

# Fostering Ecosystem Approach to Fisheries Management in the Southeast Asian Region through SEAFDEC

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Small-scale fisheries are widely recognized as a large and important source of protein food and for its contribution to the coastal and rural communities for multiple socio-economic benefits. This is especially true for the Southeast Asian region where a large number of people are dependent on harvesting fishery resources to support food security, livelihoods, and income generation. Countries in the region have been working towards sustainable fisheries development for several decades.

However, the management of small-scale fisheries in tropical developing countries is generally constrained by insufficient government funding, lack of political will, open access regimes, multiple and scattered landing sites, and low participation of resource users in decision-making (Andrew *et al.*, 2007; Salas *et al.*, 2007; Kato *et al.*, 2012). In the past, fisheries were managed based on traditional management approaches such as catch-quotas and size limits for target species. However, such management approaches exhibit several practical difficulties when applied in multi-gear and multi-species tropical small-scale fisheries (Salas *et al.*, 2007; Purcell and Pomeroy, 2015).

Therefore, over the past two decades, a shift in fisheries management has been observed from a single-species approach – in which the main objective was to obtain the maximum sustainable yield (MSY) of target species – to a more holistic approach that also considers the impacts of fishing at the community and ecosystem level, for which two main frameworks are commonly used: the Ecosystem Approach to Fisheries – EAF (Garcia, 2003) and the Ecosystem-Based Fisheries Management – EBFM (Pikitch *et al.*, 2004). Both frameworks take into account the undesired effects of fishing on ecosystems due to the inherent selectivity of the fisheries for a particular size range and/or taxonomic group; these effects may include impacts on biodiversity, taxonomic composition, population abundance, size structure, trophic structure and trophic dynamics of biological communities (Jennings and Kaiser, 1998; Arias-González *et al.*, 2004; Pikitch *et al.*, 2004).

Throughout the past decade, the Southeast Asian Fisheries Development Center (SEAFDEC) has been working towards ensuring the sustainable development of fisheries

with a special focus on ensuring sustainable contribution from small-scale fisheries in close collaboration with the ASEAN Member States (AMSs). One of the important policy frameworks that guided SEAFDEC in the development of programs and projects to support the AMSs is the “Resolution and Plan of Action on Sustainable Fisheries Development for Food Security for the ASEAN Region Towards 2030” or RES&POA-2030 which was adopted by the ASEAN Senior Officials and Ministers during the Special Senior Officials’ Meeting of the 41<sup>st</sup> Meeting of the ASEAN Ministers on Agriculture and Forestry on 5 August 2020 and the 42<sup>nd</sup> Meeting of the ASEAN Ministers on Agriculture and Forestry on 21 October 2020, as well as the Senior Official and Minister responsible for fisheries of Japan. The specific aims of the RES&POA-2030 toward ensuring the sustainability of small-scale capture fisheries are:

**Resolution #6:** *Implement effective management of fisheries that integrates habitat with fishery resources management and aims to improve the social and economic benefits of all stakeholders, especially by delegating selected management functions to the local level and promoting co-management as a partnership between government and relevant stakeholders.*

**Plan of Action #14:** *Strengthen the adoption of fisheries management approaches, e.g., co-management and ecosystem approaches to fisheries management, at all levels with all relevant stakeholders involved in the process of planning and policy formulation for management of natural resources, conservation, rehabilitation of habitats and protective geographical features, and improvement of human well-being.*

**Plan of Action #15:** *Strengthen the capacity of fisheries communities and the capability of fisheries-related organizations (e.g., by empowering such organizations as appropriate) to implement necessary actions towards increased resilience, improved livelihoods, adoption of supplementary livelihoods, and poverty alleviation, in support of achieving sustainable development with gender integration in the process.*

## Introduction of the EAFM Concept in Southeast Asia

Since 2000, several management concepts and approaches aiming toward ensuring the sustainability of small-scale fisheries were promoted by the SEAFDEC Training Department (TD), particularly rights-based fisheries, community-based fisheries, and co-management. However, with the development of the more recent concept of the ecosystem approach to fisheries management (EAFM) as an integrated management approach across coastal and marine areas and their natural resources that promotes

conservation and sustainable use of the whole ecosystem, and the development in 2012 of the Essential Ecosystem to Fisheries Management (E-EAFM) Training Course by the Food and Agriculture Organization (FAO), the U.S. National Oceanic and Atmospheric Administration (NOAA), and IMA International with technical assistance from several consultants; TD has expanded its activities to promote the EAFM concept in the region by developing human resource development program at the regional and national levels.

