUES, KNOWLEDGE GAPS, AND CHALLENGES

The Scientific and Technical Committee for fisheries refugia project identifies the issues, knowledge gaps, and challenges for sustainable utilization of Indo-Pacific mackerel based on the reviews and inputs from six targeting Southeast Asian countries, namely Cambodia, Indonesia, Malaysia, Philippines, Thailand, and Viet Nam. In response to SEAFDEC questionnaires in September 2019, the issues, knowledge gaps, and challenges are categorized and summarized as follows:

3.1) DATA AND INFORMATION

- Insufficient information on the Indo-Pacific mackerel fishery characteristics
- Insufficient series catch and effort data, series of size data, biological data collection for population and abundance study
- No current information of migratory route, spawning ground, and season for a whole life cycle
- No regular monitor data collection on capture production.

3.2) UNDERSTANDING THE STATUS OF FISH STOCK

- Lack of knowledge on stock structure (need on DNA study)
- Insufficient stock status of *R brachysoma* (distribution and abundance)
- Insufficient information on Population dynamics (Growth parameters, mortalities, and relationship to other regional stock)
- No Actual effort to exploit the resources
- Trans-boundary distributions
- Lack of knowledge on how to assess multi-fishing gears to harvest

3.3) MANAGEMENT RESPONSES

- No Fisheries Management Plan
- No information on existing and effectiveness of regulations
- No co-management schemes/arrangements
- No transboundary management mechanism/plan
- No information on Effects/Loss to IUU fishing
- No reliable database or software for Assessment
- No Traceability system using an electronic logbook
- support the Sustainable management concept, Co-management, and EAFM

3.4) AWARENESS BUILDING

- Educate people and student in fisheries communities
- Distribute brochures or any media to promote fisheries management
- Raise awareness of both small-scale fishers and commercial fishers
- Sharing of the findings to both policy management level and fishermen
- develop consultation among researchers, managers, and stakeholders (EAFM)
- to support the Sustainable management concept, Co-management, and EAFM

3.5) STRENGTHEN REGIONAL COOPERATION

- Standardization on data collection for regional stock assessment
- Data sharing

- Lack of management body
- Develop the transboundary management mechanism/plan

3.6) STUDY THE ENVIRONMENT IMPACT

- Temporary disappear of short mackerel in the Gulf of Thailand
- impact of climate change to fish migration route

3.7) ENHANCE CAPACITY BUILDING

- Strengthen knowledge on research works as follows:
  - Species identification of small size (juvenile) and larval fishes
  - otolith (to know the age of fish)
  - Data collection at landing sites: catch and biological data
  - Data analysis
  - Stock Assessment and modeling for stock assessment
  - Harvest Strategy
- Fishing gear technology
- Fisheries manager
  - Translating scientific advice into management measures and actions
  - Understand various fisheries management tools and used them in the actual implementation

3.8) INFORM THE AGREED MANAGEMENT MEASURES

- Relavant stakeholders including fishers, fishing industry, local community, etc.)
- Ensure its compliance.

Technical Training on Biological Studies of Indo-Pacific Mackerel on 12-14 February 2019 in Koh Kong Province, Cambodia

CHAPTER 4: REQUIRED REGIONAL COOPERATION FOR TRANSBOUNDARY MANAGEMENT

Since 1953, Thailand undertook several management actions for Indo-Pacific mackerel stock. From 1953 to 2015, 13 Notifications were released concerning the closure of fishing areas in the Gulf of Thailand to conserve the spawning grounds and nursery stages of aquatic resources (Saikliang 2016). Thailand also undertook several studies to enhance knowledge on migration patterns of Indo-Pacific mackerel within the country's EEZ in the Gulf of Thailand. The country's efforts for effective fisheries management for Indo-Pacific mackerel have continued up to the present.

Although the information on migration patterns of Indo-Pacific mackerel within the country's EEZ in the Gulf of Thailand sub-region is already available for almost 30 years, however, the recent result from genetic analysis of Indo-Pacific mackerel using the individual assignment and mixed-stock analysis shows the contradictory migratory behavior of the species between the stock in the inner Gulf of Thailand and the stock in the eastern part of the Gulf of Thailand (Kongseng et al., 2020). Additionally, the population from Pattani Province may also migrate across the eastern Gulf of Thailand through the southern part of Viet Nam and Cambodia waters. Such results indicated that Indo-Pacific mackerel is transboundary species, and joint management cooperation at the regional or sub-regional levels among countries that harvested Indo-Pacific mackerel is necessary for sustainable management.

Regional Consultative Meeting on Drafting of the Regional Action Plan for Management of Transboundary Species, Indo-pacific Mackerel was held at Bay Beach Resort, Jomtien, Chonburi Province, Thailand (12th – 13th September 2019).

CHAPTER 5: PROVISIONS OF THE REGIONAL ACTION PLAN

There are a number of international instruments aiming at conservation and management of marine resources, e.g., the 1982 United Nations Convention on the Law of the Sea (UNCLOS), the United Nations Fish Stock Agreement (UNFSA), and the UN Sustainable Development Goal (SDG) 14. These instruments also support initiatives in combating illegal fishing towards sustainable use of seas and marine resources and enhancing the environmental, economic, and social well-being of coastal fishers and communities. At the regional level, the ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region adopted by the ASEAN-SEAFDEC Member Countries in 2001 and 2011 also specified the importance of establishing and implementing effective fisheries management through ecosystems approach by integrating habitat and fisheries resources and increasing social and economic benefit to all stakeholders and applying knowledge/science-based development and management of fisheries.

It recognizes the need to strengthen cooperative efforts among countries toward sustainable utilization of the marine resources, particularly the Indo-Pacific mackerel, a critical transboundary resource in the Gulf of Thailand. SEAFDEC with the funding support from the Government of Sweden through the SEAFDEC-Sweden Project on "Fisheries and Habitat Management, Climate Change and Social Well-being in Southeast Asia" and the SEAFDEC/UNEP/GEF Project on "Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand (Fisheries Refugia)" therefore facilitated discussion among the Gulf of Thailand countries to develop the Regional Action Plan (RAP) for Management of Indo-Pacific mackerel. The RAP contains five Sections, namely:

Section 1: Introduction

Section 2: Stock Status of Indo-Pacific mackerel

Section 3: Issues, Knowledge Gaps, and Challenges

Section 4: Required Regional Cooperation for Management of Transboundary Species

Section 5: Provisions of the RAP including goal, outcomes, objectives, and actions.

The Provisions of RAP were categorized into five dimensions, which are: 1) Governance; 2) Social; 3) Economic, 4) Ecosystem; and 5) Climate Change. These five dimensions were aligned with the concept of the Ecosystem Approach to Fisheries Management (EAFM).

This RAP for Management of Indo-Pacific mackerel is a non-legal binding document meant to serve as a foundation to identify practices and processes that support the implementation of the relevant ASEAN-SEAFDEC Resolution and Plan of Action. It marks an evolutionary step towards a concerted regional approach to support countries' efforts to manage the transboundary fish stock in the Gulf of Thailand.

5.1) THE GOAL OF REGIONAL ACTION PLAN

The Regional Action Plan is intended to serve as a guide for concerned countries in implementing actions to achieve the goal of

"Sustainable Indo-Pacific mackerel fisheries in the Gulf of Thailand sub-region through science-based management for the shared benefit to the other ASEAN Member States by 2030"

5.2) EXPECTED OUTCOMES

1) Healthy Indo-Pacific mackerel resources through the implementation of fishery management plan of the Gulf of Thailand.
2) Accurate and comprehensive information on Indo-Pacific mackerel of the Gulf of Thailand.
3) Model for development of management plan for Indo-Pacific mackerel that could be applicable to other sub-regions.

5.3) ACTIONS

A) GOVERNANCE DIMENSION

Overall Objective:

Regional/sub-regional fisheries management mechanism is in place building upon national regulations and management scheme.

Specific Objectives

A1. Fisheries management mechanism developed and approved (including fisheries management plan and arrangement, the effect of regulation)

A2. The data management system is enhanced and considered regional/sub-regional standardization data management system in place.

A3. The standard for assessing fishing effort large, medium and small-scale fishery agreed.

A4. Understandings on national law and management schemes within the sub-regional are communicated and applied.

A5. Impact of unregulated and unreported fishing assessed.

A6. Catch documentation system applied as a tool to improve traceability of the short mackerel fishery.

