

Marine Fisheries Management Plan of Thailand 2020-2022



**Department of Fisheries
Ministry of Agriculture and Cooperatives, Thailand**

CONTENTS

EXECUTIVE SUMMARY	3
1. INTRODUCTION	6
1.1 Overview of Thailand’s fisheries industry	6
1.2 Important of Thailand’s marine fishery	6
1.3 Background of Thailand’s fisheries development.....	8
1.4 Reformation of Thailand’s marine fishery	9
1.5 Assessment of progress of the Marine Fisheries Management Plan (2015-2019).....	11
1.6 Policy framework and legislation.....	13
2. CURRENT STATUS OF FISHERIES RESOURCES AND HABITATS	16
2.1 Fisheries resources	16
2.2 Current status of critical habitats.....	20
2.3 Fleet profile and catches.....	21
2.4 Current management and measures.....	24
3. ISSUES AND CHALLENGES	26
4. FMP LOGICAL FRAMEWORK	30
4.1 Vision, goals and underlying principles	31
4.2 Scope	32
5. OBJECTIVES, TARGETS AND MANAGEMENT MEASURES	35
6. FINANCING	62
7. Management mechanism of the plan	72
7.1 Mechanism of the Thailand FMP	72
7.2 Review of the plan	72
8. Monitoring and evaluation	72
9. Outcome	77
Appendix A: Abbreviations and definitions	78
Appendix B: Stock assessment result, 2019	82
Appendix C: Categories of fishing vessels in Thailand.....	87
Appendix D: Fleet management: controlling number of fishing vessels through licensing, allowable fishing days and fishing gears	91
Appendix E: Current management measures.....	94

EXECUTIVE SUMMARY

The new Royal Ordinance on Fisheries B.E. 2558 (2015) and its revision in B.E. 2560 (2017) recognize the significance of sustainable management of the fisheries resources of Thailand and stipulates that the Thailand Department of Fisheries (DOF) develop and implement a National Fisheries Management Plan (FMP).

This National Marine Fisheries Management Plan (FMP) (2020-2022) is prepared under the Policy for the development of fisheries in Thai waters and the Policy for the promotion, development and resolution of problems pertaining to fisheries outside of Thai waters. The FMP (2020-2022) is also built on the success of FMP (2015-2019) and takes into consideration the assessment of progress against the FMP (2015- 2019) goals and objectives, changes in the status and nature of the fishery and newer approaches to management. Many of the management measures specified in the FMP (2015-2019) have already been implemented. Excellent progress has made against the urgent issues of (i) overfishing and overcapacity, and (ii) Illegal, unreported and unregulated (IUU) fishing. For the other issues, good progress has been made against all objectives.

This progress is the direct result of a number of fisheries reforms that have been implemented since 2015 that included the conversion from an open-access to a limited-access fishery, tighter controls on IUU fishing including ratification and implementation of the Food and Agriculture Organization of the United Nations (FAO) Port State Measures Agreement (PSMA), implementation and enforcement of technical measures and more stringent requirements for overseas vessels, including ratification and implementation of the United Nations Fish Stock Agreement (UNFSA).

Marine fisheries are important both socially and economically for Thailand. In order to maintain the sustainable development of the sector, a number of challenges still need to be addressed. These include rebuilding and maintaining the fish resources at a level commensurate with the MSY, reducing the large quantities of small low value/trash fish, including juveniles of larger commercial species that are taken, further reducing illegal, unreported and unregulated fishing (IUU), improving the status of critical marine habitats (mangroves, sea grasses, and coral reefs), improving the well-being of artisanal fishers and strengthening the capacity for effective fisheries management.

Based on these challenges, the goals of the FMP (2020-2022) are:

1. Fisheries resources restored to a level that can support the MSY in Thai waters and sustainable fishing expanded into deep-sea and overseas waters;

2. IUU-free fishery;
3. Healthy habitats and environment;
4. Improved livelihoods of artisanal fishers and fishing communities; and
5. Effective fisheries management capacity.

Important management measures specified in the FMP (2020-2022) include the control of fishing effort through a total allowable effort (TAE) and licensing scheme and the use of incentives such as a buy-backs and license combination schemes to remove excess capacity for fishing vessel, the introduction of area-based management for selected fisheries, including clams and shrimp and introducing Fishery Improvement Projects (FIPs) for selected fisheries. Restrictions on the number and characteristics of fishing gear will be maintained. The expansion of sustainable fishing into deeper waters in Thailand and into overseas fishing grounds will be promoted. To reduce the catch of juvenile market fish, mesh size limits will be maintained or increased and seasonal closures improved. Artificial reefs and restocking programs will be maintained.

The FMP is designed to reduce the level of IUU fishing to a level that can be controlled through regular MCS arrangements in the future. Specific management measures to achieve this include a review of the National Plan of Action to Prevent, Deter and Eliminate IUU fishing (NPOA-IUU) and the further strengthening of Thailand's coastal State, flag State and port State responsibilities. The traceability systems already in place will also be improved and international and regional MCS networking adopted.

The DOF will collaborate with the Department of Marine and Coastal Resources (DMCR) to improve the status of critical habitats and rebuild biodiversity as well as to reduce marine debris which affects ecosystems and sustainability of fisheries resources. A new important initiative of the FMP 2020-2024 will be the application of the FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (FAO SSF Guidelines) to further improve the well-being of artisanal fishers and fishing communities.

The FMP also recognizes the importance of better data and information to inform management decision making and proposes several important changes on research, data and information that can be used in the future management of Thailand's marine fisheries. Lastly the FMP recognizes the need for institutional changes and strengthening the human capacity to improve future fisheries management.

The details of all management measures needed to meet the FMP's objectives, as well as key performance indicators, timelines, and responsible agencies, are included in the plan.

The implementation of the FMP also requires the provision of the adequate financial, technical and human resources. The Thai Government has a policy to allocate budget of 2,970 billion baht over the three years period of the FMP.

The FMP will be reviewed every second year with a report on progress against the objectives, and if appropriate, the challenges, goals and objectives and management measures will be modified.

1. INTRODUCTION

1.1 Overview of Thailand's fisheries industry

Fishery plays an important role to Thailand's economy. It supports continuing businesses and contributes to huge amount of the country's income. In 2019, total aquatic animal production from fisheries was 2.60 million tonnes including 1.69 million tonnes of production from capture fishery divided into 1.41 million tonnes of marine capture fishery (56.2% of total aquatic animal production) and 0.19 million tonnes of inland capture fishery. In addition, 0.91 million tonnes was from aquaculture including 0.50 million tonnes of coastal aquaculture and 0.41 million tonnes of freshwater aquaculture. The upstream of fisheries sector includes important components, i.e., 32,529 fishing vessels, divided into 21,460 artisanal fishing vessels and 11,069 commercial fishing vessels, and 187,947 workers in fishing. Furthermore, in 2019, Thailand imported 2.06 million tonnes of fisheries product. Most of them was used as material for processed products, e.g., chilled and frozen tunas, squids, and various species of fishes (Figure 1).

Aquatic animals from domestic fisheries and importation of fisheries products, which are altogether more than 4.6 million tonnes, are important food source and raw material for domestic consumption, processing, and exportation. There are continuing businesses throughout the supply chain; therefore, fishery is important to Thailand in terms of economy and society. The important continuing businesses in fisheries sector include fish market, fishing port, cold storage, wholesale market, primary fish processing establishment, and processing factory. Currently there are altogether 345 processing factories and cold storages which employ more than 240,000 workers in the middle stream of fisheries industry.

In 2019, Thailand consumed approximately 2.2 million tonnes of fisheries products accounted for 33 kilograms/people/year and exported about 1.5 million tonnes/year created an income about 200 billion baht to the country. The United States, Japan, and Middle Eastern countries are among the important importing countries of fisheries products from Thailand. In the past, Thailand had exported fisheries products more than 2.0 million tonnes/year; however, It currently has a market share of only 4%. This can be seen that the world's fisheries product market is still widely open to Thailand.

1.2 Important of Thailand's marine fishery

Thailand's marine fishery plays a significant socio-economic role. Fish is the main source of protein for Thai people particularly in coastal provinces where fish consumption rate is higher than consumption of pork, beef, and chicken.

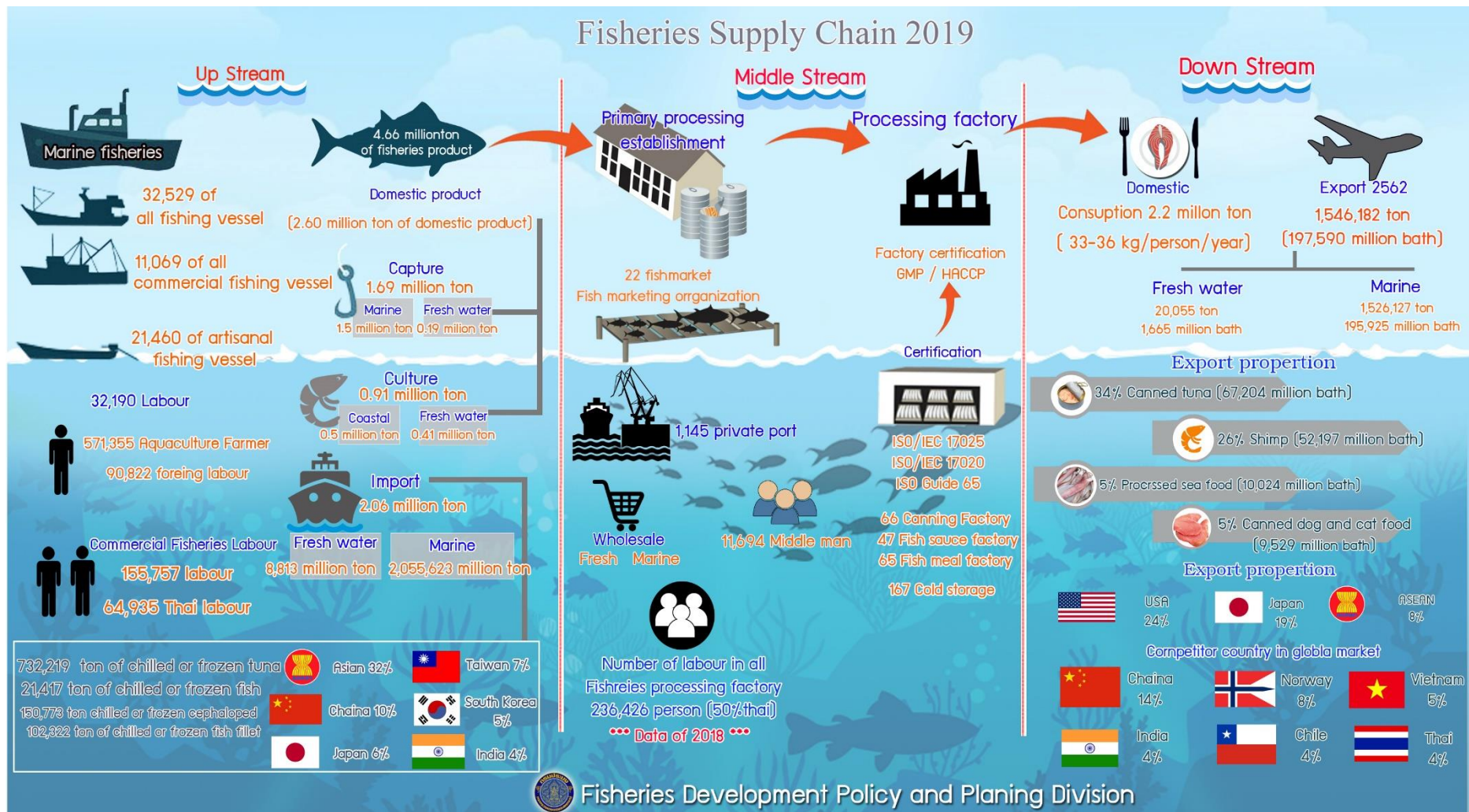


Figure 1 Fisheries industry supply chain of Thailand, 2019

The total number of fishing vessels in Thailand was 32,529 vessels. In 2019, the total catch from this fleet was 1.5 million tonnes in Thai waters valuing approximately 59,000 million baht. Thailand's catch ranked 12th in the world. This amount of catch supports livelihood, income, and employment of approximately 180,000 onboard workers and more than 500,000 workers, mostly female, employed in the continuing industries in fisheries sector, e.g., fish processing industry, fish canning and freezing factory, animal feed factory, and shipyard industry. In the rural areas of Thailand, particularly 2,500 artisanal fisher villages located along the coastline, fish is inexpensive protein source, affordable for everyone, and important for health and food security.