At the initial stage, the training materials developed by FAO, NOAA, and IMA International were used in the conduct of the EAFM training by TD; however, the materials were subsequently simplified to make them more suitable for the region with different types and targets of the training, *i.e.* E-EAFM training course, EAFM training-of-trainers, and LEAD EAFM training course. Through the training courses conducted by TD during 2014–2022, there were a total of 530 trainees from Member Countries, comprising 121 trainees in the regional training courses and 409 trainees in the national training courses.

## Promotion of EAFM in Pilot Learning Sites

In addition to the conduct of a series of training courses to build up the understanding and capacity of the AMSs on the EAFM concept, TD also facilitated the EAFM implementation in the AMSs. A core EAFM team was established in each AMS with knowledge and capacities related to sustainable fisheries provided by TD through a series of training courses to ensure that the teams would be able to apply the knowledge and skills gained from the training courses in real situations. The EAFM concept was further promoted in selected pilot learning sites as case studies.

The EAFM implementation at different pilot learning sites (**Figure 1**) started in different years, *i.e.* in 2016 for Tharthon, Myanmar, in 2017 for Trapaeng Ropov, Cambodia, and Baan Nainang, Thailand, and in 2018 for Pak Kradun, Lao PDR. A series of activities were conducted, starting from an initial workshop with key persons to select an appropriate learning site and identify/prioritize key stakeholders. Subsequently, a series of workshops were organized with the participation of the key stakeholders to obtain information and understand the main issues of fisheries in the learning site and to develop a fisheries management plan. This was followed by a series of workshops with all key stakeholders to finalize and formalize the EAFM plan. After the development and implementation of the EAFM plan, collaboration was maintained with other sectors and stakeholders in monitoring the progress of activities relevant to the EAFM plan at the learning sites based on the management actions and the objective indicators.

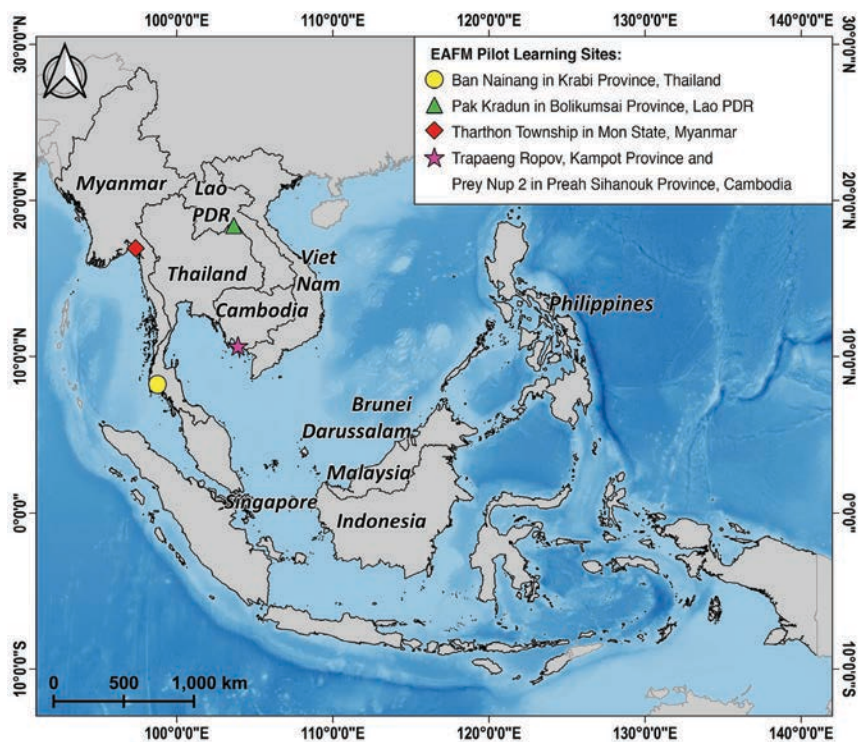


Figure 1. EAFM pilot learning sites in Tharthon Township in Mon State, Myanmar; Trapaeng Ropov, Kampot and Prey Nup 2 in Preah Sihanouk Provinces, Cambodia; Ban Nainang in Krabi Province, Thailand; and Pak Kradun in Bolikumsai Province, Lao PDR