Knowledge Gaps/Issues	Actions	Ref.	Responsibility
Insufficient catch and landing data	Develop the SOP/technical guidance for data collection (including catch data, biological data	A2	• SEAFDEC • University • Government agency • Fishery research institute
	To further develop catch documentation	A2	
	Harmonization/standardized on data collection and develop database system	A2	
Insufficient biological data collection	Conduct capacity building program for data collection to enumerator and scientist, researchers	A3	• SEAFDEC • University • Government agency • Fishery research institute
	Conduct time series data collection with standardized method	A3	
Insufficient Fishing effort (include commercial and small scale)	Link to the catch documentation include commercial and small-scale fishery (as available)	A4	• Government and Private sector
	Regular monitor data collection on fishing effort capture production (include commercial and small scale)	A4	
Fisheries Management Mechanism (including fisheries management plan and arrangement, the effective of regulation)	Develop fisheries management plan for short mackerel at national and sub-regional level	A1	• SEAFDEC • University • Government agency • Fishery research institute • All stakeholder (fishers, others)
	Initiative on development of harvesting strategy		

	Establish regional cooperation on monitoring, control and surveillance	A1	• Existing national MCS partners/network
	Raise awareness of both small-scale fishers and commercial-scale fishers ○ Policy and regulations ○ Management measures ○ Sustainable utilization ○ Involvement the participation, considering gender sensitivity	A1	• SEAFDEC • University • Government agency • Fishery research institute • All stakeholder
	Promote stakeholder consultation among researchers, managers and stakeholders using EAFM	A1	• SEAFDEC • University • Government agency • Fishery research institute • All stakeholder • International organizations (FAO, NOAA, etc)
	Conduct habitat conservation and rehabilitation and conduct stock enhancement programs	A1	• SEAFDEC • University • Government agency • Fishery research institute • All stakeholder
Understanding national law and regulations	Comparative review of national law and regulations, (including local wisdom)	A5	• Government and resource person
	Disseminate knowledge and information on the conservation and management of Indo-pacific mackerel to fisheries communities and students	A5	• Government • Other stakeholders
Flexibility of regulation to respond to science advise	Encourage periodic evaluation of policy and regulation	A1	• Government
Management schemes/arrangements including transboundary aspects.	Develop management schemes/arrangements at sub-regional area including transboundary aspects	A1	• SEAFDEC • University • Government agency • Fishery research institute • All stakeholders
	Support establishment of regional cooperation/management mechanism (non-legal binding and scientific advisory committee)	A1	
Illegal, Unregulated and Unreported Fishing	Assessing the impact of Illegal, Unregulated and Unreported Fishing	A6	• Government and resource person • Inter-agencies coordination
	Strengthen the Monitoring, Control and Surveillance network against the illegal fishing (none legal binding)	A6	
Traceability system for fish and fishery product (using electronic logbook, etc)	Develop the catch documentation that suitable for traceability system e.g. electronic logbook, etc.	A6	• Government and resource person

B) SOCIAL DIMENSION

Overall Objective:

Social responsibility and involvement in fisheries management achieved

Specific Objectives:

B1. Understanding the social condition of people involving in the fishery at the local and national level.

B2. Increase participation and involvement of stakeholders at various levels.

B3. Resolve conflict on land and resource use

B4. Build awareness and capacity at all level.

Knowledge Gaps/Issues	Actions	Ref.	Responsibility
Social and economic at local and national level	Conduct a baseline survey based on available information on social and economic at local and national level (S)	B1	• Government • University
Traditional fishing (indigenous knowledge and social responsibility)	Improve and disseminate the best practice to other (indigenous people)	B1	• Government
People engagement in fishery activity (include small scale fishery and large scale/commercial fishery, processing)	Conduct stakeholder analysis for understanding the important and influence of stakeholder in various level	B2	• Government • University
People engagement in policy making (fisherfolk organization, academy, private sector,	Promote Public Private Partnership	B2	• Government
	Promote multi stakeholder engagement in policy making	B2	• Government and relevant stakeholder
Social structure (community small scale and large scale, gender, migrant labor, and fisher)	Encourage gender equality based on understanding of social structure in community	B2	• Government and relevant stakeholder
Conflict on land and resource use	Promote stakeholder consultation	B3	• Government and relevant stakeholder
	Promote marine spatial planning and coastal zone management	B3	• Government • Resource person • Relevant stakeholder
Awareness Raising	Distribute brochures or any media (e.g. digital media) to promote fisheries management and regulations)	B4	• SEAFDEC • Government • Relevant stakeholder
	Capacity building and experts exchange		
	Fishing gear technology for eco-friendly (Reduce bycatch, cost and expenditures		

C) ECONOMIC DIMENSION

Overall Objective:

Equal distribution of economic benefit, economic return, and employment opportunities

Specific Objectives:

C1. Ensure the national government and private sector commitment for long-term funding and support.

C2. Understanding the structure and ownership of assets within the fishing industry (large, medium, and small scale).

C3. Maximized economic benefit return for management response and reduced unequal distribution.

Knowledge Gaps/Issues	Actions	Ref.	Responsibility
Funding	To ensure the national government commitment for long-term funding and support	C1	• Government • Private sector • Funding agency/donor
	Explore various potential donor	C1	
	Promote capital access through micro finance scheme	C1	
	Promote corporate social responsibility	C1	
Structure and ownership of asset within the fishing industry (large and small scale)	Review structure and ownership of asset within the fishing industry (large, medium and small scale) for management responses	C2	• Government • Resource person
Benefit and economic return and unequal distribution	Assess benefit and economic return throughout the value chain	C3	• Government • Resource person
Increase of cost (fuel and other inputs)	To ensure the fuel and other input exist for local fishermen	C3	• Government
Fisheries employment revenue	To create the alternative work	C3	• Government • Private Sector • Relevant stakeholder
	Require the contract among people engage in fishing		

D) ECOSYSTEM DIMENSION

Overall Objective:

Maintain a healthy ecosystem for the wellbeing of short mackerel resources

Specific Objectives:

D1. Understand current status and improve the knowledge of short mackerel resources for scientific-based management

D2. Understand various habitats of short mackerel throughout its life cycle

Knowledge Gaps/Issues	Actions	Ref.	Responsibility
Migratory route	Update, further define and confirm the migratory route at national, sub-regional or regional area	D2	• Fisheries Agencies, • National Research Institutions, • Regional Institutions
	Conduct tagging program, e-DNA, DNA	D1	• Fisheries Agencies, • Research Institutions
Spawning and nursery grounds (including dispersion and distribution of fish larvae)	Conduct comprehensive larvae survey (e.g. ichthyoplankton)	D1	• Fisheries Agencies, • Research Institutions
	Study on critical habitats	D2	• Fisheries Agencies, • Research Institutions,
Seasonal changes	Conduct comprehensive larvae survey (e.g. ichthyoplankton)	D1	• Fisheries Agencies, • Research Institutions, • SEAFDEC
	Conduct reproductive biology study	D1	• Fisheries Agencies, • Research Institutions, • SEAFDEC
Physical and chemical oceanographic conditions and ocean circulation	Conduct oceanography survey	D2	• Fisheries Agencies, • Research Institutions, • SEAFDEC
	Develop oceanographic modelling	D2	• Fisheries Agencies,

			• Research Institutions, IOC/WESTPAC
	Conduct satellite imagery (GIS, remote sensing) analysis	D2	• Fisheries Agencies, • Research Institutions
Stock structure	Conduct DNA study, otolith, tagging, etc.	D1	• Fisheries Agencies, • Research Institutions, • SEAFDEC
Stock status at national and regional of *R. brachysoma* (distribution and abundance)	Conduct stock assessment at national, sub-regional or regional level	D1	• Fisheries Agencies, • Research Institutions, • SEAFDEC
	Share data, information and findings from scientific research to relevant stakeholders	D1	• Fisheries Agencies, • Research Institutions, • SEAFDEC
	Standardized data collection for regional stock assessment	D1	• Fisheries Agencies, • Research Institutions, • SEAFDEC
	Develop modeling for stock assessment	D1	• Fisheries Agencies, • Research Institutions, • SEAFDEC, • FAO
Species Identification	Provide capacity building on species identification of small size (juvenile) and larval fishes	D1	• Fisheries Agencies, • Research Institutions, • SEAFDEC
Status and Trends	Investigate the trend of short mackerel catch at national, sub-regional levels	D1	• Fisheries Agencies, • Research Institutions, • SEAFDEC
Population dynamics (Growth parameters, mortalities etc.	Conduct survey on fisheries biology	D1	• Fisheries Agencies, • Research Institutions
Impact of fishing effort on stock structure (Multi-fishing gears to harvest)	Conduct study on impact of fishing effort on stock structure (Multi-fishing gears to harvest) to improve the fishery management	D1	• Fisheries Agencies, • Research Institutions, • SEAFDEC

	Enhance Fishing gear technology for eco-friendly (Reduce bycatch, cost and expenditures)	D2	• Fisheries Agencies, • Research Institutions, • SEAFDEC
Stock assessment and distributions for transboundary species	Enhance the cooperation for information sharing among the bordering countries	D1	• Fisheries Agencies, • SEAFDEC
Capacity building and experts exchange	Training, workshop, conference and experts exchange	D1,2	• Fisheries Agencies, • Research Institutions, • SEAFDEC, FAO, UNEP-GEF

E) CLIMATE CHANGE DIMENSION

Overall Objective:

Adaptive management based on understanding the impact of climate change and disaster

Specific Objectives:

E1. adaptive management measures **in place** in response to the impact of climate change and disaster on short mackerel fisheries and habitats

E2. mitigation and precautionary measures **adopted** to compensate for the effects of climate change