1.3 Background of Thailand's fisheries development

During 1960 to 1979, Thailand's fishing capacity had been grown up rapidly in terms of increasing number of fishing vessels and introduction of new technologies. In addition, trawl and purse seine fisheries largely affected fisheries resource. When the fisheries resource was declining, the fishers had developed larger vessels with higher horsepower which could fish further offshore and stay in the sea for longer periods of time.

Between 1990 and 2007, Thailand became one of the world's largest producers of fisheries products with 2.5 million tonnes of catch (Figure 2). Although neighboring countries started to declare their exclusive economic zone during 1977 to 1981, Thailand's overseas fishery had been operated through joint venture. Large vessels had gone further to Bangladesh, India, Sri Lanka, and Yemen.

Indonesia and Malaysia, which were the main overseas fishing ground of Thai fishers, refrained foreign fishing vessels to fish in their waters in 2008 resulting in rapidly catch reduction. In 2014, Myanmar canceled fishing permits granted to foreign fishing vessels. Then, in 2015, Papua New Guinea remove access to fish in its waters as well.

In 2018, there was no permission for Thai fishing vessels operated overseas until control measures for overseas fishing vessels are finalized causing no catch from overseas fishery. However, there are a few overseas fishing vessels still holding valid fishing licenses and waiting to go fishing. Furthermore, there are several transshipment vessels registered with the DOF that are operating outside Thai waters in Malaysia and the Maldives

In 2019, overseas fishing vessels resumed to fish. Fishing ground was the Saya de Malha Bank in the western Indian Ocean which is the competent area of Southern Indian Ocean Fisheries Agreement (SIOFA). Therefore, Thailand began to have outside Thai waters catch after no overseas fishing vessel in 2018.

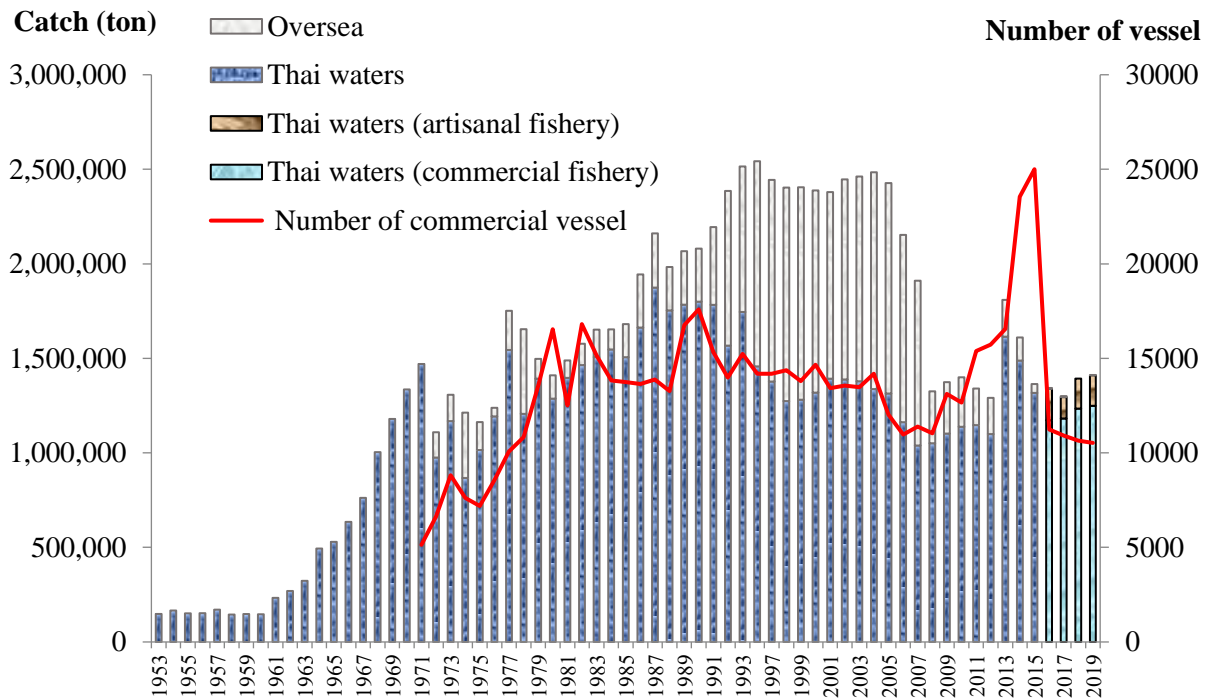


Figure 2 Total capture production of marine fish inside and outside of Thailand 1953-2019

1.4 Reformation of Thailand's marine fishery

In recognition of the degraded fisheries resources and marine environment that occurred over the past 50 years, Thailand initiated major reforms in the marine fishery in 2015. These reforms began with the Royal Ordinance on Fisheries B.E. 2558 (2015) that was amended in B.E 2560 (2017). This new legal framework forms the basis for fisheries regulations across the entire supply chain of the fishery sector, including the issuance of fishing licenses at a level appropriate to the natural productivity of the resources, the limitation of fishing gears, the revamp of fleet control measures, the management of catch, and the mechanism to deter potential infringements of the laws. Thailand has effectively entered into force the Food and Agriculture Organization of the United Nations (FAO) Port State Measures Agreement (PSMA) in 2016 and the United Nations Fish Stock Agreement (UNFSA) in 2017. It also fully complies with the relevant Regional Fisheries Management Organizations (RFMOs), such as the Southern Indian Ocean Fisheries Agreement (SIOFA) and the Indian Ocean Tuna Commission (IOTC).

Monitoring, control and surveillance (MCS) has also been strengthened. The Fisheries Monitoring Center (FMC), where the Vessel Monitoring System (VMS) is overseen, now operates with state-of-the-art equipment and manpower to detect high-risk fishing operations. The monitoring done by the FMC is complemented with the inspections at ports and at sea,

where officers are on hand to eliminate the risks of illegal activities and, when applicable, prosecute them. The Department of Fisheries (DOF) also issued a Notification dated 25 December 2015, requesting all owners of fishing vessels with a capacity of 30 gross tonnes (GT) and above operating outside Thai waters to bring the vessels back to port within 30 days of the issuance of the Notification. No license had been given to any fishing vessels to fish outside Thai waters since 2017. Overseas fishing and transshipment in the future will require advanced electronic reporting and monitoring systems, equipped with CCTVs, cameras, and sensors. A catch traceability system now traces fish and fish products throughout the supply chain from the time they enter the country through to their final destination.

When the requirements for overseas vessels was being strengthened, a number of fishing and transshipment vessels, previously flagged by Thailand, have reflagged to avoid the strict controls that are now in place. However, Thailand, as a party to the PSMA, is working with other States to impose stricter control measures to counter this. Article 8 of the Royal Ordinance on Fisheries B.E. 2558 (2015) and its revision B.E. 2560 (2017) allows Thai law enforcement authorities to pursue the prosecution all Thai, non-Thai, and stateless vessels associated with Thai beneficiaries, in line with the international Agreements and Conventions related to fisheries conservation and management. As the result, a number of arrests have been made and penalties applied. Thailand is also actively cooperating with other countries and RFMOs to keep track of vessels suspected of engaging in illegal fishing in overseas waters.

Thailand has also placed equal priority on labor reforms. Several International Labour Organization (ILO) Conventions have recently been ratified, such as Convention Concerning Forced or Compulsory Labour, 1930 (No. 29), Discrimination (Employment and Occupation) Convention, 1958 (No. 111), and Work in Fishing Convention, 2007 (No. 188). Thailand is currently drafting a law to support Thailand's readiness to ratify the International Labor Organization's "Work in Fishing Convention" (C 188). Efforts have been made to regularize and collect biometric data of migrant workers. Oversights and protections provided to migrants recruited through legal channels have been significantly strengthened. Outreach to migrant workers has been expanded through the establishment of Migrant Worker Assistance Centers.

The enforcement of the laws, particularly the enforcement of fishery and labor cases, has been strengthened in all agencies involved in the enforcement system. The police force, the public prosecutors, and the court have all established special offices and set a clear timeline to expedite the fishery- and labor-related criminal cases. In addition to the criminal proceedings, the administrative sanctioning procedure is in place to impose such penalties to deter illegal activities.

In accordance with the Royal Ordinance on Fisheries B.E. 2558 (2015) the Ministry of Agriculture and Cooperatives developed a Marine Fisheries Management Plan of Thailand (FMP 2015-2019) that was adopted in 2015. Following the specification in the legislation, the FMP included:

1. Issuance of fishing licenses in line with the fishing capacity and the maximum sustainable yield, using reference points as the basis for determination;
2. Restoration of aquatic animal resources to their normal natural state;
3. Reduction in the fishing vessels engaged in commercial fishing operations;
4. Elimination of IUU fishing operations;
5. Resolution of conflicts of interests between artisanal and commercial fishing operations;
6. Preventing the catching of aquatic animals of premature sizes;
7. Development of information related to fisheries;
8. Enhancement of fisheries management.

This FMP (2020-2022) is a revision of the National Marine FMP (2015-2019) based on an assessment of progress and taking into consideration changes in the status and nature of the fishery and newer approaches to management.

1.5 Assessment of progress of the Marine Fisheries Management Plan (2015-2019)

This FMP (2020-2022) is developed based on the success of the FMP of 2015-2019 and taking into consideration changes in the status and nature of the fishery and newer approaches to management. Assessment and review of progress against the objectives and targets of the FMP (2015-2019)¹ were also carried out and a summary of results is at Table 1 and full details are in the assessment report. The report concluded that many of the management measures specified in the FMP (2015-2019) had already been implemented and that the FMP needed to be updated by revising objectives and targets of management in the next 3 years. Excellent progress was made against the urgent issues of (i) overfishing and overcapacity, and (ii) IUU fishing. For the other less urgent issues, good progress has been made against all objectives.

Table 1 Assessment of progress of the 2015-2019 FMP

¹ Nootmorn (2019) Assessment Report for the Marine Fisheries Management Plan of Thailand (2015-2019)

	Target achieved		Good progress		No progress
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Goal and objective	Assessment
Goal: Reform Thailand's marine fisheries into a limited access regime where the fishing effort is commensurate with the MSY	
Objective: Reduce fishing capacity and fishing effort	
Objective: Rebuild fish resources through artificial reefs and restocking	
Objective: Reduce the catch of juveniles of economically important species	
Goal: Prevent, deter and eliminate IUU fishing	
Objective: Minimize IUU fishing through effective MCS	
Goal: Increase benefits for and reduce conflicts among major stake holders	
Objective: Resolve conflicts between small-scale and large-scale fishers	
Goal: Improve the marine environment	
Objective: Restore and maintain critical habitats	
Goal: Strengthen capacity to sustainably manage fisheries	
Objective: Improve fisheries data and information	
Objective: Strengthen fisheries management capacity	

As shown by the assessment, the overall situation in the marine fisheries of Thailand has improved significantly since the adoption of the FMP (2015-2019). Fishing effort in the demersal fleet has been reduced by more than 30% to a level below the fishing effort needed to produce maximum sustainable yield (MSY), thus allowing rebuilding of the fisheries resources. IUU fishing has been the target of concerted efforts to control and inspect many aspects of the fishing activities throughout the value chain. Law enforcement has been strengthened and penalties for infringements greatly increased. The control of vessels fishing and transshipping fish outside Thai waters has also been strengthened, with no vessel authorized to fish in 2017-2018. Measures have also been taken to reduce the catch of juvenile of economically important species and small low value/trash fish. Critical fisheries habitats and biodiversity are being restored through the planting of mangroves and seagrass and the maintenance and expansion of marine protected areas (MPAs). Some progress has been made to improve the management of the artisanal fishery and its dependent communities, but more is required. Moreover, illegal labor practices have also been targeted and the overall situation is improving through issuing seabooks and seaman books and improving working conditions

for workers in fishing industries.

In addition, an analysis of the detailed management measures contained in the 2015-2019 FMP was also made. Of the 75 measures, 74 had been implemented. About 50% of these were completed and could be removed from the 2020-2022 FMP.

The revision of the FMP should also take into account the suite of new management measures that are being considered. These include:

- Introduction of area-based management, e.g., clam and shrimp that inhabit specific areas;
- Fishing licensing system for different fishing zones, e.g., territorial use rights for fishing (TURFs) for coastal communities, fishing permits at provincial level, and fishing license for national waters;
- FIPs for economically important species that can be controlled through market forces, such as trash from trawls, purse seine, neritic tuna and blue swimming crab;
- Stricter law enforcement; and
- Feasibility of marine ranching.

1.6 Policy framework and legislation

International and regional cooperation

Thailand has ratified a number of key legal instruments relating to fisheries and the environment, including ratification of the UNFSA and the FAO PSMA.