## Issues and threats

Managing multispecies and multigear fisheries in Southeast Asia requires dealing with multiple stakeholder groups and with disparate uses of fisheries and marine and coastal resources. All the learning sites, *i.e.* in Myanmar, Cambodia, Thailand, and Lao PDR, had once enjoyed the benefits from abundant fishery resources, productive coastal and marine habitats (*e.g.* coral reefs, seagrasses, and mangroves), and high biodiversity. However, the threats were examined and found to be similar in all learning sites, *i.e.* overexploitation of resources, destructive fishing methods, and illegal activities, degradation or loss of habitats, and declination of the fishery resources. The four sites also had similar management issues and challenges, *i.e.* ineffectiveness of fisheries governance, weak enforcement, lack of cooperation among stakeholders, and little understanding of rules and regulations among resource users. The situation has been aggravated as the communities were highly dependent on fishery resources and have limited types of livelihoods. The fishing grounds of small-scale fishers have been invaded by large-scale fishers with higher productive fishing capacities. At the same time, the market access of small-scale fishers is often limited and is conducted by middle people. Across all sites, following catch declines and decreases in fisheries-related income, livelihoods have become insecure, and the lack of the resources, skills, and capacities needed to initiate and successfully pursue supplementary and/or alternative livelihoods has become a critical problem.



Freshly caught fishes from small-scale fisheries in Ban Nainang, Krabi Province, Thailand

## Lessons learned

The four pilot learning sites applied the EAFM principles (**Box 1**) in their EAFM implementation, the lessons learned from the different case studies could be summarized as follows:

**Box 1. Key EAFM principles (adopted from www.eafmlearn.org)**

**Good governance:** Process for developing rules and regulations for sustainable management and ensuring their compliance through a participatory process that improves acceptance, transparency, and accountability

**Appropriate scale:** Suitable levels and processes at which management is applied, taking into account the nature of the fishery and the people involved, as well as the issues being addressed. This can cover political, geographic, socioeconomic, and temporal scales

**Increased participation:** The need for stakeholders to become involved and work effectively together in the planning and implementation of EAFM

**Multiple objectives:** Addressing multiple objectives takes account of the various objectives of different stakeholders and considers trade-offs. It also strives to balance the multiple, often conflicting, objectives relating to human and ecological well-being

**Cooperation and coordination:** Voluntary but conscious and organized efforts of various stakeholder groups working together to achieve the EAFM objective. *Horizontal* cooperation and coordination refer to efforts across sectors and agencies while *vertical* cooperation and coordination are across levels of government

**Adaptive management:** Iterative and systematic process for continually improving management by learning from the outcomes of the previous management objectives and actions  
**Precautionary approach:** Cost-effective measures to deal with uncertainty or risk without delaying action because of a lack of full information and being risk averse

### **Good governance**

Good governance is fundamental for addressing any ecosystem-based fisheries issues, whether they are related to natural resource conditions or people's livelihoods. Fisheries reforms and amended or new fisheries laws were created and implemented to sustain fisheries and improve the livelihoods of local communities. In Cambodia, new fishery laws aim to ensure fisheries and fishery resources management; enhance aquaculture development; management of production and processing; and improve the socioeconomic conditions of the local communities.

In Myanmar, fisheries laws, rules, and regulations have been amended and updated to align with international standards, best practices, and provisions. Additionally, the management in Myanmar emphasized transparency and participation in co-managing and conserving fisheries resources. From Thailand, we learned that enforcing laws effectively requires fair legal frameworks, following the rule of law impartially, and commitment to protecting human rights, particularly the rights of those who are disadvantaged or marginalized.