Knowledge Gaps/Issues	Actions	Ref.	Responsibility
Impact of climate change to fish migration route	Assess the impact of climate change/disaster/anthropogenic activities to fish migration route, habitat and behavior	E1	• Fisheries and Environmental Agencies, • Research Institutions, • SEAFDEC, UNEP-GEF, UNDP, FAO
	Study effect of environmental changes on the migratory pattern and spawning patterns based on climate change	E1	• Fisheries and Environmental Agencies, • Research Institutions, • SEAFDEC, UNEP-GEF, UNDP, FAO
	Share information from the findings of scientific research to both fisheries managers and fishers	E2	• Fisheries and Environmental Agencies, • Research Institutions, • SEAFDEC, UNEP-GEF, UNDP, FAO
Sensitivity of species on critical habitats and environment impact to ecosystem (pollution, climate change, etc)	Conduct study on sensitivity of species on environment change (pollution, climate change, etc) to support the management response	E1	• Fisheries and Environmental Agencies, • Research Institutions, • SEAFDEC, UNEP-GEF, UNDP, FAO
	Study on the critical habitats (spawning and grounds)	E1	• Fisheries and Environmental Agencies, • Research Institutions,

			• SEAFDEC, UNEP-GEF, UNDP, FAO
	Study effect of environmental changes on the migratory pattern and spawning patterns	E1	• Fisheries and Environmental Agencies, • Research Institutions, • SEAFDEC, UNEP-GEF, UNDP, FAO
	Data sharing (assign focal person to share information)	E1	• Fisheries and Environmental Agencies, • Research Institutions, • SEAFDEC, UNEP-GEF, UNDP, FAO
Capacity building and experts exchange	Training, workshop, conference and experts exchange on CC impacts	E1 E2	• Fisheries and Environmental Agencies, • Research Institutions, • SEAFDEC, UNEP-GEF, UNDP, FAO

REFERENCES:

1. Em Puthy (2007). Final Report of the Fisheries Training Programme: Policy and Planing, the United Nations University, Iceland. http://www.unuftp.is/static/fellows/document/puthy07prf.pdf
2. Indaryanto et al. (2015). Genetic variation of short body mackerel, *Rastrelliger brachysoma* of Java Island, Indonesia based on mtDNA control region sequences AACL Bioflux, 2015, Volume 8, Issue 5. http://www.bioflux.com.ro/aacl
3. Kongseng, S., Phoonsawat, R.s Swatdipong, A., (2020). Individual assignment and mixed-stock analysis of short mackerel (*Rastrelliger brachysoma*) in the Inner and Eastern Gulf of Thailand: Contrast migratory behavior among the fishery stocks. Fish. Res. 221, 1-9. https://doi.org/10.1016/j.fishres.2019.105372
4. SEAFDEC (2017). Report of the Experts Group Meeting on Stock Status and Geographical Distribution of Anchovy, Indo-Pacific mackerel and Blue Swimming Crab (AIB), in the Gulf of Thailand, Bangkok, Thailand, 22-23 September 2016, Southeast Asian Fisheries Development Center. 69 pp.
5. SEAFDEC (2018). Fishery Statistical Bulletin of Southeast Asia 2016. Southeast Asian Fisheries Development Center.143 pp.
6. Zamroni, A.& Ernawati, T. (2019). Population Dynamic and Spawning Potential of Short Mackerel (*Rastrelliger brachysoma* Bleeker, 1851) in the Northern Coast of Java. 1-9. http://ejournal-balitbang.kkp.go.id/index.php.ifrj
7. Munprasit R., Nootmorn P., Loychuen K. (2020). Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand, Technical Report of Fisheries Refugia Profile for Thailand: Trat. Southeast Asian Fisheries Development Center, Training Department, Samut Prakan, Thailand; FR/REP/TH25, 37 p.

ANNEX 12 THE THIRD REGIONAL TRAINING WORKSHOP ON LARVAL FISH IDENTIFICATION AND FISH EARLY LIFE HISTORY SCIENC (ADVANCED COURSE)

Executive Summary

Due to the lack of scientists on fish larval identification, SEAFDEC, in collaboration with GEF/UNEP project "Reversing Environment Degradation Trends in the SCS and GoT" in 2007 and 2008, organized the Regional Training Courses on the larval fish identification. This matter was raised again at the Regional Scientific and Technical Committee Meeting with the high demand for training on fish larvae identification to support the activities of the SEAFDEC/UNEP/GEF Project on establishment and operation of a regional system of fisheries refugia in the SCS and GoT. In collaboration with the SEAFDEC Training Department, the advanced course to enhance the scientist's keying and identification of species was developed in 2019 (see Appendix 1). The PCU proposed the Regional Training Workshop on Larval Fish Identification and Fish Early Life History Science based at the 3rd RSTC in Viet Nam, which expects to conduct the training course in 2020. In response to capacity-building requirements on fish larvae identification, the PCU prepares $10.5K to support the larval fish identification activities. However, the covid-19 pandemic has seriously impacted traveling across countries from early 2020 until the present. The PCU considers that it is a low possibility to succeed in conducting the training workshop in 2021.

The SEAFDEC/PCU, therefore, wants to consult with the committee on modification of the allocated budget to produce the publications related to Larval Fish Identification and Fish Early Life History Science guidebook or other related activities that should be useful to SEAFDEC Member Countries.

ACTIONS BY THE RSTC4:

- Take notes and endorse the request from SEAFDEC/PCU to spend the allocated budget to produce the publications/guidebooks related to Larval Fish Identification and Fish Early Life History Science.
- To provide comments and suggestion on the way forward on the above subject.

Appendix 1: Program and Syllabus

Date/Time	Training Activity/Topic	Resource Person	Note
Day 1 - Sunday			
	Participants arrive at SEAFDEC Training Department, Samut Prakan, Thailand	SEAFDEC Personnel	
Day 2 - Monday			
0900-1000	Opening ceremony & group photo	SEAFDEC & SEAFDEC-UNEP project	
1000-1020	Refreshment	SEAFDEC Personnel	
1020-1040	Brief on schedule and anticipated output	SEAFDEC Personnel	
1040-1200	Country report on the implementing plan of the fisheries resources refugia project	Participants (Cambodia, Philippines, Thailand and Vietnam)	(a)
1200-1330	Lunch break	SEAFDEC Personnel	
1330-1430	Lecture: Review on morphological development of larval fish characters	Yoshinobu Konishi	(b)
1500-1700	Lecture & Practice: Method for calculation of abundance of fish larvae collected by net sampling	Yoshinobu Konishi and SEAFDEC Personnel	
Day 3 - Tuesday			
0900-1000	Lecture: Identification methods of the Scombridae larvae and juveniles in the Southeast Asian region	Yoshinobu Konishi	©
1030-1200	Practice: Species identification and morphological description of the Scombridae larvae and juveniles - 1	Instructor Team	
1200-1330	Lunch break	SEAFDEC Personnel	
1330-1700	Practice: Species identification and morphological description of the Scombridae larvae and juveniles - 2	Instructor Team	(d)
Day 4 - Wednesday			
0900-1200	Practice: Species identification and morphological description of the Scombridae larvae and juveniles - 3	Instructor Team	(e)
1200-1330	Lunch break	SEAFDEC Personnel	
1330-1430	Lecture: Identification methods of the Carangidae larvae in the Southeast Asian region	Yoshinobu Konishi	
1500-1700	Practice: Species identification and morphological description of the Carangidae larvae - 1	Instructor Team	
Day 5 - Thursday			
0900-1200	Practice: Species identification and morphological description of the Carangidae larvae - 2	Instructor Team	(f)
1200-1330	Lunch break	SEAFDEC Personnel	
1330-1700	Practice: Species identification and morphological description of the Carangidae larvae - 3	Instructor Team	
Day 6 - Friday			
0900-1000	Lecture: Identification methods of the Engraulidae larvae in the Southeast Asian region	Yoshinobu Konishi	
1030-1200	Practice: Species identification and morphological description of the Engraulidae larvae - 1	Instructor Team	
1200-1330	Lunch break	SEAFDEC Personnel	

1330-1700	Practice: Species identification and morphological description of the Engraulidae larvae - 2	Instructor Team	
Day 7 - Saturday			
	Rest Day		
Day 8 - Sunday			
0900-1200	Practice: Species identification and morphological description of the Engraulidae larvae - 3	Instructor Team	
1200-1330	Lunch break	SEAFDEC Personnel	
1330-1700	Presentation of case study on early life history science based on the references for planning of future working subjects in participating countries	Participants (Cambodia, Philippines, Thailand and Vietnam)	
Day 9 - Monday			
0900-1200	Lecture: Identification methods of the Lutjanidae, Siganidae and serranid Epinepherinae larvae in the Southeast Asian region	Yoshinobu Konishi	
1200-1330	Lunch break	SEAFDEC Personnel	
1330-1700	Practice: Species identification and morphological description of the Lutjanidae, Siganidae and serranid Epinepheninae larvae - 1	Instructor Team	
Day 10 - Tuesday			
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	
Day 11 - Wednesday			
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	
Day 12- Thursday			
0900-1200	Presentation on results of species identification and morphological 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	Closing ceremony	SEAFDEC Personnel	
1800-2200	Farewell Dinner	SEAFDEC Personnel	
Day 13- Friday			
	Participants leave SEAFDEC/TD for Home Countries	SEAFDEC Personnel	