Some key global legal instruments relating to fisheries and the environment

Law of the Sea Convention (UNCLOS)	Convention on Biological Diversity (CBD)	Convention on International Trade in Endangered Species (CITES)	Ramsar Convention on Wetlands of International Importance (Ramsar)	UN Framework Convention on Climate Change (FCCC) and Kyoto Protocol	UN Fish Stocks Agreement (UNFSA)	FAO Port State Measures Agreement (PSMA)
✓	✓	✓	✓	✓	✓	✓

As a member country of FAO, Thailand has adopted the FAO Code of Conduct of Responsible Fisheries (CCRF) and the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (the FAO SSF Guidelines). Thailand is a member of IOTC and SIOFA and a cooperating non-member of Western and Central Pacific Fisheries Commission (WCPFC). In addition, Thailand also

cooperates with the International Commission for the Conservation of Atlantic Tunas (ICCAT) and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) in information exchange.

Thailand has ratified 18 ILO conventions, including two conventions during the past 12 months. The Kingdom ratified the original Forced Labour Convention in 1969 and the 2014 Protocol updates that strengthens the earlier convention to take into account today's problems and changing conditions. The Thai government also ratified the ILO Work in Fishing Convention and is planning two other conventions on collective bargaining and the right to organize for both national and migrant workers.

Thailand, as a member of the ASEAN community, is guided by the ASEAN Roadmap for an ASEAN Community (2009-2015) and its supporting Blueprints. Thailand has also endorsed the ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 (Res/POA).

Thailand is part of the Regional Plan of Action against IUU fishing (RPOA-IUU), which is a ministerial initiative of eleven countries namely Australia, Brunei Darussalam, Cambodia, East Timor, Indonesia, Malaysia, Papua New Guinea, The Philippines, Singapore, Thailand and Vietnam to promote responsible fishing practices and combat IUU fishing in the Southeast Asian region.

National fisheries policies

At the national level, the overall policy framework is guided by the 20-year National Strategy. This is implemented through the five-year National Economic and Social Development Plans (NESDP). NESDP (2017-2021) recognises that natural resources and the environment have rapidly deteriorated in both quantity and quality, resulting in higher economic costs and devastating negative impacts on people's quality of life. It also recognises that past attempts at management of natural resources and the environment have not been effective. It specifies the protection of marine resources by designating marine and coastal areas, employing restrictive measures for fisheries, banning catching juvenile of commercial species, regulating the use of illegal fishing gear, and protecting the artisanal fisheries. It specifically highlights the issue of illegal, unreported and unregulated (IUU) fishing and developing sustainable fisheries and aquaculture systems.

The Fisheries Act (1947) provided the basics for managing Thailand's fisheries from 1947 through to 2015. The Act was replaced by the Royal Ordinance on Fisheries B.E. 2558 (2015)

and its amendment in B.E 2560 (2017). This new law strengthened Thailand's international obligations and broadened the concept of fisheries management under an ecosystem approach. Many of the policy statements of relevance to marine fisheries management are contained in this Royal Ordinance on Fisheries B.E 2560 (2017). The following are relevant to this FMP:

1. Achieving good governance in the management and conservation of aquatic resources and the fisheries sector, and ensuring that complete and accurate data are collected.
2. Protection of special interests of artisanal fisheries and local fisheries communities.
3. Fulfillment of Thailand's international obligations with regard to the conservation and management of aquatic resources.
4. Providing effective means for preventing, deterring and eliminating IUU fishing, as well as unlawful labor practices in the fisheries sector.
5. Using best available scientific evidence to achieve long-term economic, social and environmental sustainability, in line with the ecosystem-based approach and precautionary approach that ensures that fisheries resources are maintained or restored to a level that can produce the maximum sustainable yield.
6. Preventing and eliminating overfishing and overcapacity and ensure that the level of fishing effort does not undermine the sustainability of fisheries resources.

As well as the fisheries law, there are a number of other Acts that apply, including the Thai Vessels Act, B.E. 2481 (1938) and the Navigation in Thai Waters Act. Emergency Decree Amending the Thai Vessels Act, B.E. 2481 (1938), B.E. 2561 (2018) was then supplemented in order to prevent illegal fishing and elevate Thai fisheries standards to meet international standards and to be in line with the Royal Ordinance on Fisheries. There are also a number of natural resource exploitation Acts dealing with other natural resources, including the Minerals Act B.E. 2510 (1967), the Petroleum Act B.E. 2514 (1971), and the Tourism Act B.E. 2522 (1979). There are also three relevant nature conservation acts: Wild Animal Reservation and Protection Act B.E. 2503 (1960), a National Park Act B.E. 2504 (1961), and the National Forest Reserves Act B.E. 2507 (1964). These three acts cover both land and water, especially the National Park Act, which also includes marine parks as well as forest parks. A new Marine and Coastal Resources Management Act B.E. 2558 was also adopted in 2015. Additionally, the National Maritime Interests Protection Act B.E. 2562 is used to regulate fisheries resource utilization.

Sustainable Development Goal (SDG)

Sustainable Development Goal of the United Nations has a conceptual framework that links the economic, social, and environmental dimensions of sustainable development which contains 17 goals. The FMP corresponds SDG as following:

SDG 2 Zero hunger: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture

Target 2.3: By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment

SDG 14 Life below water: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Target 14.4: By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics

Target 14.B: Provide access for small-scale artisanal fishers to marine resources and markets

Target 14.C: Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of The Future We Want

2. CURRENT STATUS OF FISHERIES RESOURCES AND HABITATS

2.1 Fisheries resources

The current status of the marine fisheries has been assessed and reported in DOF 2018: Assessment Report for the Marine Fisheries Management Plan of Thailand (2015-2019). The assessment is based on trends in the catch per unit effort (CPUE) in research trawl surveys, and recent and past stock assessments.

Standardized research vessel surveys have been carried out in both the Gulf of Thailand and the Andaman Sea since the 1960s. The CPUE declined dramatically during the 1960s at the time the fishery was developing rapidly and the CPUE is now only 11% and 20% of the original CPUE in the Gulf of Thailand and the Andaman Sea, respectively. However, since

2016, the CPUE shows increasing trend both in the Gulf of Thailand and the Andaman Sea (Figure 3).

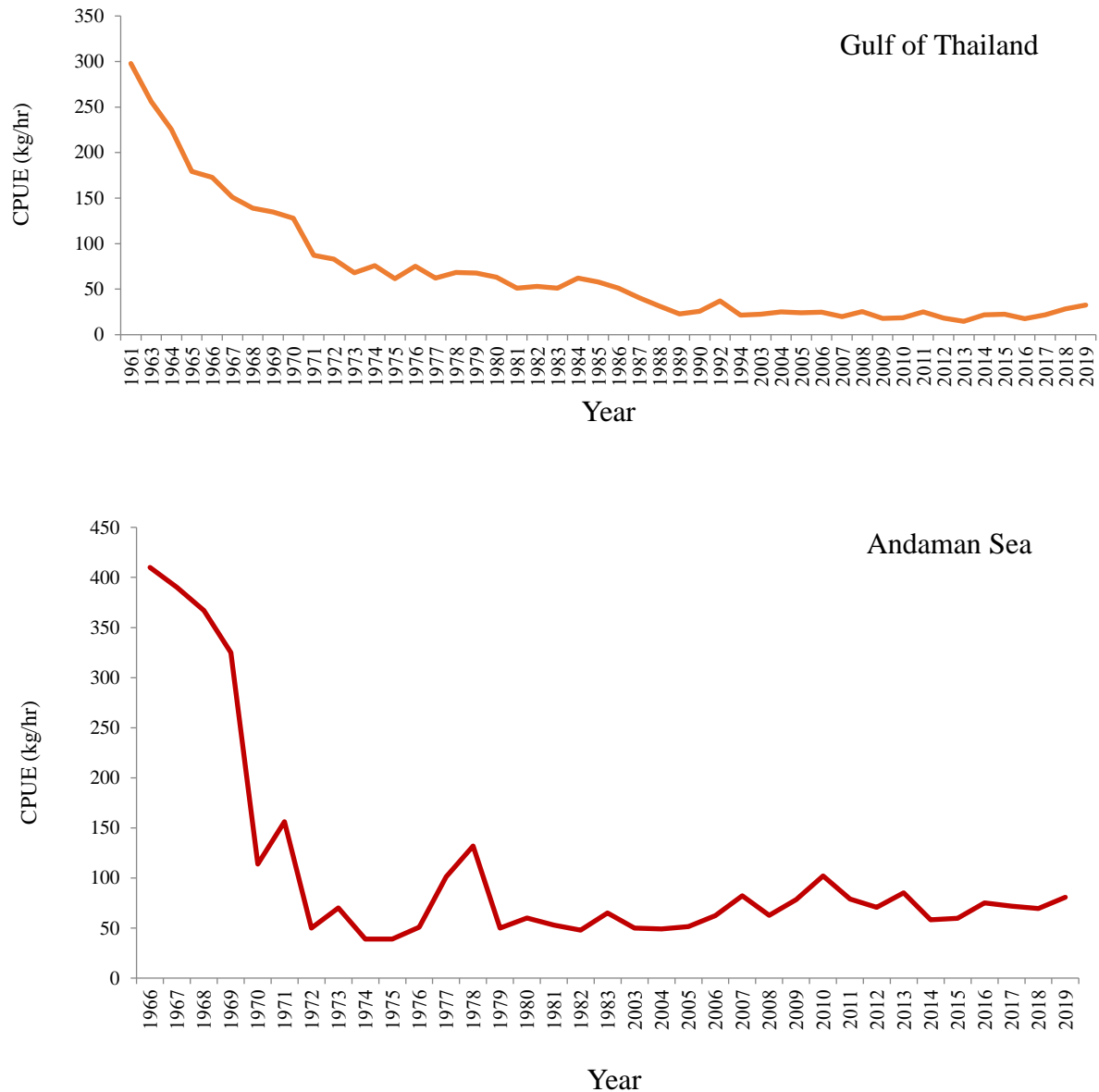


Figure 2 CPUE (kg/hour) trends of demersal trawl surveys in the Gulf of Thailand and the Andaman Sea 1960s – 2019

Stock assessments for demersal, anchovy, and pelagic fish for 2019 have been carried out based on the analyses of the main fishing gear in Thailand marine waters (about 80% of the total catch). The maximum sustainable yield (MSY) estimate is 1.6 million tonnes and the current catch is below the MSY in all these species groups in both the Gulf of Thailand and the Andaman (Table 2). Also, because of recent reductions in fishing effort, the fishing effort is now below the fishing effort at MSY (F_{MSY}), especially for anchovies which the fishing effort

reduced more than other groups.

Table 2 Maximum sustainable yield of marine fisheries resources in Thai waters 2019 and recent changes in catch and effort of the main gears

MSY = Maximum sustainable yield; F_{MSY} = Fishing effort at MSY

Location	MSY (tonnes)	F_{MSY}	Current catch (tonnes)	Current fishing effort	Percent change in catch 2015 to 2019	Percent change in fishing effort 2015 to 2019	Current effort as percentage of F_{MSY}
(1) Demersal Fish*							
Gulf of Thailand	790,985	22.61 mh **	545,363	17.34 mh	+8.4	-52.1	76.7
Andaman Sea	230,115	5.33 mh	174,717	3.98 mh	-1.7	-21.8	74.7
(2) Anchovy							
Gulf of Thailand	202,077	172,480 days	112,701	52,476 days	-38.5	-54.6	30.4
Andaman Sea	33,007	55,158 days	32,442	31,588 days	-4.3	-38.7	57.3
(3) Pelagic Fish***							
Gulf of Thailand	251,547	133,991 days	246,496	113,705 days	+0.2	-36.4	84.9
Andaman Sea	118,344	67,269 days	111,688	44,423 days	+12.8	-31.6	66.0

* Demersal fish refers to all bottom-dwelling fish including crustaceans and molluscs

** mh = million hours

*** Other pelagic fish refers to all pelagic fishes excluding anchovies

The fishing effort has declined over the past four years in both the Gulf of Thailand and the Andaman Sea; whereas, the catch has increased in demersal fish group both in the Gulf of Thailand and the Andaman Sea and pelagic fish group in the Andaman Sea (see Table 2). Because the decline in effort was greater than the change in catch, the CPUE has increased in all groups.

For demersal fish in the Andaman Sea, because they were being fished under F_{MSY} in 2019, the decrease in catch with decreasing effort is to be expected (see Model results in Appendix B). For the anchovy and pelagic fish in the Andaman Sea, the abundance is higher than MSY level. The demersal fish in the Gulf of Thailand has recovered to a level near MSY; while, for the anchovy and pelagic fish, their abundance is slightly higher than MSY.

