



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

Toward Fisheries Refugia in Indonesia Coastal Water

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THE AGENCY FOR MARINE AND FISHERIES RESEARCH AND
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Abstract:

Fisheries refugia is a new approach to fisheries management that integrates habitat and resource management, focusing on protecting critical life stages for sustainable use. This concept enriches fisheries management and supports biodiversity conservation with a different approach from MPAs that have been developed so far. The implementation of the fisheries refugia project in two priority sites starting in 2019 has provided valuable lessons-learned and experience in establishing refugia in Indonesia. The project provides a mechanism to build an integrated management system between habitat and fish resources by involving various stakeholders including local community participation. The results of the refugia project in Indonesia strengthen fisheries and environmental management to achieve ecological and economic balance in the utilization of fisheries resources. For the effective replication of establishment refugia in Indonesia, there are several main factors should be highlighted which cover ecology, economy, social and government aspect. The experience of the fisheries refugia project is significant to the GEF IW project and transboundary resource management. This experience represents the GEF IW project in establishing a management system that integrates the environment and fisheries, focusing on the critical life cycle of fishery resources in Indonesia.

PROJECT DESCRIPTION

Indonesia started the implementation 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 in 2019 until December 2022. The project's specific objective is to operate and expand the network of fisheries *refugia* in the South China Sea and Gulf of Thailand for the improved management of fisheries and critical marine habitats linkages in order to achieve the medium and longer-term goals of the fisheries component of the Strategic Action Program for the South China Sea.

The longer-term goals of national-level activities of the project in Indonesia are to (1) build the resilience of fish stocks of transboundary significance to the effects of high and increasing levels of fishing effort, (2) Improve the understanding amongst stakeholders, including fishermen, scientists, policymakers, and fisheries managers, of ecosystem and fishery linkages, as a basis for integrated fisheries and ecosystem/habitat management; (3) Build the capacity of fisheries stakeholders to engage in meaningful dialogue with the environment sector regarding the improvement of fisheries and management of interactions between fisheries and critical marine habitats

National level activities of the project are organised within 4 components: (1) Identification and management of fisheries and critical habitat linkages at priority fisheries *refugia* in Indonesia; (2) Improving the management of critical habitats for fish stocks via national actions to strengthen the enabling environment and knowledge-base for fisheries *refugia* management in Indonesia; (3) Information Management and Dissemination in support of national-level implementation of the fisheries *refugia* concept in Indonesia; and (4) National coordination for integrated fish stock and critical habitat management in Indonesia.

Project sites in Indonesia are located in Bangka-Belitung Province and West Kalimantan which is part of Fisheries Management Area (FMA) 711 of Republic Indonesia. In term of fisheries management, Indonesia consists of eleven Fisheries Management Area, and FMA 711 encompasses the Karimata Strait, Natuna Sea, and the South China Sea, is a strategic fishing ground in Indonesia.

THE EXPERIENCE

Issue

The fisheries sector plays important role in national economic development, especially in providing food for the nation, earning income and foreign exchange, and providing employment opportunities. Small-scale fisheries have an important role from a socio-economic perspective providing livelihoods and food security for small-scale fishermen and local communities in coastal areas which are largely dependent on marine fishery resources. Along with the rapid increase population, the number of small-scale fishermen in inshore has also increased and there are also unsustainable fishing methods using by the fisher in order to maintain catch and increase incomes in the short-term. Accordingly, inshore fish resources experience high fishing pressure. In addition, rapid development from land and coastal area has contributed to increased sedimentation, pollution, and loss of critical habitats in coastal areas.

Coastal habitats, seagrass and coral reef habitats play an essential role in the stock sustainability of marine fish, crustacean, mollusc, and other species. In completing their life cycle, most marine fish, shrimp, squid are linked to critical habitat like mangroves, coral reefs, and seagrass beds. However, coastal habitats have been threatened for decades due to anthropogenic threats among others,

destructive fishing such as push nets and trawls, overfishing, coastal construction, sedimentation from coastal development and pollution from land.