Notes:

a) including an explanation of larval fish samples brought from participating countries for this course
b) 0. Morphological characters, 1. Body shape (BD, HD, Preanal length), 2. Fin formation (two D-fin shape, delayed form of 3rd anal spine, precocious pelvic fin), 3. Sequence of fin formation, 4. Pigment, 5. Head spines
c) Mainly Identification key to genus (species) for the scombrid juvenile fishes (making a flow chart of the procedure)
d) Larvae: comparison with the other scombrid and similar family larvae (numbers of specimen and size range of each species to be provided to the workshop from the participating countries should informed in advance)
e) Juveniles: distinguish from other scombrids by meristic characters (Auxis vs Euthynnus- an idea & trial of measurement method: horizontal distance between 1st and 10th spine of first dorsal fin/horizontal distance between origins of 1st and 2nd dorsal fin) "
f) Hand-on work to count a total number of vertebrae with fresh specimen (and fixed Auxis juvenile)
g) Larvae: abundant resources species - Decapterus spp., Selar crmenophthalmus(S. boops), Selaroides leptolepi; staill unknown species - Megalapsis cordyala

ANNEX 13 TERMS OF REFERENCE of the Mid-term Review of the SEAFDEC/UNEP/GEF PROJECT: "Establishment and Operation of a Regional System of Fisheries Refugia In the South China Sea and Gulf of Thailand" (GEF ID 5401)

•

Executive Summary

The purpose of the Mid-Term Review (MTR) is to provide an independent assessment of project performance at mid-term, to analyze whether the project is on track, what problems and challenges the project is encountering, and which corrective actions are required so that the project can achieve its intended outcomes by project completion in the most efficient and sustainable way.
The TOR consists of three sections: 1) Project background and overviews, 2) Objective and scope of the mid-term review, and 3) Mid-term review approach, methods and deliverables. The Mid-term Review will be in-depth evaluations using a participatory approach whereby key stakeholders are kept informed and consulted throughout the evaluation process. Both quantitative and qualitative evaluation methods will be used as appropriate to determine project achievements against the expected outputs, outcomes and impacts of the projects
The Mid-term Review consultant will be selected and recruited by the SEAFDEC under an individual Special Service Agreement (SSA). By signing the service contract with SEAFDEC, the consultant certify that he/she has not been associated with the design and implementation of the FR Project in any way which may jeopardize his or her independence and impartiality towards project achievements and project partner performance. Tentative schedule for the Mid-term Review is finalized soon before officially announcement.

ACTIONS BY THE RSTC4 COMMITTEE:

- ❖ Take note on the preparation for TOR for Mid-Term Reviews
- ❖ For consideration, clarification and suggestion on the proposed TOR for Mid-term reviews.

TERMS OF REFERENCE

Mid-term Review of the SEAFDEC/UNEP/GEF PROJECT: "Establishment and Operation of a Regional System of Fisheries *Refugia* In the South China Sea and Gulf of Thailand" (GEF ID 5401)

INTRODUCTION

This Terms of Reference (TOR) is for the Mid-Term Review (MTR) of the UNEP/GEF-SEAFDEC project on "Establishment and Operation of a Regional System of Fisheries *Refugia* in the South China Sea and Gulf of Thailand", hereafter called "*FR project*". The purpose of the Mid-Term Review (MTR) is to provide an independent assessment of project performance at mid-term, to analyze whether the project is on track, what problems and challenges the project is encountering, and which corrective actions are required so that the project can achieve its intended outcomes by project completion in the most efficient and sustainable way.

SECTION 1: PROJECT BACKGROUND AND OVERVIEW

1. Project General Information (Table 1)

Table 1: General information of the FR Project

Identification		*GEF ID.: 5401*	*Insert Umoja no.:*
Project Number + Project Title		*Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand*	
Duration months	*Planned*	*48 months*	
	Extension(s)	*January 2021*	*December 2022*
Division(s) Implementing the project		*DEPI GEF International Waters*	
Name of co-implementing Agency		*UNEP*	
Executing Agency(ies)		*Southeast Asian Fisheries Development Center (SEAFDEC)*	
Names of Other Project Partners		*Fisheries Administration (FIA), Cambodia*	
		The Agency for Marine and Fisheries Research and Human Resources (, MMAF, Republic of Indonesia	
		Department of Fisheries (DOF), Malaysia	
		National Fisheries Research and Development Institute (NFRDI), Department of Agriculture	
		Department of Fisheries (DOF), Thailand	
		Directorate of Fisheries (D-Fish), Ministry of Agriculture and Rural Development, Viet Nam	
Project Type		*Full Size Project (FSP)*	
Project Scope		*Regional: South East Asia*	
Region *(delete as appropriate)*		*Asia Pacific*	
Names of Beneficiary Countries		*Cambodia, Indonesia, Malaysia, Philippines, Thailand and Viet Nam*	
Programme of Work		*Healthy and productive ecosystems*	
GEF Focal Area(s)		*International Waters*	

UNDAF linkages		*Cambodia (2016-2018) – Outcome 1* *Indonesia (2016-2020) – Outcome 1& 3* *Malaysia - *Eleventh Malaysia Plan 2016-2020 –Strategy 6* *Philippines (2012-2018) - Outcome 1& 3* *Thailand (2017-2021) – Outcome 1* *Vietnam (2017-2021) – Outcome 2*
Link to relevant SDG target(s) and SDG indicator(s)		*SDG Target 14: Indicator 14.2, 14.4 and 14.a* *SDG Target 1: Indicator 1b* *SDG Target 2: Indicator 2.4* *SDG Target 12: Indicator 12.2*
GEF financing amount		*US$3,000,000*
Co-financing amount		*US$12,717,850*
Date of CEO Endorsement		*January 12, 2016*
Start of Implementation		*March 21, 2016*
Date of first disbursement		*August 25, 2016*
Total disbursement as of 31 Dec 20		*US$1,819,035*
Total expenditure as of 31 Dec 20		*US$ 1,613,844*
Expected Mid-Term Date		*4th Quarter 2020 – 1st Quarter 2021*
Completion Date	*Planned*	*December 31, 2020*
	Revised	*December 31, 2022*
Expected Terminal Evaluation Date		*TBD*
Expected Financial Closure Date		*TBD*

2. Project Rationale

1) 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 situation of high small-scale fishing pressure and declining fisheries resources has contributed to the adoption of unsustainable fishing methods to maintain catch and increase incomes in the short-term. These include the use of destructive fishing gear and practices, such as the operation of demersal trawls and push nets in seagrass areas, and the detonation of explosives and release of fish poisons in coral reef areas. Small-scale inshore fishing pressure has therefore been identified as a significant cause of the degradation and loss of coastal habitats in the South China Sea.

2) Although action aimed at reducing the rate of loss of coastal habitats has been implemented by countries bordering the South China Sea, the decadal rate of loss of such habitats remains high, e.g., seagrass beds (30 percent), mangroves (16 percent), and coral reefs (16 percent). 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 being 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. This project entitled "Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand" has been developed to meet this need via

implementation of the fisheries component of the Strategic Action Program for the South China Sea. Executed regionally by the Southeast Asian Fisheries Development Center in partnership with the government agencies responsible for fisheries in the 6 participating countries, the project is comprised of the following 4 project components.

3) Component 1 will result in the establishment of operational management at 14 priority fisheries refugia, with community-based refugia management plans being key outputs. Supporting activities include consultative processes to facilitate agreement among stakeholders on the boundaries of fisheries refugia, identification of key threats to refugia sites, recording of fishing community views regarding appropriate fisheries and habitat management measures, and eliciting stakeholder inputs to management plan review. Refugia management plans will provide rules inter alia on operating requirements for the use of particular classes of fishing vessels or fishing gear within refugia, procedures for adjusting management measures over time, and mechanisms for enforcement. Specific direction is given to drafting of regulations and ordinances required in support of plan implementation.

4) Component 2 focuses on strengthening the enabling environment for the formal designation and operational management of refugia. Preparatory activities include legal reviews to identify, inter alia: legal terminology for describing refugia; formal procedures for demarcating boundaries of spatial management areas such as refugia, including requirements for assessing the socio-economic impacts of management measures and stakeholder consultation; and provisions for decentralizing refugia management to the community level via development of co-management and rights-based approaches. These national reviews are aimed at informing the drafting of required policy and legislative amendments for adoption by competent authorities. This component will also build the national and site-level science and information base required to inform the monitoring and evaluation of the effectiveness of individual refugia and the regional network of sites.

5) Component 3 focuses on strengthening information management and dissemination aimed at 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. Supporting activities involve the development of national knowledge management systems on the use of fisheries refugia in capture fisheries management, and the establishment of a Regional Education and Awareness Centre that will operate as a facility for the production and sharing of information and education materials on fisheries and critical habitat linkages in the South China Sea. Importantly, Component 3 will support the development of indicators to monitor the effectiveness of coastal fisheries management systems established for priority fisheries refugia. A regional program for the compilation of standardized fisheries statistics for use in identifying and managing fisheries refugia will also be developed to support longer-term management.