However, for the demersal fish in the Gulf of Thailand and pelagic stocks in both the Gulf of Thailand and the Andaman Sea where significant overfishing was taking place, the MSY model predicts that a decrease in effort would result in an increase in catch, but this has

not occurred. For the demersal fish, a complicating factor was that the increase in the mesh size of the trawl cod end to 4 cm could have resulted in decreased catch. More importantly, the MSY model is based on an assumption of equilibrium and does not take into account changes in the environment, such as those associated with climate change, changes in the fish community structure (fishing down the food chain that has been demonstrated to have occurred in Thailand) and the time needed to increase the fish abundance through increased recruitment of young fish. The model is also fitted to a large number of species grouped together, which makes it even more difficult to predict responses to reduced fishing effort.

Stock assessments for 11 single species in both the Gulf of Thailand and the Andaman Sea using length-based methods carried out in 2017 were consistent with the species group assessments.

The main conclusion that can be drawn from the MSY analyses and the CPUE trend of the research trawl surveys is that, although the effort has been reduced and overfishing controlled, the demersal groups in the Gulf of Thailand are still overfished and it will take time to rebuild. However, recent assessment in 2019 showed that all other groups recovered to MSY level (Table 3).

Table 3 Status of the fisheries resources in the Gulf of Thailand and Andaman Sea

	Demersal fish	Anchovy	Pelagic fish
2015			
Gulf of Thailand	Overfishing*	Fished at MSY	Overfishing*
Andaman Sea	Fished at MSY	Fished at MSY	Overfishing*
2017			
Gulf of Thailand	Overfishing controlled Overfished**	Fished at MSY	Overfishing controlled Overfished**
Andaman Sea	Fished at MSY	Fished at MSY	Fished at MSY
2019			
Gulf of Thailand	Overfishing controlled Overfished**	Fished at MSY	Fished at MSY
Andaman Sea	Fished at MSY	Fished at MSY	Fished at MSY

**Overfishing is defined as excessive fishing that has produced a decline of the abundance of spawning fish and consequently low recruitment of young fish back into the population.*

*** Overfished is defined as a stock with an abundance below the sustainable level. A fish resource can remain overfished for a period of time after overfishing has been controlled.*

Quantities of juvenile fish caught

The proportion of low value/trash fish taken by trawls (both otter board and pair trawlers) is high, driven by the demand for trash fish to convert to animal feed (including feed for aquaculture). A significant part of this trash fish in the trawl catches is made up of juveniles of commercially important species that could grow to mature and spawn and also fetch a higher price. No recent reliable data on the catch of these juvenile fish are available, but there is good data on the trends in trash fish catches (Table 4).

Overall, the amount of trash fish taken is declining. However, the amount of trash taken by trawling is still high and appears to be declining only in the otter board trawl catch, due in part to lower numbers of otter board trawlers operating in Thai waters.

Table 4 Trends in the amount of trash fish caught 2010 – 2019

Year	Total Catch (tonnes)	Total trash fish catch (tonnes)	% of total catch	Number of otter board trawlers	Otter board trawl trash (tonnes)	Percent trash	Number of pair trawlers	Pair trawl trash (tonnes)	Percent trash
2010	1,601,320	418,990	26.2	2,511	264,678	44.4	1,096	107,402	50.6
2011	1,610,418	355,813	22.1	2,256	223,041	40.6	1,092	104,621	47.6
2012	1,500,200	321,732	21.5	2,238	179,380	33.9	1,052	100,322	50.6
2013	1,614,536	323,632	20.0	2,075	161,132	30.0	1,026	115,327	50.9
2014	1,488,280	301,942	20.3	1,940	127,535	26.8	982	129,436	59.8
2015	1,317,217	281,027	21.3	1,922	146,155	37.5	978	107,165	52.2
2016	1,343,283	276,122	20.6	2,161	98,003	38.4	1,142	157,433	51.4
2017	1,295,010	268,733	20.8	2,099	81,204	33.7	1,138	165,859	50.5
2018	1,392,931	324,850	23.3	2,023	110,550	44.2	1,126	181,489	49.5
2019	1,410,414	330,467	23.4	2,010	107,537	42.1	1,123	184,056	50.2

2.2 Current status of critical habitats

Approximately 80–90% of mangrove forests along the Gulf of Thailand disappeared between 1975 and 2005 (Thampanya et al., 2006)². The Andaman coast experienced less development pressure than the Gulf of Thailand but losses were also high (20% between 1975 and 2005). There are anecdotal reports on loss of seagrass, but no figures are available. For the

² Thampanya et al (2006) Coastal erosion and mangrove progradation of Southern Thailand. *Estuarine, Coastal and Shelf Science* 68, 75-85

period 2015 to 2017, DMCR reported that the area of mangrove forests, seagrass beds, and coral reefs have remained constant. The status of mangroves has improved slightly due to strong law enforcement over illegally claimed areas. Seagrass beds have also improved slightly with higher percentage cover, while considerably deterioration in coral reefs has occurred due to widespread coral bleaching in 2016 (Table 5).

Thailand currently has 7.3% of its marine waters under some form of marine protected area (MPA) (25,593 km²). These include Fisheries Reserve Areas (41.5%), Environment Protected Areas (37.6%), Marine National Parks (19.1%), Non-hunting Areas (1.7%) and Wetlands (0.1%). There is also 2,550 km² of mangrove reserve area and biosphere reserve.

Table 5 Change in the status of mangrove, sea grass and coral reefs from 2015 to 2017 (DMCR, 2018)

	Area 2015-2017	Status
Mangroves	2,455.34 km ²	- No significant changes in area. - Slightly improved status
Seagrass beds	255.73 km ²	- Area remaining constant. - Slightly improved health condition
Coral reefs	238.33 km ²	- Area remaining constant. - Considerably deterioration in health condition due to coral bleaching

2.3 Fleet profile and catches

Many types of gear (multi-gear) are used to catch many species (multi-species) in Thailand's tropical marine fisheries. Most fishing gears can catch more than 100 species and there are more than 20 types of fishing gear. Further, most fishing vessels are artisanal and support a large number of fishers and fishing communities. This multi-species/multi-gear and artisanal nature of the fishery needs to be taken into account when assessing the status of the resources and applying management measures based in the context of temperate fisheries.

Fishing fleet

Fishing vessels in Thailand are categorized into artisanal and four commercial categories based on size, power and fishing gear (See Appendix C for details). In 2019, there were about 32,529 fishing vessels comprising 21,460 artisanal vessels and 11,069 commercial

vessels. The precise number of artisanal vessels is not known due to some vessels have not been registered yet. Artisanal vessel survey will be carried out in 2020.

Commercial fishing vessels are divided into 2 groups, i.e., vessels operating highly efficient fishing gear and vessels operating low efficient fishing gear. All commercial vessels are required to be licensed. In 2018-2019 fishing license round, a total of 10,645 vessels were licensed (8,690 fishing vessels and 1,955 light luring vessels). Artisanal vessels operating high efficiency gear (i.e. trawls, purse seine, anchovy purse seine and light luring vessel), and dredges also need to apply for commercial fishing license in order to control their efficiency and fishing effort. Registered commercial fishing vessels without fishing license are locked under the Marine Department regulation.

Table 6 Number of fishing vessels by fishing vessel category and fishing gear in Thai marine waters on 1st April 2018

Type of fishing gear	Category of vessel						Total
	Artisanal	Commercial					
		< 10 GT	10-< 30 GT	30-< 60 GT	60-< 150 GT	Extra-large > 150 GT	
Pair trawl		2	3	275	841	5	1,126
Otter board trawl		144	548	794	521	16	2,023
Beam trawl		11	166	204	71	0	452
Purse seine		13	43	161	601	51	869
Anchovy purse seine		3	68	22	86	17	196
Anchovy falling net		0	162	296	117	0	575
Anchovy lift net		0	13	20	0	0	33
Light luring vessel		70	1,706	178	1	0	1,955
Total high efficiency		243	2,709	1,950	2,238	89	7,229
Total low efficiency	21,154	63	2,125	1,053	169	6	3,416
Total	21,154*	306	4,832	3,003	2,407	95	10,645

* estimated from the number of registered artisanal vessels in the 2015 survey

Fish catch

The total catch for the Thai fishing fleet was calculated from statistic data, fishing logbook and landing survey data. The total catch in 2019 was 1,410,666 tonnes comprised 1,410,415 tonnes inside Thai waters, increase from 1,317,217 tonnes in 2015, and 251 tonnes outside Thai waters. The Gulf of Thailand catch was 73.7% of the total Thai waters. The bulk of the catch in Thai waters comes from commercial vessels – 88.4% of the total catch in the Gulf of Thailand and 89.1% in the Andaman Sea. Overall, commercial vessels accounted for 88.6% of the total catch (Table 7).

Table 7 Total catches (tonnes) in 2019

Resources	Gulf of Thailand		Andaman Sea		Outside Thai waters
	Artisanal	Commercial	Artisanal	Commercial	
Demersal fish	88,788	545,140	30,184	175,491	139
Anchovies	1,860	110,076	1	31,281	-
Other pelagic	30,303	263,891	10,327	123,073	112
Subtotals	120,951	919,107	40,512	329,845	251
Totals	1,040,058		370,357		
	Artisanal		Commercial		
Totals	161,463		1,248,952		251
Grand total	1,410,666				

Catch composition by vessel category and species groups

The artisanal fishery takes a wide range of species (Figure 4), the major categories being pelagic fish, demersal fish, squid, and a large group of “other” catch. These “others” consist of mantis shrimp, shellfishes, crabs, jellyfish, sergestid shrimp, sea cucumber, etc. The commercial catch consists of pelagic fish, demersal fish, anchovies, and trash fish. The largest group is pelagic fish, which makes up 31% of the total.

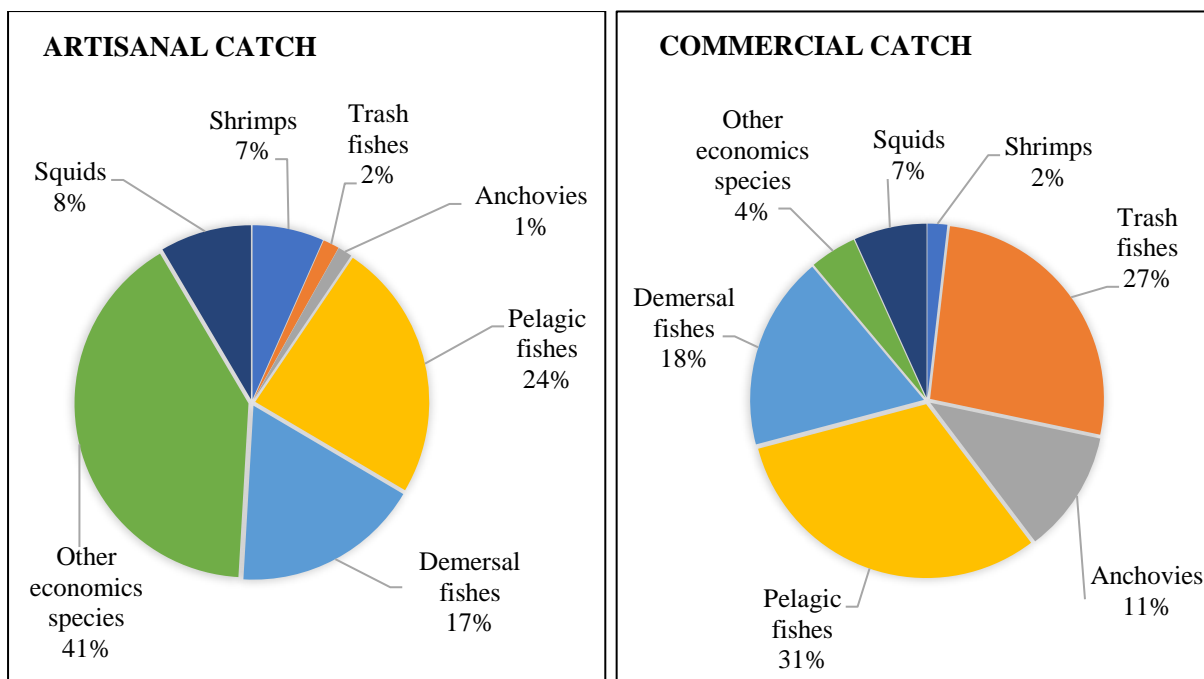


Figure 4 Catch composition of the artisanal and commercial fleets in 2019 (DOF 2019)

Trash fish made up 27% of the commercial catch in 2019, but only 2% of the artisanal catch. Trash fish has accounted for 20-26% of the total catch in Thailand marine waters between 2010 and 2019 (see Table 4). Trash fish are taken mainly by trawling (pair trawls and otter board trawls), and these gears account for 80-90% of all the trash fish caught. Pair trawling catches has the highest percentage of trash fish (~ 50%), followed by otter board trawling (~ 30-40%) and then purse seines.