The clear benefits and equal treatment motivated people to comply with relevant laws and to support law enforcement efforts. Good fisheries governance has expanded from the conventional focus on fisheries production alone to broader and more holistic approaches to fisheries management that also respond to the needs for conserving fisheries habitats and ecosystems and for securing the livelihoods of the communities. Restoring habitats and increasing household income have been identified as primary management objectives at all sites. The communities at each of the sites had limited alternative and supplementary livelihood opportunities, and most community members lacked the relevant skills to add value to fisheries products or to pursue non-fisheries livelihoods. Good governance, therefore, includes commitments to and strategies for improving sustainable livelihoods and food security, and for the sustainable development of fisheries sector.

In Trapaeng Ropov, improving the livelihoods of community members has been considered the most urgent issue. Supplementary livelihood development projects were initiated to be locally appropriate as well as being low cost, low technology, and geared toward locally available materials. The projects include ecotourism, value-added fisheries products, and mariculture. In Tharthon, the Japanese Trust Fund (JTF) supported SEAFDEC to organize a workshop to identify how to engage stakeholders and conducted a survey to identify appropriate activities for increasing fishing community incomes. Skill training with the women in Tharthon was conducted to enable them to create value-added products as supplementary livelihoods. Products included dry fish, fish crackers, and packaged dry shrimps. In Nainang, community-based tourism and apiculture were initiated to increase additional income and to help protect fisheries resources and habitats. The livelihood diversification initiated by different groups including fish processing, beekeeping, ecotourism, souvenir making, traditional snacks, and mixed agriculture.

### **Appropriate scale**

While the case study sites share issues, backgrounds, and some similar fisheries habitats, the scale and scope of fisheries management are different. Decisions about appropriate scales have taken into consideration not only existing administrative and management structures but also the feasibility and practicality of implementation. Attention has been particularly given to ensuring that EAFM is integrated into fisheries management at multiple levels, including the community-based level and the level of national policy. While Thailand and Myanmar have their fisheries management areas (FMAs) at the village level, Trapaeng Ropov defined a transboundary marine area as their FMA, jointly managed under one set of regulations by two provinces sharing responsibilities to rehabilitate the overlapping fishery resources, to promote supplementary and alternative livelihoods, and to strengthen law enforcement focusing on reducing IUU fishing in an area important to both jurisdictions. In the case of Nainang,

while the EAFM initiative started at a small local scale of a single village, its success has awakened the interest of the provincial fisheries of Krabi and started expanding the EAFM to encompass the rest of the Krabi Province in 2021.

### *Increased participation*

EAFM encourages and strengthens the participation of communities and other stakeholders. Increased participation should be practiced at all stages of the EAFM, including understanding the needs, issues, and contexts of different sectors and groups and possible solutions, developing fisheries management plans together with fisheries officials, and implementing management activities in collaboration with relevant stakeholders. Increased participation helps build shared ownership and shared responsibility among the groups. It also helps balance gender participation and provides opportunities for involving those who are under-represented. In the case studies, we found that the willingness to participate can come from building stakeholders' awareness of the importance of sustaining resources and the value of rules and regulations. In all sites, levels of awareness raised on the importance of fishery resources and frequencies of awareness and outreach activities were set as indicators in the EAFM fisheries management plans, reflecting the importance of these as foundations of achieving good governance. The learning from the case studies showed that fisheries management cannot be successful with only one or two stakeholder groups and that it is important to involve the different groups early in the planning process to understand, support, and agree to be involved in management actions.

In Cambodia, Communities Fisheries (CFi) were established to help manage fisheries and related ecological systems and to improve communities' standard of living. By 2015, there were over 507 CFis in Cambodia. In Trapaeng Ropov, key stakeholder groups have extended to include community representatives, community chiefs, the Fisheries Administration Cantonment (FiAC), District Governor, Chief of Commune, and local non-government organizations. Progressively, the local groups grew to include the CFi, Provincial Department of Agriculture, Forestry, and Fisheries, and national level stakeholders grew to include the Ministry of Environment, marine police, navy, Ministry of Tourism, Ministry of Public Works and Transport, National Committee for Marine Security, and inclusion of local and international non-government organizations also increased.