6) At the national-level, Component 4 will strengthen cross-sectorial coordination for integrated fisheries and environmental management and will harness the national scientific and technical expertise and knowledge required to inform the policy, legal and institutional reforms for fisheries refugia management in the participating countries. Local community action and strengthened 'community to cabinet' linkages will be facilitated via establishment and operation of site-based management boards for fisheries refugia at the 14 priority locations in the South China Sea. Regionally, Component 4 will foster regional cooperation in: the establishment and operation of a regional system of fisheries refugia; and in the integration of scientific knowledge and research outputs with management and policy making. This component also includes project coordination and management activities aimed at: ensuring the timely and cost-effective implementation of regional and national-level activities; and satisfying the reporting requirements of UNEP and the GEF.

7) The longer-term goals of this project are to contribute to: improved integration of habitat and biodiversity conservation considerations in the management of fisheries in the South China Sea and

Gulf of Thailand; improved national management of the threats to fish stock and critical habitat linkages within fisheries refugia; and enhanced uptake of good practice in integrating fisheries management and biodiversity conservation in the design and implementation of regional and national fisheries management systems. The medium-term objectives align with those of the fisheries component of the Strategic Action Program for the South China Sea which are to: build the resilience of Southeast Asian fisheries to the effects of high and increasing levels of fishing effort; improve the understanding among stakeholders, including fisherfolk, scientists, policy-makers, and fisheries managers, of ecosystem and fishery linkages as a basis for integrated fisheries and ecosystem/habitat management; and build the capacity of fisheries departments/ministries to engage in meaningful dialogue with the environment sector regarding the improvement of fisheries and management of interactions between fisheries and critical marine habitats. Related end of project targets are:

a. by 2022, to have established a regional system of a minimum of fourteen refugia for the management of priority transboundary, fish stocks and endangered species; and

b. by 2022, to have prepared and implemented fisheries management systems in the identified priority refugia based on and consistent with, the ASEAN SEAFDEC Regional Guidelines for Responsible Fisheries in Southeast Asia.

8) Given the limited integration of the work of fisheries and environment ministries observed in Southeast Asia and many other parts of the world, the establishment and operation of the regional system of fisheries refugia provides an opportunity to learn from a regional fishery sector led initiative to collaborate with the environment sector on integrating fisheries and coastal habitat management. It is anticipated that the experience gained in the South China Sea region through this project will be suitable for application in other marine areas such as the Yellow Sea where over-fishing and the use of inappropriate fishing gear are significant impediments to more sustainable exploitation of fisheries resources and the use of coastal habitats.

3. Project Results Framework

9) The objective of this project is to operate and expand the network of fisheries refugia in the South China Sea and the Gulf of Thailand for the improved management of fisheries and critical marine habitats linkages to achieve the medium and longer-term goals of the fisheries component of the Strategic Action Program for the South China Sea. The project has four components as listed in **Table 2-5** below with associated expected outcomes and outputs.

Table 2: FR Project Results Framework: Component 1.

Component 1:	Outcomes	Targets End of Project
1. Identification and management of fisheries and critical habitat linkages at priority fisheries *refugia* in the South China Sea and Gulf of Thailand	***1. Reduced stress** on fish stocks and coastal habitats via improved national management of key anthropogenic threats to fisheries and critical habitat linkages in the South China Sea and Gulf of Thailand*	*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*
	1.1 Fisheries and critical habitat linkages at 14 priority sites in the South China Sea and Gulf of Thailand safeguarded via the delineation of fisheries *refugia* boundaries and the setting of priorities for *refugia* management	Agreement among stakeholders on the boundaries of fisheries *refugia,* key threats to *refugia*, and priority management interventions for 14 sites in the South China Sea and Gulf of Thailand
	1.2 Amelioration of key threats to fish stock and critical habitat linkages via the adoption and implementation of	Community-based *refugia* management plans that are consistent with the FAO and ASEAN-SEAFDEC Guidelines for Responsible

	community-based *refugia* management plans at 14 sites	Fisheries developed, adopted, and under implementation at 14 fisheries *refugia* sites
	1.3 Catalysed community action for fisheries *refugia* management at 14 sites	Networks of management boards and community-based fisheries and habitat management volunteers for *refugia* management established at 14 fisheries *refugia* sites
	1.4 Empowered fishing communities, particularly artisanal fishermen and women involved in inshore gleaning and processing, for enforcement of agreed management rules at 14 priority *refugia* sites in the South China Sea and Gulf of Thailand	Enforcement programmes at 14 fisheries *refugia* sites, including participatory activities for monitoring, control and surveillance
	1.5 Strengthened civil society and community organisation participation in fisheries *refugia* management	Operational partnership with the GEF Small Grants Programme to strengthen civil society and community organisation participation in the management of fisheries *refugia* at 14 sites

10) The component 1 aligns with the GEF theory of change framework via implementing strategies, i.e., application of fisheries refugia to significantly reduce stress on fish stocks and coastal habitats. Specifically, component 1 will result in 269,500 ha of fish refugia habitat will be conserved/effectively managed as well as a 50% reduction in fishing pressure within sites at times critical to the life-cycles of fished species of transboundary significance.

Table 3: FR Project Results Framework: Component 2.

Component 2:	Outcomes	Targets End of Project
2. Improving the management of critical habitats for fish stocks of transboundary significance via national and regional actions to strengthen the enabling environment and knowledgebase for fisheries *refugia* management in the South China Sea and Gulf of Thailand	***2. 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 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*
	2.1 Strengthened enabling environments for the effective management of the effects of fishing on fisheries and critical habitat linkages in the South China Sea and Gulf of Thailand	Measures for the fisheries sector's sustainable use of fish habitats and biodiversity, and based on site-level models of ecosystem carrying capacity, incorporated in the fisheries policies of participating countries
	2.2 Cross-sectorial agreement on national guidelines for the use of fisheries *refugia* for integrated fisheries and habitat management	National guidelines on the use of fisheries *refugia* in integrating fisheries and habitat management developed and endorsed by heads of national government departments responsible for fisheries and environment in the participating countries
	2.3 Endorsed policy, legal, and planning frameworks, both and national and regional levels, for the establishment and management of fisheries *refugia*, including the reduced use of destructive fishing gear and practices in areas of critical habitats	National policy, legal and planning frameworks for demarcating boundaries and managing *refugia* assessed and required reforms endorsed in the participating countries and reflected in an updated regional action plan

	2.4 Enhanced access to information relating to status and trends in fish stocks and their habitats in waters of the SCS	Annual synthesis reports of new and additional information and data relating to the stocks of priority fish, crustaceans and molluscs and their habitats published in each country and disseminated at national and regional levels
	2.5 Improved national and regional-level management and sharing of information and data on fish early life history in the waters of the SCS	Establishment and population of 6 online national databases, and 1 regional database, of fish egg and larvae distribution and abundance in national waters and the SCS basin
	2.6 Enhanced access to information relating to the locations and status of coastal habitats and management areas in the SCS and GoT	National and regional online Geographical Information Systems on fisheries and marine biodiversity featuring information on locations and management status of coastal habitats, fisheries *refugia*, MPAs, and critical habitats for threatened and endangered species
	2.7 Strengthened information base for the planning, monitoring and evaluation of management at priority fisheries r*efugia* sites in the South China Sea and GoT.	Fisheries and habitat data collection programmes operational to characterise 14 priority *refugia* sites in the South China Sea and Gulf of Thailand
	2.8 Improved basin-wide understanding of linkages between ocean circulation patterns, nutrient/chlorophyll concentrations, and sources and sinks of fish larvae in the South China Sea	Modelling system linking oceanographic, biochemical, and fish early life history information developed applied to improve regional understanding of fish early life history and links to critical habitats
	2.9 Regionally and locally appropriate best practices generated to address the effects of trawl and motorised push net[1] fishing on seagrass habitat, and the capture of juveniles, pre-recruits and fish in spawning condition	Best practice fishing methods and practices to address key threats to fish stock and critical habitat linkages demonstrated at priority *refug*ia

11) The component 2 aligns with the GEF theory of change framework through strengthening institutional capacity via reform of policy, regulatory and planning frameworks aimed at enabling improved integration of fisheries and environmental management. 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.

Table 4: FR Project Results Framework: Component 3.

Component 3:	Outcomes	Targets End of Project
3. Information Management and Dissemination in support of national and regional-level implementation of the fisheries *refugia* concept in the South China Sea	***3. 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*	*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*

and Gulf of Thailand	3.1 Enhanced uptake of best practices in integrating fisheries management and biodiversity conservation, in the design and implementation of fisheries management systems	Best practice approaches and measures for integrated fisheries and habitat management captured, documented and communicated nationally and regionally
	3.2 Improved community acceptance of area based approaches to fisheries and coastal environmental management	Public awareness and outreach programme to promote local social, economic and environmental benefits of fisheries *refugia* implemented at 14 priority locations in the South China Sea and Gulf of Thailand
	3.3 Knowledge generated and experiences from establishing and operating fisheries *refugia,* captured and shared nationally, regionally, and globally	National knowledge management systems on the use of fisheries *refugia* in capture fisheries management established and operational
	3.4 Information and Education Campaigns for small-scale fisherfolk on the links between fisheries, habitats and biodiversity coordinated regionally through a Regional Education and Awareness Centre	Regional Education and Awareness Centre on fisheries and critical habitats established and operating as a facility for the production and sharing of information and education materials for *refugia* management
	3.5 Standardised methods for collection and analysis of information and data, for use in assessing the impacts of *refugia* and in the design appropriate indicators for the longer-term operation of the regional system of fisheries *refugia*	Regional agreement on standardised information and data collection procedures in support of longer-term operation of a regional system of fisheries *refugia*, including design of stress reduction and environmental state indicators for managed *refugia*

12) The component 3 aligns with the GEF theory of change framework through knowledge and information activities aimed at improving information sharing and access, awareness raising, skills building, and monitoring and evaluation.