Fishing gears

The main fishing gears used on the commercial vessels are trawls, purse seines and falling nets. Artisanal vessels use a wide variety of fishing gears including gill nets, falling nets, traps and hook and lines. Across the whole fleet, the most common net is the gill net. In 2019, over 1.1 million tonnes (81.1%) of the total catch is taken by high efficiency gears (trawls, anchovy seine/falling/lift nets, and purse seines). The catch from trawls accounts for 45.2% of this total and the catch from purse seines 24.0%. Trawling still dominates the catch in the Gulf of Thailand, while in the Andaman Sea both trawls and purse seines are dominant.

2.4 Current management and measures

Thailand's responsible agencies

Thailand's marine fisheries are managed by the DOF of the Ministry of Agriculture and Cooperatives (MOAC) who also have overall responsibility for fisheries management and

MCS. The DOF has 24 Divisions, six of which are directly involved in marine fisheries management. These include fisheries management policy and planning, control and surveillance, fishing and fleet management, foreign affairs, research and development and information and communication. The DOF also set up a new Fisheries Monitoring Center (FMC) with a new structure in May 2016.

The Thailand Maritime Enforcement Coordinating Center (Thai-MECC) was established in March 1997. THAI-MECC is led by the Royal Thai Navy as the focal point, with another five law enforcement agencies, namely, the Royal Thai Marine Police, Customs Department, Marine Department, DOF and the Department of Coastal and Marine Resources. The THAI-MECC has been upgraded to have full authority at sea, having its own budget and a combined maritime task force. Information is shared through a Maritime Information Sharing System (MISS) manned by personnel from all six agencies.

The Thai government established the Command Center for Combating Illegal Fishing (CCCIF), located at the Royal Thai Navy Command Center, in May 2015. The government also set up Port in-Port out (PIPOs) Centers in 22 coastal provinces, with the goal of improving control of fishing vessels over 30 GT and fishing vessels less than 30 GT that use high efficiency fishing gears. There are currently 30 PIPO centers and 21 forward inspection points (FiPs) at more convenient locations. The PIPO Centers are under the supervision of the Thai-MECC, which also coordinates Anti-IUU Fishing Task Forces in three areas, which are multi-disciplinary inspection teams at sea, ports and seafood processing factories.

The Marine Department is mainly responsible for vessel registrations, vessel use permits, change of vessel type, vessel demolition, seaman books, seafarer's certification and other matters relation to marine safety. Management of the marine environment is the responsibility the Department of Marine and Coastal Resources (DMCR) under the Ministry of Natural Resources and Environment (MNRE).

Current management measures

Thailand's marine fishery is managed through a combination of input controls, technical measures and ecosystem protection and conservation. Input controls consist of limiting the number of vessels using high efficiency gears by allocating licenses to vessels up to total allowable effort (TAE) (see Appendix D for details). In addition, each vessel is allocated a number of allowable fishing days through a fishing day scheme. Fishing for a given vessel is stopped when that limit is reached. There is also a restriction on the number and size of gears that can be used.

Most of the technical management measures that were in place under the Fisheries Act B.E. 2490 (1947) were carried forward into the new Royal Ordinance on Fisheries B.E. 2558 (2015) and its revision B.E. 2560 (2017). Technical measures include protection of spawning stock and juveniles through closed seasons and areas, demarcation zones between artisanal and commercial fisheries, minimum mesh sizes for purse seines, anchovy purse seines, trawls, anchovy lift/falling nets and collapsible crab traps. There is also a ban on the use of push nets except for catching sergestid shrimp.

Artisanal fishing vessels need to be registered but not licensed except those operating high efficiency gear or dredges. Artisanal fishing is managed through co-management activities involving fishing communities, local government and non-government organisations (NGOs). There has been a large number of donor-supported projects over the years, including a large-scale CHARM project between 2002 and 2007 that supported over 200 local fisheries projects. Co-management has continued with projects under Thai Marine Fisheries Master Plan between 2009 and 2018.

The Royal Ordinance on Fisheries B.E. 2558 (2015) also introduced broader measures that included the use of marine protected areas/sanctuaries as a management tool. The new law also provides for much better participation of stakeholders, including the private sector, through a National Fisheries Committee and Provincial Fisheries Committees in each coastal province.

3. ISSUES AND CHALLENGES

The following set of five challenges have been identified through a risk assessment based on their likelihood of occurring and their impact on the sustainable management of Thailand's marine fisheries resources:

1. The need to restore the degradation fishery resources in Thai waters
2. Illegal, unreported and unregulated (IUU) fishing
3. Habitat degradation and declining biodiversity
4. Socio-economic conditions of artisanal fishers and communities that need to be developed
5. Inadequate fisheries management capacity

Table 8 below identifies the core problem and causes of the issues, which were then used to establish management objectives and management measures (Section 5).

Table 8 Issues, core problems and their causes

Issue	Core problem	Cause of the issue
<p>1. The need to restore the degradation fishery resources in Thai waters</p>	<ul style="list-style-type: none"> • Fishing effort needs to be maintained at a level that is commensurate with the MSY • A Large amount of juvenile fish and breeder harvested during spawning season. • Insufficient number of artificial reefs and restocking programs • Lack of information and potential of accessing deep-sea resources in Thai waters • Inadequate capacity for fishing operations, other than trawling, in overseas waters 	<ul style="list-style-type: none"> • Past overfishing of demersal and pelagic fish resources • Time needed for the fish resource to respond to management measures and rebuild • Fisheries with some fishing gear that catches large quantities of juvenile fish of market species • Possible impact of climate change • Changes in the marine ecosystem as a result of “fishing down the food chain” • Insufficient human resource and budget for artificial reefs and restocking • Lack of experience and expertise in gears other than trawls for development of overseas fishing, especially among Thai masters • High cost of overseas fishing • Poor image of overseas Thai vessels
<p>2. Illegal, unreported and unregulated (IUU) fishing</p>	<ul style="list-style-type: none"> • IUU fishing requires ongoing monitoring and control • Traceability systems not yet fully operational • Insufficient cooperation 	<ul style="list-style-type: none"> • Inadequate awareness of the benefits of combatting IUU • Rapid changes in laws, rules and regulations that are difficult to keep up with • Limitations in law enforcement

Issue	Core problem	Cause of the issue
	and collaboration in MCS among ASEAN Member States	<ul style="list-style-type: none"> • Difficulty of MCS in remote areas • Lack of unity in law enforcement and unskilled field officers • Inadequate cooperation and coordination among MCS agencies • Inadequate standard operating procedures (SOP) • Inadequate understanding about RFMOs regulations
3. Habitat degradation and declining biodiversity	Degraded fisheries habitats (mangroves, sea grass and coral reefs) and declining biodiversity	<ul style="list-style-type: none"> • Mangrove <ul style="list-style-type: none"> • Past transformation of mangrove to agriculture and aquaculture area • Land and coastal development • Freshwater intrusion and contamination from waste water and industry • Tourism • Climate Change • Coral reef <ul style="list-style-type: none"> • Fishing in coral reef areas • Tourism • Acidification and rising temperatures (climate change) • Disasters • Sea grass <ul style="list-style-type: none"> • Coastal erosion • Sedimentation • Mangrove deforestation

Issue	Core problem	Cause of the issue
		<ul style="list-style-type: none"> • All habitats <ul style="list-style-type: none"> • Lack of collaboration and coordination among authorities related to habitat protection and restoration • Marine debris <ul style="list-style-type: none"> • Land debris dispersed to sea • Debris from fishing vessels discarded to sea • Debris brought by currents from territorial water • Debris from marine tourism
<p>4. Socio-economic conditions of artisanal fishers and communities that need to be developed</p>	<ul style="list-style-type: none"> • Conflict among fisheries resource users • Limited opportunities for increased share of wealth 	<ul style="list-style-type: none"> • Lack of fishing gear management in overlapping fishing grounds • Management measure cannot be agreed among different groups • Inadequate co-management arrangements for resolving conflicts • Inadequate recognition of the importance of artisanal fisheries • Artisanal fisher well-being dependent on fishing with no alternative livelihoods • Limited access to markets • Inadequate empowerment to negotiate • Lack of infrastructure • Vulnerability to disasters

Issue	Core problem	Cause of the issue
5. Inadequate fisheries management capacity	<ul style="list-style-type: none"> • Difficult accessibility of fisheries data and information • Knowledge and experience in fisheries management inadequate 	<ul style="list-style-type: none"> • Lack of an integrated fisheries management information system (FMIS) • Insufficient time and effort (and funds) allocated to collect and analyze data and information required for fisheries management • Lack of unity of regular reporting requirements and obligations to senior policy staff and the Minister • Inadequate scientific communication skills of scientists • Insufficient human capacity in fisheries management in DOF headquarters and provincial offices

4. FMP LOGICAL FRAMEWORK

This FMP is based on a problem tree analysis of issues, core problems and causes that logically give rise goals, objectives and management measures (Figure 5).

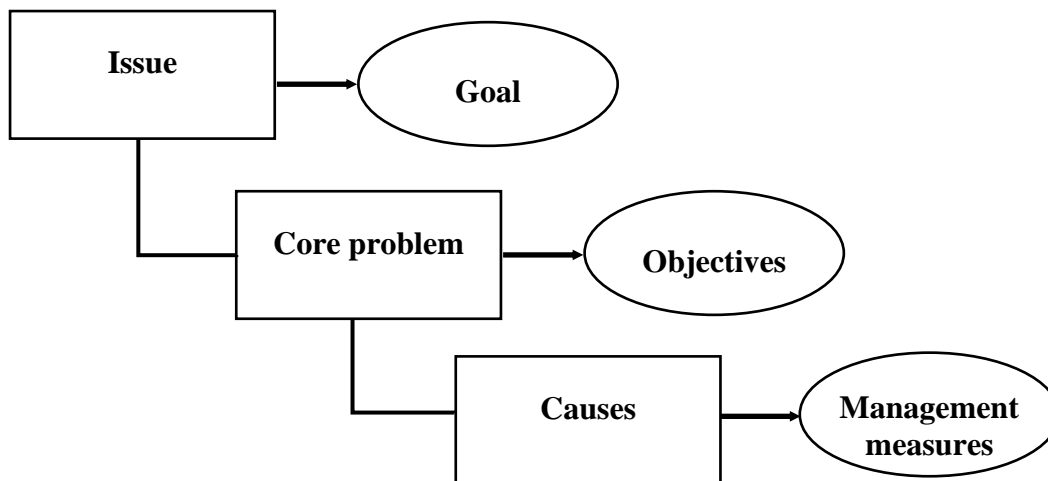


Figure 5 Logical Framework for the FMP (2020-2022)

4.1 Vision, goals and underlying principles

The vision for the future of Thailand marine fisheries is:

Sustainably managed marine fishery that contributes to increased national prosperity, livelihoods and environmental well-being

This broad vision can be broken down into a number of goals that address major issues:

Goals:

1. Fisheries resources restored to a level that can support the MSY in Thai waters and sustainable fishing expanded into deep-sea and overseas waters
2. IUU-free fishery
3. Healthy habitats and environment
4. Improved livelihoods of fishers and fishing communities
5. Effective fisheries management capacity

This FMP is underpinned by a number of key principles:

Key principles

Sustainable development that promotes a balance between ecological well-being (e.g. healthy fish resources and environment) and human well-being (e.g. food security, employment, livelihoods, income) so that the benefits derived from the fisheries are available for future generations;

Ecosystem approach to fisheries management that implements sustainable development in the fisheries sector;

Good governance that facilitates the setting of rules and regulations and adequate resources and arrangements for compliance and enforcement;

Participation and transparency that encourages stakeholder participation in both fisheries planning and management, especially artisanal fishers and fishing communities;

Adoption of international best practice and regional cooperation with neighboring countries;

Science-based decision-making that ensures fisheries management decisions are based on the best available information;

Balance between fishing capacity and fisheries resources to maintain or restore fish stocks to a level capable of producing the maximum sustainable yield (MSY);

Adaptive management that embraces change through learning and adapting; and

Precautionary approach that does not delay action because of lack of information and applies management cautiously when uncertainty exists (e.g. uncertainty in the MSY estimate).