In Nainang, the revised management plan has been used as an adaptive fisheries resources management tool that has also enabled different stakeholder groups (small-scale fishers and commercial fishers, different community-based groups, and the Sub-District Administration Organization) to participate in the decision-making processes of revising the plan and activities, and of developing budget proposals. This expanded



Development of the Fisheries Management Plan in Krabi Province, Thailand

participation created a sense of belonging in managing fisheries resources, a willingness to collaboratively resolve conflicts, and a greater understanding and positive attitudes toward fisheries officers among different types of fishers.

It was recognized that equitable and inclusive participation and collaboration among governmental officials, community members, and other stakeholder groups were instrumental in achieving good governance. Gender equity and equality are important for the social safeguarding and sustainable development at which EAFM aims. In the Tharthon case, for example, a livelihood project was developed especially for women, while in Nainang men and women have worked in a complementary manner to benefit from different aspects of product development related to apiculture. Men construct the bee houses and take care of the beekeeping and honey extraction, while women take care of marketing and developing other value-added products from honey and beeswax, and for the case of Trapaeng Ropov, Cambodia both men and women were involved in most of the process for fish sauce production and the local business went well.

### *Multiple objectives*

In all sites, coastal and marine resources are being used by different sectors and for multiple purposes, including tourism, small- and large-scale fisheries, and coastal development, while these sites serve as habitats for endangered species



Training/Workshop to Revisit/Finalize the Existing Fisheries Management Plan for Pak Kading, Bolikhamsai Province, Lao PDR

and others. To balance ecological with social goals, several activities have been developed to achieve multiple objectives. These objectives include improving and conserving the habitat conditions, creating a better understanding of rules, regulations, and ways to sustain marine life, promoting shared management and enforcement of illegal fishing activities, and establishing quality and value-added fisheries products, as well as non-fisheries livelihood options.

Competition among multiple objectives occurred. Management actions need to take into consideration the varied impacts of different actions taken to improve and restore fishery habitats and resources and to ensure that those who are dependent on them can sustain their livelihoods. This requires balancing the ecological and human components and understanding how actions can benefit one component at a cost to others. Within the human component itself, there are often different groups with different societal objectives. In all sites, there are competing interests between small-scale and large-scale fisheries, between fishing community well-being and larger-scale coastal development, or between those living inside and outside an FMA. Recognizing the multiple objectives in an FMA is critical for the success of EAFM. It is essential for officials implementing EAFM to be involved with and understand the communities well so that they can analyze the situation, identify issues, and engage stakeholders to fairly discuss and negotiate the trade-offs in a transparent way. For Nainang, the village leadership felt strongly that collective results and benefits were most important. There the aim was for all to have reasonable livelihoods rather than for some to be better off while others are marginalized.

Some objectives are complementary to one another. The apiculture project in Nainang was a good example of how a local enterprise for supplementary community income can help support the conservation of local mangrove forests, and how the restored forests in turn benefit not only the livelihoods

of both women and men in the community but also improve fisheries resources, ecosystem sustainability, and biodiversity.

### *Cooperation and coordination*

Fisheries issues are better addressed when there is a collaboration among stakeholder groups and coordination with non-fisheries sectors and programs to better achieve the multiple objectives of different EAFM components and to avoid possible conflicts. Different stakeholder groups need to understand that cooperation and coordination allow everyone to better contribute to the success of an EAFM plan and improve shared benefits. Conducting regular meetings to strengthen cooperation among relevant stakeholders is also critical. In the case studies, the coordination efforts were often led and/or supported by a champion or a group of champions in the FMAs and supported by management structures.

The background of several case studies showed that fisheries law enforcement had been ineffective in reducing illegal fishing due both to insufficient resources and weak cooperation among stakeholders. Ultimately, it has been recognized that illegal fishing needs to be addressed collaboratively. Consequently, efforts to combat illegal fishing have extended to include different stakeholder groups, emphasizing cooperation and coordination among them, as well as the importance of community participation in the monitoring. In Trapaeng Ropov and in Tharthon, community-based monitoring has been established. In Tharthon, the monthly frequency of monitoring by fishers was included as the main indicator for good governance. Similarly, in Trapaeng Ropov, a benchmark for the number of days per month for joint patrols with relevant stakeholders was set as an indicator for the EAFM management plan. In Nainang, the frequency of collaborative monitoring with an enforcement plan being in place became an important indicator for good governance alongside laws and community-based rules and regulations to reduce illegal fishing and commitments to monthly informative meetings.