One of the issues has been identified in the project sites, Bangka and West Kalimantan is fishing on the spawning stock and pre recruit of squid and shrimp. Fishing on the spawning stock of squid in Bangka and shrimp in West Kalimantan will trigger the growth overfishing condition of both populations. Like the spawning stock, juvenile/pre recruit also threaten by the fisheries activities, particularly the small-scale fisheries in the coastal areas. Non-selective fishing gears used in both locations can trigger the growth-overfishing condition.

Fish production is linked to the quality and habitat area, therefore, there is need to integrate fish habitat and fish stock management for the sustainability of fish production. Efforts to manage the environment for habitat protection have been developed through the establishment of conservation areas which include mangroves, seagrass beds, and coral reefs, but this does not necessarily increase fish stocks. In addition, habitat protection through the establishment of Marine Protected Areas (KKP) with a "no-take zone" concept is often not easily accepted by fishing communities.

The project activities proposed mechanisms for effective management in terms of integrating critical habitat management and fish stock management by involving community participation and cross- sectoral consultation and coordination.

Addressing the Issue

The fisheries refugia project proposes mechanism to address the issues through (1) Introducing fisheries refugia concept as a novel approach in fisheries management which integrate fisheries and habitat management. The fisheries refugia approach is shown to provide an adequate platform for building partnerships and enhancing communication between the environment and fisheries sectors; (2) Scientific studies in order to identify critical habitats and fisheries condition as a basis for establishing a refugia system in Indonesia; (3) Improving understanding among stakeholder including fisherfolk, scientists, policy makers and fisheries managers of the significance of critical habitat to fisheries as a basis for integrated fisheries and habitat management; (4) Developing network between sectors/ministries/institutions that have authority in managing fish resources and their critical habitat; (5) Increasing the involvement of local fishing communities and the private sector in fisheries habitat management and biodiversity conservation with a focus on sustainable use rather than restricted fishing; (6) Managing information and dissemination to support fisheries refugia implementation.

National level activities of the project that have been conducted to support addressing the issues are organised within 4 components : (1) Identification and management of fisheries and critical habitat linkages at priority fisheries *refugia* in Indonesia; (2) Improving the management of critical habitats for fish stocks of transboundary significance via national actions to strengthen the enabling environment and knowledge-base for fisheries *refugia* management in Indonesia; (3) Information Management and Dissemination in support of national-level implementation of the fisheries *refugia* concept in Indonesia; and (4) National coordination for integrated fish stock and critical habitat management in Indonesia.

Some detailed activities of the project have been conducted are:

- Collecting data and information on fisheries and critical habitat at priority fisheries refugia.

- Data collection on fisheries and critical habitat have been conducted in two project site, Bangka and West Kalimantan Province.
- Consultation to have input on fisheries refugia boundaries as well as assessment of environmental and social impacts of designation of sites as refugia.
- Establishing management plan of fisheries refugia;
- Developing national guidelines on the establishment and operation of fisheries *refugia*
- Developing coordination and cooperation among agencies/institutions on the study of fish life- cycles and critical habitat linkages as the basis data for establishing fisheries refugia system.
- Strengthening sectoral coordination related to critical habitat and fish resources management, especially for economically important species that experience high fishing pressure.
- Improving community acceptance of area-based approaches to marine management;
- Enhancing community participation in the management of habitat and fish resources;
- Institutional strengthening of fishing communities to support community participation in fisheries management.

RESULTS AND LEARNING

The fisheries refugia concept aligns with the Ministry of Maritime Affairs and Fisheries' strategic program to accelerate the implementation of the blue economy, namely (1) expansion of conservation areas with a target of 30% of the total area of Indonesian waters; (2) quota-based fisheries policy, which is the application of fishing quotas and the establishment of conservation areas in fishing zones with a focus on critical habitat linkages with fish life cycles such as habitat for spawning and nursery.

Project implementation in Indonesia has resulted in recommendations to establish fisheries refugia for squid (*Uroteuthis chinensis*) in Bangka waters (Bangka Belitung Province) and Penaeid shrimp (*Penaeus merguensis*, *P.indicus*) refugia in West Kalimantan Province. Regarding the concept of refugia, Indonesia has adopted the concept for tuna (*Tunnus albacares*) management in Fisheries Management Area (FMA) 714 (Tolo Bay and Banda Sea). In 2020, the Minister of Marine Affairs and Fisheries has issued a regulation regarding the prohibition of tuna fishing in the spawning and nursery areas of FMA 714 for two months (October-December).