4.2 Scope

Fisheries policies under the Royal Ordinance on Fisheries B.E. 2558 (2015) consist of 1) Policy for the development of fisheries in Thai waters; 2) Policy for the promotion, development and resolution of problems pertaining to fisheries outside of Thai waters; 3)

Policy for the country's aquaculture development; and 4) Policy for the development of the country's related fisheries industries covering fisheries industry's value chain.

This FMP is developed under the Policy for the development of fisheries in Thai waters and the Policy for the promotion, development and resolution of problems pertaining to fisheries outside of Thai waters. The FMP covers managing fishing and fisheries resources, establishing a system of good governance in order to ensure sustainable use as determined by the examination of best scientific evidence and balanced by economic, social and environmental considerations, promoting the participation of all stakeholders in the management and conservation of aquatic animal resources, and also ensuring that fisheries resources are maintained or restored to a level that can produce the maximum sustainable yield (Figure 6). Moreover, the FMP relates to developing and promoting deep-sea fishery in Thai waters, in order to cover sustainable use of fisheries resources in Thai waters, as well as overseas fisheries in the context of responsible use of fisheries resources from overseas fisheries. On the other hand, inland fisheries management plan, aquaculture development plan, and fisheries-related industry development plan is excluded from this FMP.

The FMP (2020-2022) applies to all marine capture fisheries taken by both artisanal and commercial vessels in Thai waters (including the territorial waters out to 12nm and the Thailand exclusive economic zone (EEZ)) as well as marine capture fisheries conducted by Thai vessels in the territorial waters and EEZs of other States and the high seas. In Thai waters the fishing areas are those in the east (Gulf of Thailand) and those to the west (Andaman Sea) (Figure 7).

The FMP covers the species of:

- All pelagic species;
- All demersal species;
- All highly migratory tuna and tuna-like species (often managed under a RFMO); and
- Other non-target, associate or dependent species taken while fishing, such as endangered and threatened species.

Fisheries Management Plan of Thailand 2020-2022

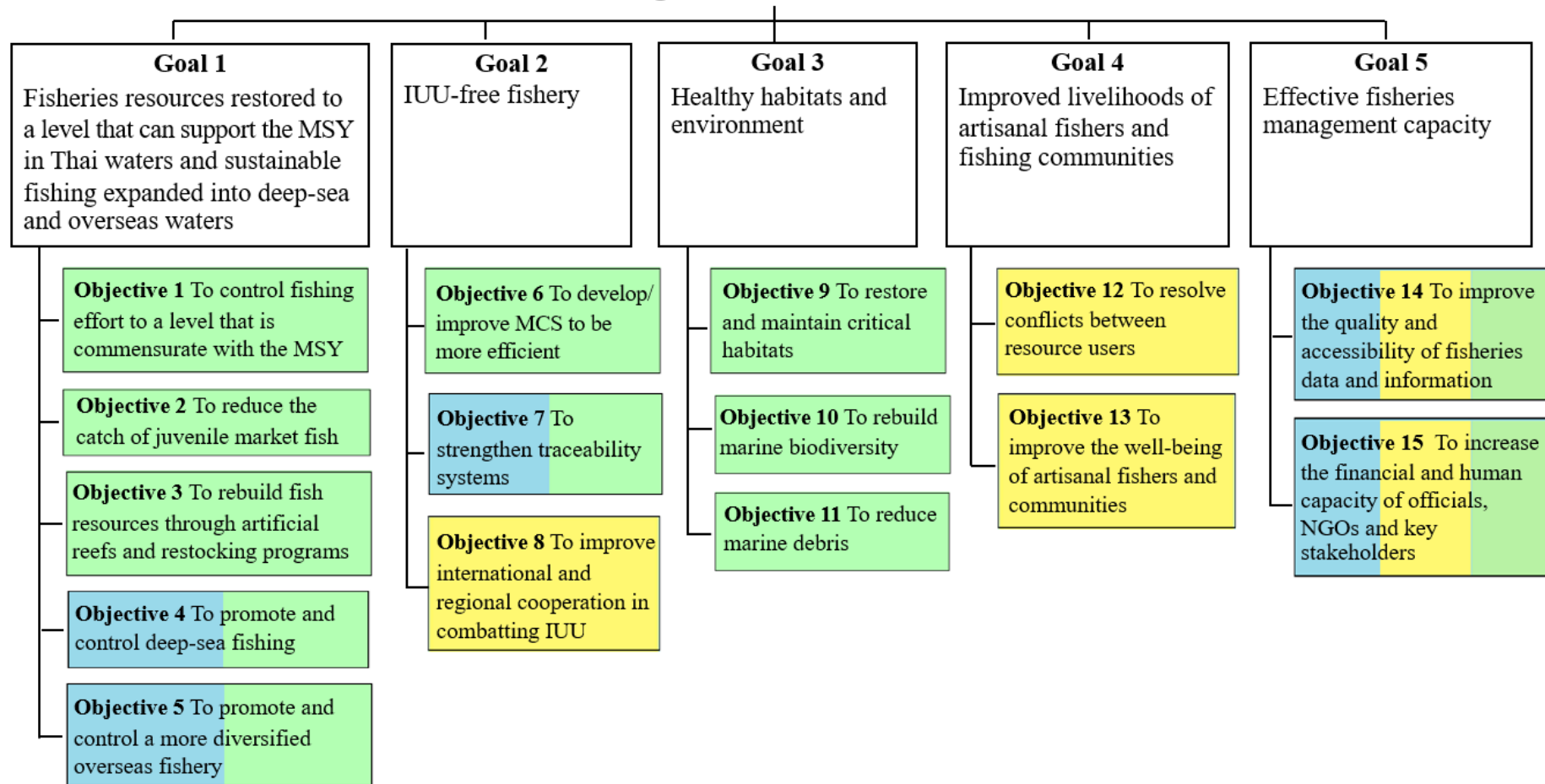


Figure 6 Goals and objectives of the Marine Fisheries Management Plan of Thailand 2020-2022

Remark Economic goal Social goal Environmental goal

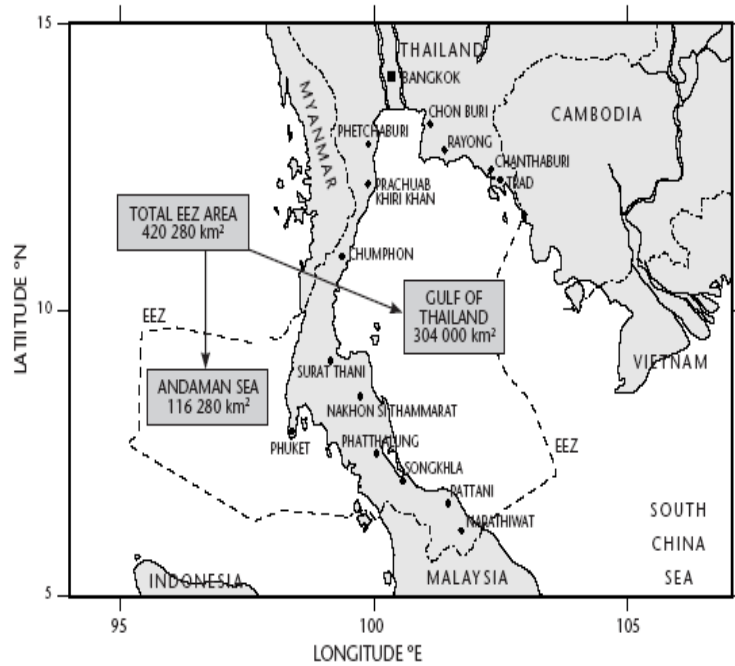


Figure 7 Gulf of Thailand and Andaman Sea marine fishing areas

5. OBJECTIVES, TARGETS AND MANAGEMENT MEASURES

The following section gives an overview of the objectives and management measures need to address the key issues and their causes described in Table 8. The detailed management measures, key performance indicators and timelines to achieve these objectives are presented in Table 9.

Goal: Fisheries resources restored to a level that can support the MSY in Thai waters and sustainable fishing expanded into deep-sea and overseas waters

Objectives:

1. To control fishing effort to a level that is commensurate with the MSY
2. To reduce the catch of juvenile economic species
3. To rebuild fish resources through artificial reefs and restocking programs
4. To promote and control deep-sea fishing
5. To promote and control a more diversified overseas fishery

Objective 1: To control fishing effort to a level that is commensurate with the MSY

Target: To maintain fishing effort below the F_{MSY} for the next three years

The main management measure for this objective is to allocate a limited number of fishing licenses based on the F_{MSY} , as shown in Appendix D. The precautionary approach is used to determine the TAE (set at around 95% of the F_{MSY} in 2018) taking into account the uncertainty in the MSY estimate. In addition, each boat is allocated a number of allowable fishing day and fishing is stopped when the limit is reached.

To supplement fishing capacity reduction measures, in consultation with Fisheries Associations and fishers, a new standard for the size and characteristics of fishing gear has been agreed and strictly implemented.

Other management measures being considered include:

- A register of vessels, based on surveys to calculate the accurate number of artisanal fishing vessels;
- A buy-back scheme to remove excess capacity for fishing vessels;
- A license combination scheme, where vessels are removed from the fishery by having its license combined with another vessel;
- Introducing area-based management for selected fisheries, including clams and shrimp; and
- Introducing fishery improvement projects (FIPs) for selected fisheries.

Objective 2: To reduce the catch of juvenile economic species

Target: Reduce the proportion of juvenile caught and landed to 25% of current levels in three years

Technical measures to reduce the catch of juvenile fish include minimum mesh sizes and spatial/temporal closures, along with awareness raising for the fishers. Legal mesh size for trawl net cod end is 4 cm, for purse seines 2.5 cm and for anchovy purse seines 0.6 cm. Push nets are now banned except for catching sergestid shrimp.

Objective 3: To rebuild fish resources through artificial reefs and restocking programs

Target: Increase number of effective artificial reefs at least 10 sites per year and increase community stock enhancement projects 5 communities project per year

To supplement the fleet and fishing effort reduction measures, rebuilding the fish resources will also occur through constructing artificial reefs through private-public partnerships, and involving local communities in restocking schemes. The feasibility of conducting sea ranching on artificial reefs will also be explored.

Objective 4: To promote and control a deep-sea fishery in Thai waters

Target: A sustainable and well-controlled deep-sea fishery developed by 2022

A deep-sea fisheries survey is planned to estimate current biomass of deep-sea demersal and pelagic resources in the Andaman Sea. Sharing the results of the survey will be coupled with demonstrations of appropriate fishing gears and methods. The number of deep-sea licenses will be limited to be commensurate with the estimated MSY.

Objective 5: To promote and control a more diversified overseas fishery

Target: A sustainable and well-controlled overseas fishery be developed by 2021

MCS requirements will include developing the Electronic Reporting System (ERS), and the Electronic Monitoring System (EMS), which will allow continuous monitoring of the vessel's activities - from port to port. The vessels will be authorized to port out and port in only at designated ports. Fishing authorization from a foreign State or an international organization is also required and applicants and the vessel masters are required to be trained on regulations of fishing outside the Thai waters prior to the first port-out, and to maintain consultations with the competent officers over the phone or other media during operations. The collaborations and cooperation with relevant RFMOs will be strengthened.

Diversification of fishing gears and methods will be encouraged through research and sharing of expertise and experience.

Goal: IUU-free fishery

Objectives:

6. To minimize IUU fishing through effective MCS
7. To strengthen traceability systems
8. To improve international and regional cooperation in combatting IUU

Objective 6: To develop/improve MCS to be more efficient

Target: Reduce the level of IUU fishing through MCS arrangements

More detailed management measures to meet the objective of minimizing IUU fishing are contained in Thailand's National Plan of Action to Prevent, Deter and Eliminate IUU (NPOA-IUU). Building on the progress made since 2015, the measures to strengthen MCS in

Thailand will include (i) possible further restructure of MCS activities in DOF; (ii) advanced electronic reporting and monitoring systems, including cameras, sensors and CCTVs for overseas fishing and transshipment vessels; (iii) improved collaboration among MCS agencies with better data and information sharing.

Objective 7: To strengthen traceability systems

Target: All domestic and imported fish and fisheries products traced through the whole supply chain

The main management measure is to further improve Thailand’s electronic traceability system, “PSM Linked and Processing Statement System; PPS” for imported fish control scheme and “Thai Flagged Catch Certification System; TF” for Thai flagged fish control scheme. These IT traceability systems ensure that no IUU fish and fisheries products enters the supply chain. Moreover, Thailand will also continue to collaborate with SEAFDEC for implementation of ASEAN Catch Documentation Schemes (ACDS) to prevent entry of fish and fishery products from IUU fishing into the supply chain of ASEAN Member State (AMS).