Table 5: FR Project Results Framework: Component 4

Component 4:	Outcomes	Targets End of Project
4. National and regional cooperation and coordination for integrated fish stock and critical habitat management in the South China Sea and Gulf of Thailand	***Cost-effective and efficient** coordination of national and regional level cooperation for integrated fisheries and environmental management*	*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*
	4.1 Strengthened cross-sectorial coordination in the establishment and operation of fisheries *refugia* in the participating countries	National Fisheries *Refugia* Committees (NFRC) established in 6 countries, functional and advising national decision-makers and regional *fora*
	4.2 National scientific and technical expertise and knowledge harnessed to inform policy, legal and institutional reforms for fisheries *refugia* management in the participating countries	National Technical and Scientific Committees (NTSC) established in 6 countries, functional and advising site-level management boards, the NFRC and the Regional Scientific and Technical Committee
	4.3 Community-led planning of fisheries *refugia* management at priority locations in the South China Sea and Gulf of Thailand	Local community action catalysed via establishment and operation of site-based management boards for fisheries *refugia* at 14 locations in the South China Sea and Gulf of Thailand
	4.4 Regional cooperation in the integration of scientific knowledge and	Regional Scientific and Technical Committee (RSTC) established and functioning as a bridge

	research outputs with management and policy making	between the scientific community and decision-makers for operation of a regional system of fisheries *refugia* [biannual meetings]
	4.5 Regional cooperation in the establishment and operation of a regional system of fisheries *refugia*	Project Steering Committee established and functioning to oversee and act as a principal decision-making body for the project
	4.6 Effective coordination of regional and national-level activities and reporting requirements of UNEP and GEF satisfied	Functioning regional Project Coordinating Unit (PCU) supporting the coordination of regional and national level activities associated with the establishment and operation of regional system of fisheries *refugia* and meeting reporting requirements of UNEP and the GEF

4. FR Project Executing Arrangements

13) UN Environment is the GEF Implementing Agency for the FR project. The project is executed regionally by the Southeast Asian Fisheries Development Center (SEAFDEC) in partnership with the government agencies responsible for fisheries in the six participating countries, namely Cambodia, Indonesia, Malaysia, Philippines, Thailand, and Viet Nam.

14) The Project Coordinating Unit (PCU) locates within the Training Department of SEAFDEC in Samut Prakan Province, Thailand.

15) The national lead partners are as follows:

I. Administration of Fisheries (FiA), CAMBODIA
II. Directorate General of Capture Fisheries, Ministry of Marine Affairs and Fisheries (MMAF), REPUBLIC OF INDONESIA
III. Department of Fisheries (DOF), MALAYSIA
IV. National Fisheries Research and Development Institute (NFRDi) in collaboration with Bureau of Fisheries and Aquatic Resources (BFAR), Department of Agriculture (DA), the PHILIPPINES
V. Department of Fisheries (DOF), THAILAND
VI. Directorate of Fisheries (D-Fish), Ministry of Agriculture and Rural Department (MARD), VIET NAM

16) A Project Steering Committee was established and operated to oversee and act as a principal decision-making body for the project. The PSC's role is to provide managerial and governance advice to the project, and to guide the Project Coordination Unit (PCU) of the Southeast Asian Fisheries Development Centre (SEAFDEC) in the implementation and monitoring of the overall regional project.

17) At national level, National Fisheries Refugia Committees (NFRCs) was established and operated to strengthen cross-sectorial coordination in the establishment and management of fisheries refugia. The NFRC's will assume overarching responsibility for the execution of national level activities of the project and will, inter alia: receive, review, and approve reports from the management boards of refugia sites; consider advice from the National Scientific and Technical Committees in decision-making.

18) A regional Project Co-ordinating Unit (PCU) was established within SEAFDEC and will be led by a Project Director with support from SEAFDEC'S policy, technical and financial units. The PCU will be responsible for: overall leadership, management and technical oversight of the fisheries refugia project; regional project governance, monitoring and reporting; policy/technical advice and

advocacy; regional and national coordination, including the establishment of partnerships and networking; and external communications.

19) The management framework for this project is depicted in Figure 1. SEAFDEC's linkages with ASEAN through the ASEAN-SEAFDEC Strategic Partnership is depicted in Figure 2.

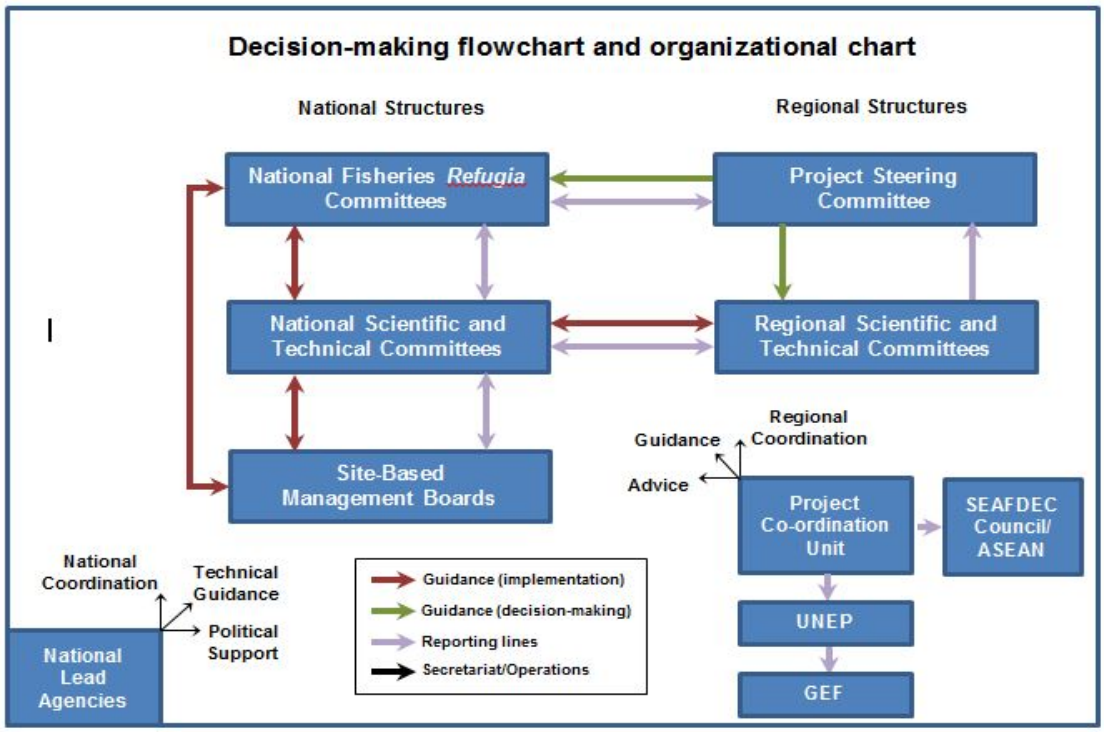


Figure 1: Project management framework for the FR Project

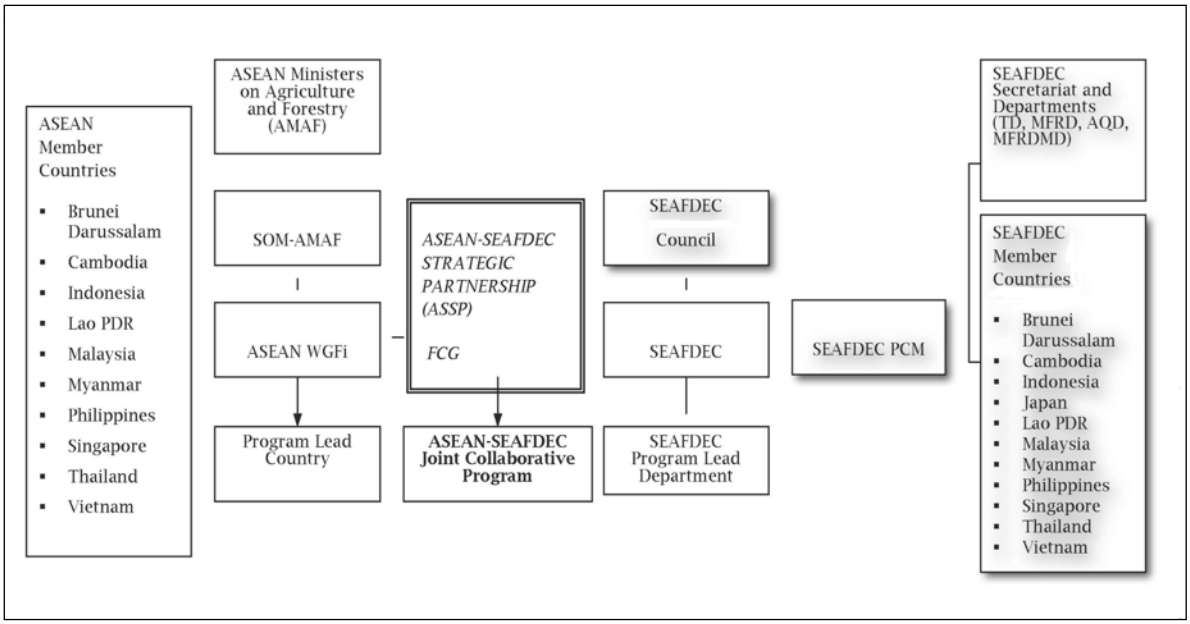


Figure 2: SEAFDEC's linkages with ASEAN

5. Project Cost and Financing

20) The total cost of the FR project planned at $15,717,850 with co-financing of $12,717,850 and cost to the GEF Trust Fund of $3,000,000. Table 6 provides an overview of sources of co-financing and Table 7 of cost per project component.