Participants using the Venn diagram during an activity on stakeholders' analysis

## ***Adaptive Management***

Adaptive management started in 2012–2013 with the modifications of the E-EAFM course to better suit national and regional capacity-building needs for ecosystem-based fisheries management in Southeast Asia. In 2019, the course materials were reviewed and modified to reflect lessons gathered from the delivery of the E-EAFM course by TD at both the national and regional levels since 2014. Specifically, it has been identified that technical EAFM modules should be developed to address the needs for sustainable fisheries management tools (*e.g.* harvest control rules, territorial use rights in fisheries, total allowable catch, individual transferrable quota, fish refuges, seasonal closures, marine protected areas, bycatch/juvenile reduction devices, and others), methods, and mechanisms that support sustainable livelihoods development in fishing communities (microcredit schemes, insurance, alternative value chains, ecolabelling, rights-based approach, etc.).

As the EAFM plans and activities are being implemented and applied in the FMUs, management continues to adapt to be more effective in addressing issues and in balancing human well-being with ecological health. In Nainang, Trapeang Ropov, and Tharthon, adaptive management involves better engaging stakeholders and benefits from their contribution, cooperation, and contribution. This is particularly important for combating illegal fishing. Monitoring and evaluation are important parts of an EAFM process. In all EAFM learning sites, indicators were established in the EAFM plan to track and understand changes related to ecological, human, and governance objectives, and to produce data that allows for informed management adaptation. While information from monitoring and evaluation is still often lacking, the importance is now recognized of supporting and sustaining monitoring programs at the EAFM sites over the long run to ensure valid and reliable results and to help guide down-the-line adaptations. Adaptive management also extends to mainstreaming an EAFM in national, regional, and transboundary fisheries management policies. The EAFM in Nainang is adapting its geographical and administrative scales from those of a village to those of a province and is supporting related activities that come with the scaling up.

## ***Precautionary Approach***

To proactively plan for sustainable fisheries, science was used to support informed decision-making. In cases where data is incomplete, decisions were made in a precautionary manner. It is fundamental to the precautionary approach to ensure that fisheries communities and other stakeholders understand both the values of coastal and nearshore habitats (such as mangroves, sea grasses, and coral reefs) and the importance of sustainable fisheries resources for the next generations. This understanding helps initiate habitat and fisheries resource conservation for future generations, as well as other activities to reduce vulnerability to natural disasters and climate change impacts. In Nainang, conservation areas were established for blood cockles, dog conch shells, and other important economic species. In Tharthon and Nainang, mangrove conservation was strengthened through different activities with the community appreciating the mangrove providing coastal protection. In Trapeang Ropov, seagrass was considered an important habitat that should be sustained. In Nainang, crab banks were established by sustainability-minded middle people and have proven effective in sustaining the crab population while enabling higher quality products with better prices and stronger appeal to be brought to consumers.

## **Sharing of lessons learned**

In sharing the lessons learned and information on the EAFM implementation, TD through its project “Small-scale Fisheries Management for Better Livelihood and Fisheries Resources” with support from the Japanese Trust Fund conducted an online survey among the EAFM trainees from Indonesia, Malaysia, Myanmar, Cambodia, Lao PDR, and Thailand. The results showed that the knowledge that the trainees have gained from the EAFM training courses included the concept of EAFM, development of fisheries management plan, importance of participation, systematic and analysis thinking process on fisheries management. The respondents also realized that the EAFM concept should be promoted to all fisheries stakeholders and all respondents applied the EAFM in their work. Subsequently, the Online Meeting on Survey Results of SEAFDEC/TD HRD and Implementation of Ecosystem Approach to Fisheries Management (EAFM) in Learning Sites in 2021. The Meeting shared the results of the online survey on the usefulness and applicability of the EAFM training and the EAFM implementation of the learning sites.