Objective 8: To improve international and regional cooperation in combatting IUU

Target: Share IUU information through the regional MCS network

Thailand will continue to provide information on IUU vessels under the regional RPOA-IUU and share the IUU list (blacklist) with other RFMOs. Also, through active participation in regional and sub-regional MCS activities, such as the Gulf of Thailand MCS network, facilitate the sharing of IUU information.

<p>Goal: Healthy habitats and environment</p> <p>Objectives:</p> <ul style="list-style-type: none">9. To restore and maintain critical habitats10. To rebuild marine biodiversity11. To reduce marine debris
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Objective 9: To restore and maintain critical habitats

Target: Increase of mangrove area by 2,000 rai by 2022 and regular monitoring and reporting on sea grass area and coral reef status

To achieve this objective, DOF will collaborate in habitat protection and restoration activities carried out by other agencies at the national, provincial and district levels, especially the DMCR that is the government agency responsible for coastal habitat restoration and management. DOF will also collaborate with on-going Integrated Coastal Management (ICM) activities. DOF is also implementing Ecosystem Approach for Fisheries Management (EAFM) Programs for coastal communities.

Objective 10: To rebuild marine biodiversity

Target: Area covered by MPA increased to 10% by 2022

The MPAs currently in place (Fisheries Reserve Areas, Environment Protected Areas, Marine National Parks, Non-hunting Areas and Wetlands) need to be maintained and controlled. The DMCR is establishing more MPAs with a predicted increase in area to cover 10% of Thai marine waters by 2022.

Objective 11: To reduce marine debris

Target: 120 tonnes/year debris brought from the sea to land

Marine debris is likely to increase and become more severe all in regional and international level. The marine debris problem causes many continuous impacts all socio-economic, tourism image, fishery, and environment, particularly the impact on entangled marine animals or marine debris eaten by marine animals mistakenly for food causing death. The problem in the Gulf of Thailand shows an increasing trend; however, there are very few studies on marine debris particularly the debris on sea floor in the Gulf of Thailand. Therefore, a study and assessment of the amount of debris on sea floor in the Gulf of Thailand should be initiated to be a guideline for planning systematic study on marine debris in Thailand as well as to increase knowledge and understanding about marine debris. This will lead to sustainable management of marine debris problem and reduce the impact of marine debris on fisheries resources.

Goal: Improved livelihoods of artisanal fishers and fishing communities

Objectives:

12. To resolve conflicts between resource users

13. To improve the well-being of artisanal fishers and

Objective 12: To resolve conflicts between resource users

Target: Reduce the incidence of conflicts in all Provinces

Currently, each Province has a demarcation zone where only artisanal vessels are allowed to fish, but it is not easy to police. More detailed demarcation of different gears and areas are required. The Provincial Fishery Committees with the Provincial Governor as Chairperson and consisting of representatives of DOF, DMCR, artisanal, commercial vessels and other key stakeholders need to be strengthened and become a forum for conflict resolution in all coastal provinces. Implementation of community conservation zones will continue.

Objective 13: To improve the well-being of artisanal fishers and fishing communities

Target: Increase the income derived from fishing and marketing fish and fish products by 10% by 2022

The first measure is to calculate how many active artisanal fishing vessels are operating and design a system to allow the maintenance of a register of these vessels. FAO SSF Guidelines are being implemented, especially providing rights to coastal fisheries resources through TURFs. The current work to improve the post-harvest sector will continue, as well as the provision of budget by the government and support for artisanal fishers through the Federation of Thai Fisherfolk Associations.

<p>Goal: Effective fisheries management capacity</p> <p>Objectives:</p> <ul style="list-style-type: none">14. To improve the quality and accessibility of fisheries data and information15. To increase the financial and human capacity of officials, NGOs and key stakeholders

Objective 14: To improve the quality and accessibility of fisheries data and information

Target: Improve data collection and information dissemination systems to a level that can be easily used to monitor the performance of this FMP in two years

The main measure to achieve this objective is to develop a FMIS as a more systematic system for collecting and collating basic fisheries statistics and information. This will involve developing a Portal/database system that links different sources of data for use in both stock assessment and fisheries management that is readily accessible to all.

Objective 15: To increase financial and human capacity of officials, NGOs and key stakeholders

Target: An effective and efficient fisheries management capacity within three years

A range on on-going human capacity building activities are planned, including a human capacity gap analysis, possible restructuring within DOF, increased training and hands-on experience in fisheries management, especially in artisanal fisheries. Training and higher education will be encouraged for key staff and a greater focus on communication skills, especially for scientists.

Table 9 Detailed management measures, Key Performance Indicators (KPIs), timelines, and agencies involved

Objective 1: To control fishing effort to a level that can support the MSY in Thai waters				
Target: To maintain fishing effort below the F_{MSY} for the next three years				
Management measure	KPI	Time frame	Responsible Agencies*	Supporting Agencies*
1. Based on the MSY and F_{MSY} estimates, restrict vessel numbers to a fishing effort not greater than the TAE every two years, giving priority to low efficiency fishing gears	<ul style="list-style-type: none"> Fishing effort of all six species groups does not exceed the TAE (three groups in the Gulf of Thailand and three groups in the Andaman Sea) 	<ul style="list-style-type: none"> 2020-2022 	<ul style="list-style-type: none"> DOF (MFRDD, FRMD) 	<ul style="list-style-type: none"> DOF (LAD) MD
2. Allocate the number of allowable fishing days to each fishing vessel, monitor and control the days that are allowed	<ul style="list-style-type: none"> TAC allocated to and fishing day specified for commercial fishing vessels 100% 	<ul style="list-style-type: none"> 2020-2022 	<ul style="list-style-type: none"> DOF (FMD, FCSD, MFRDD) 	<ul style="list-style-type: none"> NGO NFAT Thai-MECC
3. Obtain an accurate number of commercial and artisanal fishing vessels and maintain a register of vessels	<ul style="list-style-type: none"> Register of vessels is maintained and accessible through the Fishing Info system 	<ul style="list-style-type: none"> 2020-2022 	<ul style="list-style-type: none"> MD DOF (FRMD, ICT) 	<ul style="list-style-type: none"> NFAT FTFA
4. Implement a vessel buyback scheme to remove excess fishing capacity	<ul style="list-style-type: none"> Licensed commercial fishing vessel removed at least 900 vessels 	<ul style="list-style-type: none"> 2021-2022 	<ul style="list-style-type: none"> DOF (MFRDD, FRMD, LAD) 	<ul style="list-style-type: none"> NFAT MD
5. Implement a license combination scheme, where allocated catch of a vessel which will be removed from the fishing system will be	<ul style="list-style-type: none"> Fishing vessels removed from fishing system through license combination scheme at least 50 	<ul style="list-style-type: none"> 2020-2022 	<ul style="list-style-type: none"> DOF (MFRDD, FRMD, LAD) MD 	<ul style="list-style-type: none"> NFAT

combined with another vessel and the abolition of fishing rights where the amount of fish allocated but not caught for use from one vessel is given to the other.	vessels and announcements about the abolition of fishing rights			
6. Continue to restrict vessels to the standard fishing gear	<ul style="list-style-type: none"> Fishing gear inspected to be in line with regulations 	<ul style="list-style-type: none"> 2020-2022 	<ul style="list-style-type: none"> DOF (FMD, FAD, MFRDD) 	<ul style="list-style-type: none"> NFAT Thai-MECC
7. Introduce area-based management to some fisheries	<ul style="list-style-type: none"> Area-based or species-based management 2 areas/species 	<ul style="list-style-type: none"> 2020-2022 	<ul style="list-style-type: none"> DOF (MFRDD) 	<ul style="list-style-type: none"> FPO NFAT DMCR
8. Introduce fishery improvement projects (FIPs) for some fisheries	<ul style="list-style-type: none"> Four fishery improvement projects 	<ul style="list-style-type: none"> 2020-2022 	<ul style="list-style-type: none"> DOF (FCTD, FMD, FRMD, LAD, MFRDD) 	<ul style="list-style-type: none"> NFAT TOFA The Thai Fishmeal Producers Association Thai Feed meal Association Thai Tuna Industry Association Thai Frozen Foods Association Thai Food

				Processors Association <ul style="list-style-type: none"> • Thai Shrimp Association • Purse Seine Fishery Association • NGO (domestic and international)
Objective 2: To reduce the catch of juvenile economic species				
Target: Reduce the proportion of juvenile caught and landed to 20% of current levels in three years				
Management measure	KPI	Time frame	Responsible Agencies*	Supporting Agencies*
1. Maintain or increase the legal mesh size of trawl nets and other gears	<ul style="list-style-type: none"> • 100% of vessels using legal mesh size 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (FMD, MFRDD, FCSD, LAD, FRMD) 	<ul style="list-style-type: none"> • NFAT • FTFA
2. Introduce more seasonal and spatial closures based on research that shows that these times and areas protect juvenile nursery and spawning stock areas	<ul style="list-style-type: none"> • Assessment of seasonal and spatial closures 3 research per year • Number of measures imposed based on the results of research 1 measure per year 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (MFRDD, FRMD, LAD, FPO) 	<ul style="list-style-type: none"> • NFAT • FTFA • University • DMCR
3. Encourage research to find fish meal	<ul style="list-style-type: none"> • Research on effective substitute for 	<ul style="list-style-type: none"> • 2021 	<ul style="list-style-type: none"> • DOF (AFRD) 	<ul style="list-style-type: none"> • DOF (CARD,

substitutes	fish meal 1 topic			IFRD) <ul style="list-style-type: none"> • University • Thai Feed Mill Association
Objective 3: To rebuild fish resources through artificial reefs and restocking programs				
Target: Increase number of effective artificial reefs at least 10 sites per year and increase community stock enhancement projects 5 communities project per year				
Management measure	KPI	Time frame	Responsible Agencies*	Supporting Agencies*
1. Continue to build artificial reefs, especially along the artisanal and commercial fishing border, by encourage private-public partnerships	<ul style="list-style-type: none"> • Increase number of effective artificial reefs at least 10 sites per year 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (MFRDD) • DMCR • FPO 	<ul style="list-style-type: none"> • NFAT • FTFA • NGO
2. Continue with the “Marine Animal Bank” scheme for promoting stock enhancement	<ul style="list-style-type: none"> • 5 communities per year 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (MFRDD, FCSD, FPO) 	<ul style="list-style-type: none"> • FTFA • NFAT • NGO • University
Objective 4: To promote and control a deep-sea fishery in Thai waters				
Target: A sustainable and well-controlled deep-sea fishery developed by 2022				
Management measure	KPI	Time frame	Responsible Agencies*	Supporting Agencies*

1. Conduct and disseminate information on the potential deep-sea resources in the Andaman Sea	<ul style="list-style-type: none"> Report on and dissemination of the survey result at least 1 report 	<ul style="list-style-type: none"> 2021-2022 	<ul style="list-style-type: none"> DOF (MFRDD) 	<ul style="list-style-type: none"> NFAT TOFA
2. Demonstrate deep-sea fishing gears and operations by research vessels and raise awareness of these with the fishing industry	<ul style="list-style-type: none"> Research fishing conducted and results shared with the fishing industry at least 1 time 	<ul style="list-style-type: none"> 2021-2022 	<ul style="list-style-type: none"> DOF (MFRDD) 	<ul style="list-style-type: none"> NFAT TOFA
3. Issue a limited number of licenses to keep fishing effort to a level commensurate with the MSY in deep-sea	<ul style="list-style-type: none"> Number of vessels commensurate with MSY 	<ul style="list-style-type: none"> 2020-2025 	<ul style="list-style-type: none"> DOF (MFRDD, FRMD, FMD, LAD) 	<ul style="list-style-type: none"> NFAT TOFA
Objective 5: To promote and control a more diversified overseas fishery				
Target: A sustainable and well-controlled overseas fishery be developed by 2021				
Management measure	KPI	Time frame	Responsible Agencies*	Supporting Agencies*
1. Explore access arrangements and develop MOUs with coastal States.	<ul style="list-style-type: none"> Access agreements finalized with coastal States 	<ul style="list-style-type: none"> 2020-2022 	<ul style="list-style-type: none"> DOF (FAD, FMD, LAD) 	<ul style="list-style-type: none"> TOFA MFA
2. Issue overseas licenses ensuring strict adherence to Thailand's MCS requirements and those of coastal States and RFMOs	<ul style="list-style-type: none"> All licensed vessels comply with MSC requirements 	<ul style="list-style-type: none"> 2020-2022 	<ul style="list-style-type: none"> DOF (FAD, FMD, FRMD, FAD) 	<ul style="list-style-type: none"> TOFA
3. Encourage diversification of fishing gears and methods by demonstration using research	<ul style="list-style-type: none"> Technical advice given to fisheries associations and fishers 	<ul style="list-style-type: none"> 2020-2022 	<ul style="list-style-type: none"> DOF (MFRDD, FMD, FAD) 	<ul style="list-style-type: none"> TOFA SEAFDEC

vessels and providing technical advice to fisheries associations and fishers				
4. Increase collaboration and cooperation with RFMOs	<ul style="list-style-type: none"> • Report preparation and information sharing • Maintain membership in accordance with the obligations under RFMOs. 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (FAD, FFID, LAD, FRMD) 	<ul style="list-style-type: none"> • TOFA
5. Raise awareness of RFMO conservation and management measures	<ul style="list-style-type: none"> • Training conducted for all new licensees and vessel operators • Prepare public relations media relating to RFMOs' CMM 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (FAD, FRMD, LAD, FMD, MFRDD) 	<ul style="list-style-type: none"> • TOFA • NFAT • RTN
Objective 6: To develop/improve MCS to be more efficient				
Target: Reduce the level of IUU fishing through MCS arrangements				
Management measure	KPI	Time frame	Responsible Agencies*	Supporting Agencies*
I. General measures				
1. Conduct a review of progress against the Thailand National Plan of Action to Prevent, Deter, and Eliminate Illegal, Unreported and Unregulated (Thailand NPOA-IUU) 2015-2019	<ul style="list-style-type: none"> • Review conducted and revised NPOA-IUU produced 	<ul style="list-style-type: none"> • 2020-2021 	<ul style="list-style-type: none"> • DOF (LAD, FAD, MFRDD, FFID, FMD) 	<ul style="list-style-type: none"> • MD • Thai-MECC • RTP • NFAT