Table 6: an overview of sources of co-financing

Sources of Co-financing	Name of Co-financier (source)	Type of Co-financing	Cofinancing Amount ($)
National Governments	Ministries responsible for fisheries in Cambodia, Indonesia, Malaysia, Philippines, Malaysia, Thailand, and Vietnam	Cash	1,148,644
National Governments	Ministries responsible for fisheries in Cambodia, Indonesia, Malaysia, Philippines, Malaysia, Thailand, and Vietnam	In-kind	5,036,806
Multilateral Agencies	Southeast Asian Fisheries Development Centre	Cash	3,876,400
Multilateral Agencies	Southeast Asian Fisheries Development Centre	In-kind	2,456,000
GEF Agency	UNEP	In-kind	200,000
		Total Co-financing	12,717,850

Table 7: Cost per Project Component

Project Component	Indicative Grant Amount ($)	Indicative Co Financing ($)
1. Identification and management of fisheries and critical habitat linkages at priority fisheries *refugia* in the South China Sea and Gulf of Thailand	1,304,900	3,989,523
2. Improving the management of critical habitats for fish stocks of transboundary significance via national and regional actions to strengthen the enabling environment and knowledgebase for fisheries *refugia* management in the South China Sea and Gulf of Thailand	746,000	5,313,217
3. Information Management and Dissemination in support of national and regional-level implementation of the fisheries *refugia* concept in the South China Sea and Gulf of Thailand	299,600	1,792,055
4. National and regional cooperation and coordination for integrated fish stock and critical habitat management in the South China Sea and Gulf of Thailand	499,500	1,423,055
Sub-Total	**2,850,000**	**12,517,850**
Project Management Cost (PMC)	**150,000**	**200,000**
Total	**3,000,000**	**12,717,850**

6. Project Implementation Issues

21) Changing of the key government officers create problems on delay submission for work progress and financing report.

22) Delay of the project implementation due to the government policy changes in two participating countries affected on achieving the Mid-term evaluation and End of Project Targets. All participating countries, therefore, requested two years of project extension without an extra budget. The Mid-term evaluation and the end of project evaluation will be conducted by the end of 2020 and 2022, respectively.

SECTION 2: OBJECTIVE AND SCOPE OF THE MID-TERM REVIEW

7. Objective of the Mid-Term Review

23) Objective of the Mid-term Review is to determine the progress, performance, and achievement of objectives and outcomes of the project following five years of implementation from 2016-2020.

8. Scope of the Mid-Term Review

24) The scope of the mid-term evaluation will cover all activities undertaken in the framework of the project. The evaluator will compare planned outputs of the project to actual outcomes and assess the actual results to determine their contribution to attaining the project objectives. The evaluation will diagnose problems and suggest any necessary corrections and adjustments. It will evaluate the efficiency of project management, including the delivery of outputs and activities in terms of quality, quantity, timeliness, and cost-efficiency. The evaluation will also determine the project's likely outcomes and impact concerning the project's specified goals and objectives.

SECTION 3: MID-TERM REVIEW APPROACH, METHODS AND DELIVERABLES

9. Approach and Methods

25) The Mid-term Review of the FR projects will be in-depth evaluations using a participatory approach whereby key stakeholders are kept informed and consulted throughout the evaluation process. Both quantitative and qualitative evaluation methods will be used as appropriate to determine project achievements against the expected outputs, outcomes and impacts of the projects. It is highly recommended that the consultant maintains close communication with the project teams and promotes information exchange throughout the evaluation implementation phase in order to increase their (and other stakeholder) ownership of the evaluation findings.

26) The findings of the evaluation will be based on the following:

i. Desk review of the project document, outputs, monitoring reports (such as quarterly progress reports, mission reports, and the GEF annual Project Implementation Review reports, minutes of meetings, and relevant correspondences.

ii. Review of specific products including datasets, management, and action plans, publications, and other material and reports.

iii. Interviews with the Project Director, the Project Task Manager, the Project Participating Countries, the Project Collaborative Partners (if required), and other project staff.

iv. Consultations with relevant SEAFDEC/SEC and SEAFDEC/TD staff.

v. Consultations and interviews with relevant stakeholders involved, including government representatives, local communities, NGOs, private sector, donors, and other UN agencies and international /regional organizations.

vi. Survey, as deemed appropriate of associated agencies of the FR Project

vii. Country partner and project sites visits, are not deemed likely due to Covid-19 related travel restrictions, but if appropriated.

10. Deliverables

26) Under the overall supervision of the Project Task Manager and the TOR's Committee, SEAFDEC Secretary-General, relevant SEAFDEC/TD Division, and the overall guidance of the Project Director of the SEAFDEC Project Coordinating Unit, the evaluator shall undertake a MTR of the FR project during the period July 15th to October 15th, 2021.

27) The evaluation will comprise the following elements.

27.1 A summary evaluation of the project and its major components are undertaken to date and determine progress towards achieving its overall objectives.

27.2 Evaluate project performance with the indicators, assumptions, and risks specified in the logical framework matrix and the Project Document. Determine the usefulness of the indicators defined.

27.3 An assessment of the scope, quality, and significance of the project outputs produced to date with expected results.

27.4 Analysis of the extent of cooperation engendered and synergy created by the project in each of its component activities, between national and regional level activities, and the nature and extent of commitment among the countries involved.

27.5 An assessment of the functionality of the institutional structure established and the role of the Steering Committee, the Regional Scientific and Technical Committee, and national committees and working groups.

27.6 Identification and, to the extent possible, quantification of any additional outputs and outcomes beyond those specified in the Project Document.

27.7 An evaluation of the timetable of activities and allocating financial resources to project activities, and determining their consistency with the Project Document. Where activities or outputs have been delayed, the cause of the delay should be identified, and where appropriate remedial actions proposed.

27.8 Identification of the programmatic, financial variance, and adjustments made during the first five years (2016-2020) project and assessing their conformity with decisions of the Steering Committee Group and their appropriateness in terms of the overall objectives of the project.

27.9 An evaluation of project coordination, management, and administration provided by the Project Coordinating Unit. This evaluation should include specific reference to:

i. Organizational/institutional arrangements for collaboration among the various agencies and institutions involved in project arrangements and execution;

ii. Project management effectiveness in terms of assignment and execution of project activities, and flexibility of management in terms of responsiveness to the need for changes in financial allocations, the timing of activities, or mode of operation;

iii. The effectiveness of the monitoring mechanisms currently employed by the Project Coordinating Unit in monitoring on a day to day basis, progress in project execution;

iv. Administrative, operational, or technical problems and constraints that influenced the effective implementation of the project and present recommendations for any necessary functional changes; and

v. Financial management of the project in relation to those on the achievement of substantive outputs.

27.10 A qualified assessment of the extent to which project outputs to date have scientific credibility.

27.11 Assessment of the extent to which scientific and technical information and knowledge have influenced the execution of the project activities.

27.12 An evaluation of the strategy and approaches adopted by the Project Steering Committee and PCU regarding the raising of co-financing support to ensure financial sustainability.

27.13 Specification of any deficiencies in project performance, administration, and management that warrant correction with associated recommendations.

27.14 Prognosis of the degree to which the project's overall objectives and expected outcomes are likely to be met (see **Annex 1**L Rating project success).

27.15 Lessons learned during project implementation and Recommendations regarding any necessary corrections and adjustments to the overall project work plan and timetable to enhance project objectives and outcomes.

11 Consultant for Conduct of the Mid-term Review

28) Consultant shall undertake the evaluation working concurrently and in consultation from July 15th to October 15th , 2021 for three months.

29) Selected consultant will conduct the Mid-term Review.