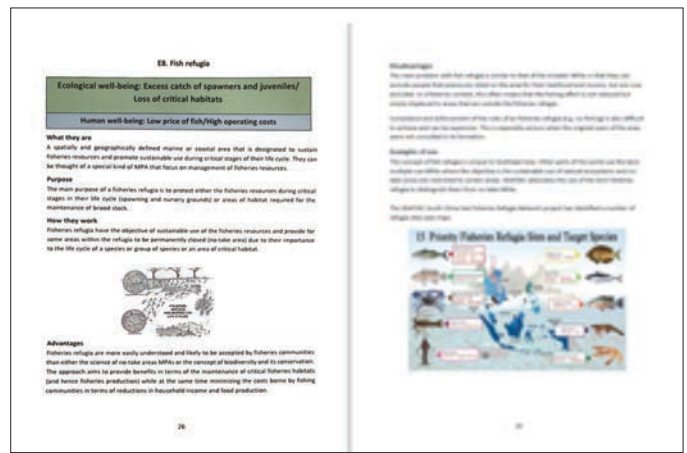
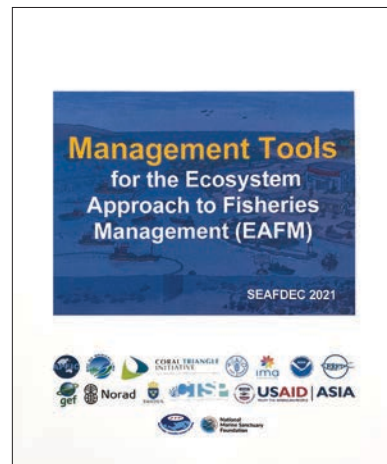
## Way Forward

The duration for EAFM implementation is one year for each site with a view to starting up the EAFM process. After the one-year period, the implementation was transferred to the respective countries, and the activities were carried out mainly by the key stakeholders. It should be noted that one of the key success factors for implementing EAFM in the pilot learning sites is the EAFM core teams as the implementation processes at the sites were carried out mainly by the key national officers of the respective country supervised by the core team with SEAFDEC only playing a support role in enhancing the core teams' capacities. The strengthening of the core team would therefore ensure that the EAFM implementation could be maintained by the respective country in the future after the completion of the project supported by TD.

Over the period of the EAFM training and implementation, the E-EAFM course was found to have some gaps, and one of the major gaps was identified to be the insufficiency of information on the different management tools that can be used to implement the EAFM. Considering that EAFM is quite broad with respect to conventional fisheries management, it has also become necessary to broaden the scope and number of relevant fishery management tools that could be applied in the implementation of the EAFM. Thus, a supplementary course module that provides an introduction and summary of these tools has been added to the E-EAFM course. This supplementary course is based on a series of fact sheets that focus on managing fishery activities under the EAFM, including the tools to manage broader environmental issues, as well as on achieving social, economic, and governance objectives.

The supplementary course aims to provide the participants with knowledge and skills that would enable them to identify the appropriate management tools that address common EAFM issues in their countries. The expected outcomes are increased capacity of participants to select the management tools that could be used for implementing the EAFM in their works and enhanced awareness of and familiarity with the EAFM management tools.

During the course, the participants will be provided with training materials such as worksheets and the fisheries management tool booklet which was developed as part of a revision of the Essential Ecosystem Approach to Fisheries Management training course undertaken during 2019–2020. The revision was funded by the U.S. Agency for International Development/Regional Development Mission for Asia (USAID/RDMA) implemented by NOAA and administered by the National Marine Sanctuary Foundation (NMSF). The management tools booklet was further improved through a regional workshop conducted by TD in August 2021, with the support of the Japanese Trust Fund.



Training materials for management tools for EAFM

Moreover, TD in collaboration with the DOF Thailand translated the Management Tools for EAFM booklet to the Thai language in March 2022 and used this as training materials for the national and regional training courses. The first national training course was conducted for officers of the DOF Thailand in August 2022, and this was followed by the first regional training course conducted with the participation of fisheries officers from the SEAFDEC Member Countries in September 2022. While these training courses are the activities carried out by TD that are envisaged to contribute to human resource development toward achieving sustainable fisheries management in the Southeast Asian region, it is expected that the tools developed by SEAFDEC in collaboration with several partners could be further used by the respective AMSs for amplifying the implementation of EAFM concepts and approaches in additional sites and wider areas with the support from the core team of the respective country in the future.



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