National-level activities of the project provide a procedure for delineating fisheries *refugia* boundaries, identifying key threats to refugia sites, and setting priority management interventions. The fisheries refugia area in West Kalimantan Province was recommended by the project to cover 4,094.32 Km² (409,432 Ha) by including several coastal areas on site, such as Padang Tikar (Kubu Raya District), Dusun Besar, Teluk Batang (Kayong Utara District), as well as Delta Pawan (Ketapang District). Meanwhile, the potential location for squid refugia in Bangka Belitung Province is 1,529,097.93 ha consisting of 1,212,572.60 ha of spawning areas and 316,525.33 of the nursery, including egg laying.

Project implementation in 2019 began with collecting data on fisheries and critical habitats of the fish life cycle, namely spawning and nursery habitats. The baseline information needed to establish refugia is information on the fish life cycle and critical habitat linkages. The project has facilitated this baseline information collection effort; therefore, additional data and information has been collected to complement the existing knowledge for developing fisheries refugia in these two provinces.

The project has facilitated the development of a management plan that engages community participation. The management plan also includes management measures applied to the refugia area.

Management measures at the fisheries refugia site must be synergized between habitat protection and fishermen's livelihoods and not cause conflicts between fishermen.

Activities of the project in Indonesia involve incorporation of measures for the fisheries sector's sustainable use of fish habitats and biodiversity in to Indonesia's national fisheries policy. Guidelines on establishing and operating fisheries refugia has been developed and will be endorsed by heads of national government departments responsible for fisheries and the environment. This national guideline will be used as the guidance for replication on establishing fisheries refugia system in Indonesia.

The project also established systems and mechanisms to capture, document and communicate best practice approaches and measures for integrated fisheries and habitat management generated from fisheries *refugia* sites at Bangka Belitung and West Kalimantan. Public awareness and outreach programme to promote local social, economic and environmental benefits of fisheries *refugia* implemented at 2 priority locations in Indonesia to enhance community acceptance of area based approaches to marine management. Awareness building and promoting activities are vital for the successful management and community cooperation in fisheries *refugia* areas.

There are three committee has been established in effective implementing the refugia project in Indonesia: National Fisheries Refugia Committee (NFRC), National Scientific and Technical Committee(NSTC) and Site based management board. National Fisheries Refugia Committee (NFRC) play important role in providing direction and strategic guidance to the National Lead Agency and site-based management boards for or each refugia site in the process of establishing the fisheries refugia system. NSTC has the role to provide guidance on scientific and technical issue on establishment refugia, while Site-based management board assisted the fisheries refugia management team in ensuring co-ordination among fisheries project and other local activities undertaken during the course of the project to further enhance local capacity to strengthen the integration of fisheries and habitat management.

REPLICATION

The implementation of the project in two sites has provided lessons learned that can be used as a reference for establishment of refugia in other parts of Indonesia. Based on the lessons learned from project implementation, there are several important factors highlighted for the successful replication of the establishment and operation of fisheries refugia in other locations in Indonesia, including information on the life cycle of fish and their habitat; cross-sectoral coordination; stakeholder engagement; mutually agreed management measures upon among stakeholders; application of responsible fishing gears and practices; public awareness; political commitment; provision of critical habitat rehabilitation programs and alternative livelihoods for fishermen during the closing season.

SIGNIFICANCE

The experience of the fisheries refugia project is significant to the GEF IW project and transboundary resource management. This experience represents the GEF IW project in establishing a management system that integrates the environment and fisheries, focusing on the critical life cycle of fishery resources. Although Indonesia had already adopted the concept of *refugia* for fisheries resource management, one of them for tuna management in WPP 714 before this project was implemented, the experience in the two project sites has enriched the lessons learned for improved establishment and management of refugia in other parts of Indonesia.

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KEYWORDS

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