30) Consultant shall, at the commencement of the work, agree with SEAFDEC Committee responsible for the conduct of mid-term review, hereafter "TOR's Committee". Members of the Committee shall include the Project Director serve as the Secretary of the TOR's Committee and the Project Task Manager as a member of the TOR's Committee. The procedure for establishment of the TOR's Committee shall follow the SEAFDEC's Guidelines on Procurement of Products and Services including procedure and method of operating to complete all sections of the report. Work plan of the mid-term review will include:

    i. Tentative proposals for the attendance of consultant at parts or all of the meetings convened during the period of the mid-term review.

    ii. Proposals for any country visits that shall be deemed appropriate.

    iii. A delivery schedule for a draft report for comment by the SEAFDEC TOR's Committee, the Project Task Manager, Secretary-General or representatives and the Project Director; and

    iv. a timetable of the periods each Consultant will work from the Project Co-ordinating Unit for Fisheries Refugia Project at SEAFDEC/TD in Samut Prakan Province, Thailand.

31) Regarding the last of these requirements, the SEAFDEC/PCU undertakes to provide office space and internet access to the Consultant (s) during the said period.

32) Consultant shall create Workplan constitutes the basis of the agreement between the SEAFDEC and the Consultant.

33) The consultant shall attend, if practical, the Regional Scientific and Technical Committee Meeting and/or Project Steering Committee Meeting to be convened during the conduct of evaluation.

34) Consultant’s responsibility to arrange for their visas and immunizations.

12 Reporting Format

35) The Mid-Term Review report shall comprise:

    i. A concise summary, prepared by consultant, not exceeding five pages, including findings and recommendations

ii. A detailed mid-term review report covers items 27.1 - 27.15 of the Terms of Reference above with attention to lessons learned and recommendations. The detailed report without annexes should not exceed 35 pages.

iii. Annexes prepared by the consultant on specific topics deemed appropriate by the consultant. The annexes should correspond to and amplify the contents of the sections of the main report.

36) The report together with the annexes, shall be written in English and presented electronically in MS Word format (see **Annex 2**: Tools, Templates and Guidance Notes for use in the Mid-Term Review).

13 Schedule of the Mid-term Review

37) The table below presents the tentative schedule for the Mid-term Review.

Table 8. Tentative schedule for the mid-term review

Milestone	Tentative Dates
Mid-term Review Initiation Meeting	Starting from 15th July 2021
Inception Report	July 2021
Attend the RSTC4 Meeting	22nd July 2021
Attend the PSC5 Meeting	August-September 2021
E-based interviews, surveys etc.	August-September 2021
PowerPoint/presentation on preliminary findings and recommendations	TBD
Draft reports to SEAFDEC TOR's Committee, Project Task Manager, SEAFDEC Sec-Gen, the Project Director, and other concerned Partners	15 September 2021
Subject to the receipt by the consultant of comments on the draft report from SEAFDEC TOR's Committee, Project Task Manager, SEAFDEC Sec-Gen, the Project Director, and other concerned Partners	30 September 2021
Final Mid-term Review Report	15 October 2021

14 Contractual Arrangements

38) The Mid-term Review consultant will be selected and recruited by the SEAFDEC under an individual Special Service Agreement (SSA) on a “fees only” basis (see below). By signing the service contract with SEAFDEC, the consultant certify that he/she has not been associated with the design and implementation of the FR Project in any way which may jeopardize his or her independence and impartiality towards project achievements and project partner performance. In addition, the consultant will not have any future interests (within six months after completion of the contract) with the projects’ executing or implementing units.

39) Fees will be paid on an instalment basis, paid on acceptance by the SEAFDEC and Project Task Manager of expected key deliverables. The schedule of payment is as follows:

Schedule of Payment for the Mid-term Review Consultant:

Deliverable	Percentage Payment

Approved FR Inception Report (as per annex 2)	20%
Approved FR Draft Main MTR Report (as per annex 2)	40%
Approved FR Final Main MTR Report	40%

40) Fees only contracts: Note that during the COVID-19 pandemic travel remains unlikely and therefore purchase of air tickets and Daily Subsistence Allowance for authorized travel mission are not applied

41) In case the consultant is not able to provide the deliverables in accordance with these guidelines, and in line with the expected quality standards by the SEAFDEC and acceptance by Project Task Manager, payment may be withheld at the discretion of the SEAFDEC until the consultant has improved the deliverables to meet UNEP's quality standards.

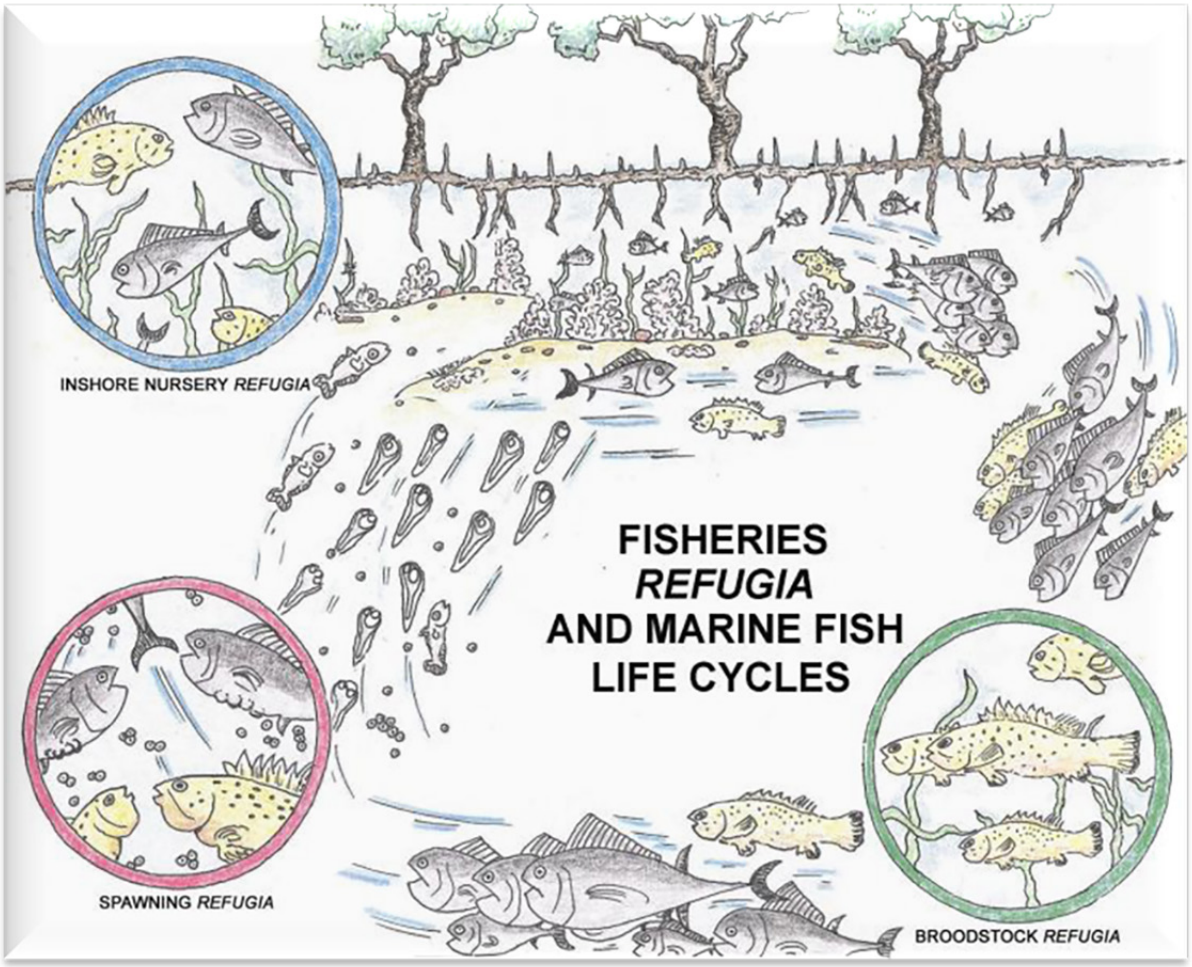
42) If the consultant fails to submit a satisfactory final product to SEAFDEC Committee in a timely manner, i.e., before the end date of his/her contract, the Project Task Manager reserves the right to employ additional human resources to finalize the reports, and to reduce the consultant's fee by an amount equal to the additional costs borne by SEAFDEC to bring the reports up to standard.

15 SEAFDEC and UNEP Contract Persons

1. **Mr. Isara Charnrachakij**
   PPMD, Head
   SEAFDEC Training Department
   P.O. Box 97, Phrasamutchedi
   SamutPrakan, 10290, Thailand
   Tel: +66 2 425 6100
   Fax: +66 2 425 6110 to 11
   E-mail: isara@seafdec.org

2. **Ms. Isabelle Vanderbeck**
   Project Task Manager,
   900 17th Street, N.W. 2006 Washington D.C. - USA
   Phone: +(1-202) 971-1314
   Email: isabelle.vanderbeck@un.org

3. **Dr. Somboon Siriraksophon**,
   Project Director, Project Co-ordinating Unit,
   SEAFDEC/Training Department,
   P.O. Box 97, Phrasamutchedi
   SamutPrakan, 10290, Thailand
   Tel: +66 2425-6104 (Direct Line
   Fax1: +66 2425-6100
   Email: somboon@seafdec.org



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