<p>2. Continue to strengthen coordination across DOF, DMCR, Customs Department, Marine Police Division, Marine Department, Provincial Administration Department, Ministry of Labor, and Thailand Maritime Enforcement Coordinating Centre (Thai-MECC)</p>	<ul style="list-style-type: none"> • Combined training exercise related to MCS conducted annually 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • Thai-MECC 	<ul style="list-style-type: none"> • RTN • DOF • DMCR • CD • RTP • MD • Department of Provincial Administration • ML
II. Thailand's Coastal State responsibilities				
<p>1. Strengthen MCS in Thai waters through the full implementation of the National Plan of Control and Inspection (NPCI)</p>	<ul style="list-style-type: none"> • The NPCI is fully implemented among all relevant agencies 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • Thai-MECC • DOF (LAD, FCSD, FMD, FFID) 	<ul style="list-style-type: none"> • MD • RTP • DMCR • ML
<p>2. Maintain the fishing information database containing fisher, fishing vessel registration, fishing crews, fishing operators, licenses and fishery infringements</p>	<ul style="list-style-type: none"> • Fishing information database is up-to-date and maintained 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (ICT, LAD, FRMD) 	<ul style="list-style-type: none"> • MD • Thai-MECC • ML • OAG
<p>3. Increase awareness and support for</p>	<ul style="list-style-type: none"> • All local communities aware of 	<ul style="list-style-type: none"> • 2020-2025 	<ul style="list-style-type: none"> • DOF (FCSD, 	<ul style="list-style-type: none"> • FTFA

preventing IUU fishing with local communities.	IUU fishing increased		FFID) • DMCR	• NFAT
III. Thailand's Flag State responsibilities				
1. Maintain the requirement for vessels operating in other States/RFMO must to have a valid authorization from a foreign State or an international organization to fish in their waters	<ul style="list-style-type: none"> • All vessels operating in the EEZ of another State or high seas have a valid permit from that State or RFMO 	• 2020-2022	<ul style="list-style-type: none"> • DOF (FMD, FFID, FRMD, LAD) • MD 	<ul style="list-style-type: none"> • TOFA • RTN
2. Maintain the requirement for all vessels fishing in the waters of another State or on the high seas to have a registration and a license to fish outside Thai waters	<ul style="list-style-type: none"> • All fishing vessels operating in another State's waters or on the high seas have vessel registration and correct vessel permit • All fishing vessels operating in another State's waters or on the high seas have correct fishing license 	• 2020-2022	<ul style="list-style-type: none"> • DOF (FMD, FFID, FRMD, LAD) • MD 	• TOFA
3. Further develop the Electronic Reporting System (ERS), and the Electronic Monitoring System (EMS) and implement on all authorized vessels operating in other State's waters or on the high seas	<ul style="list-style-type: none"> • ERS and EMS working effectively and warning system developed. 	• 2020-2022	• DOF (FMD)	<ul style="list-style-type: none"> • TOFA • DGDA

4. Maintain the integrated database system of Thai vessels operating outside Thai waters	<ul style="list-style-type: none"> • A database system of Thai fishing vessels operating overseas is developed and operational 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (FRMD, ICT) • MD 	<ul style="list-style-type: none"> • RTN • ML
5. Update the database of IUU fishing vessels (Thai blacklist)	<ul style="list-style-type: none"> • Database of Thai blacklist IUU fishing vessels is updated 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (LAD, FMD, FFID) 	<ul style="list-style-type: none"> • MFA • RTP • Thai-MECC • RTN • MD • CD • DMCR
6. Continue with the development of the Observer on board Program for both fishing vessels and transshipment vessels operating outside Thai waters	<ul style="list-style-type: none"> • 30 more training observers • Training on enhanced knowledge of observers • Development of the Observer Reporting System (ORS) 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (FRMD, MFRDD) 	<ul style="list-style-type: none"> • DOF (MFRDD, FFID, FMRD, LAD, FMD,) • SEAFDEC
7. Maintain the requirement that vessels that operate outside Thai waters comply with the law, regulation and rules as prescribed by the State or RFMO where they are fishing	<ul style="list-style-type: none"> • Positive compliance report by coastal States or RFMO. 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (FMD, FFID, FCSD) 	<ul style="list-style-type: none"> • DOF (LAD, MFRDD, FCSD, FDPD) • MFA • DMCR

IV. Thailand's Port State responsibilities				
1. Thailand to implement the FAO Port State Measures Agreement (PSMA)	<ul style="list-style-type: none"> • Report on PSMA requirements met 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (FFID, LAD) 	<ul style="list-style-type: none"> • MFA • TOFA • Thai-MECC • MD • ML • FMO • PAT
Objective 7: To strengthen traceability systems				
Target: All domestic and imported fish and fisheries products traced through the whole supply chain				
Management measure	KPI	Time frame	Responsible Agencies*	Supporting Agencies*
1. Import and export goods must comply with the laws under the CITES convention	<ul style="list-style-type: none"> • No CITES violation goods are imported to or exported from Thailand 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (FFID, LAD, FRMD) 	<ul style="list-style-type: none"> • CD • DNP • DMCR
2. Strengthen traceability to verify the origin of raw material before it enters the whole supply chain.	<ul style="list-style-type: none"> • Traceability systems is improved and strengthen through electronic system 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (FIQD, FFID, FMD, FCTD) 	<ul style="list-style-type: none"> • DOF (ICT, CARD, IFRD, AHRD)
3. Collaborate with SEAFDEC in implementing the ASEAN Catch Documentation Scheme (ACDS)	<ul style="list-style-type: none"> • A functional ACDS implemented and used by ASEAN Member States (Voluntary program) 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • SEAFDEC 	<ul style="list-style-type: none"> • DOF (FIQD, FMD)

Objective 8: To improve international and regional cooperation in combatting IUU				
Target: Share IUU information through the regional MCS network				
Management measure	KPI	Time frame	Responsible Agencies*	Supporting Agencies*
1. Compile and exchange information among States and RFMOs (except VMS data)	<ul style="list-style-type: none"> • Bi-lateral information exchange MOUs are formulated and signed with other coastal States • Information exchange mechanism with coastal State or RFMOs is operational 	<ul style="list-style-type: none"> • 2020-2022 • 2020-2022 	<ul style="list-style-type: none"> • DOF (FAD, FMD, LAD) • DOF (FAD, FFID, FMD) 	<ul style="list-style-type: none"> • MD • RTP • Thai-MECC • ML
2. Exchange information on vessels >24 m through the ASEAN Regional Vessel Record	<ul style="list-style-type: none"> • Up-to-date Thailand information in the Regional Vessel Record 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (FRMD) • MD 	<ul style="list-style-type: none"> • SEAFDEC
3. Continue to provide information on IUU vessels under the RPOA-IUU and share the IUU list (blacklist) with other RFMOs	<ul style="list-style-type: none"> • International IUU fishing vessels list is officially announced • International IUU fishing vessels list is updated annually • Thai IUU fishing vessels list is developed and announced 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (FRMD, FFID, LAD, FAD) 	<ul style="list-style-type: none"> • Thai-MECC • MD • RTP • OAG • MFA
4. Set up a regional information exchange system on IUU violations from AIS/VMS	<ul style="list-style-type: none"> • Active participation in the MCS network initiative and gaining 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (FMD, FAD, FRMD, 	<ul style="list-style-type: none"> • MD • Thai-MECC

through the MCS network initiative	agreements on confidentiality protocols for AIS/VMS information		LAD)	• RTN
Objective 9: To restore and maintain critical habitats				
Target: Increase of mangrove area by 2,000 rai by 2022 and regular monitoring and reporting on sea grass area and coral reef status				
Management measure	KPI	Time frame	Responsible Agencies*	Supporting Agencies*
1. Mangroves, seagrass beds and coral reefs are restored or subject to proper management interventions through collaboration with DMCR and other agencies	<ul style="list-style-type: none"> • Area of mangrove increased • Status of seagrass beds improving • Status of coral reefs improving 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • MD 	<ul style="list-style-type: none"> • DOF (FPO) • DLA • NGO • University
2. Initiate Ecosystem Approach to Fisheries Management (EAFM) Programs for coastal communities	<ul style="list-style-type: none"> • Consultation with the target fishing communities, to find specific fisheries and habitats • Train the local fisher in EAFM • Increase by five EAFM projects per year 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (MFRDD, FCSD, FPO) 	<ul style="list-style-type: none"> • DMCR • DLA

3. Fisheries refugia are managed for Thailand's sustainable fisheries	<ul style="list-style-type: none"> • 2 fisheries refugia established 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF • DMCR 	<ul style="list-style-type: none"> • SEAFDEC • NGO • University
Objective 10: To rebuild marine biodiversity				
Target: Area covered by MPA increased to 10% by 2022				
Management measure	KPI	Time frame	Responsible Agencies*	Supporting Agencies*
1. Through collaboration with DMCR and other agencies, conserve at least 10% of coastal and marine areas consistent with national and international law	<ul style="list-style-type: none"> • MPAs under DMCR are increased to 10% coverage by 2022 • MPAs under DMCR, especially seagrass beds, coral reefs, mangrove and critical habitats for endangered species are maintained • MPAs under DNP, especially marine national parks are maintained 	<ul style="list-style-type: none"> • 2020-2024 • 2020-2024 • 2020-2024 	<ul style="list-style-type: none"> • DMCR • DMCR • DNP 	<ul style="list-style-type: none"> • DOF • DOF • DOF
Objective 11: To reduce marine debris				
Target: 120 tonnes/year debris brought from the sea to land				
Management measure	KPI	Time frame	Responsible	Supporting

			Agencies*	Agencies*
1. Marine debris brought back to the land by commercial fishing vessels	<ul style="list-style-type: none"> At least 60% of commercial fishing vessels bring debris back to land and the amount of debris is recorded 	<ul style="list-style-type: none"> 2020-2022 	<ul style="list-style-type: none"> DOF (FFID, FPO) 	<ul style="list-style-type: none"> NFAT
2. Marine debris bank prototype established at fishing ports	<ul style="list-style-type: none"> Number of marine debris bank prototype at fishing ports along coastal provinces 30 places per year and the amount of debris is recorded 	<ul style="list-style-type: none"> 2020-2022 	<ul style="list-style-type: none"> DOF (FFID, FPO) 	<ul style="list-style-type: none"> NFAT
3. Reduce the use of plastic bag in commercial fishing vessels	<ul style="list-style-type: none"> At least 60% of commercial fishing vessels reduce the use of plastic bag and the amount of debris is recorded 	<ul style="list-style-type: none"> 2020-2022 	<ul style="list-style-type: none"> DOF (FFID, FPO) 	<ul style="list-style-type: none"> NFAT
4. Study on types and amount of marine debris	<ul style="list-style-type: none"> 1 report on types and amount of bottom debris 	<ul style="list-style-type: none"> 2020-2022 	<ul style="list-style-type: none"> DOF (MFRDD) 	<ul style="list-style-type: none"> DMCR University
Objective 12: To resolve conflicts between resource users				
Target: Reduce the incidence of conflicts in all Provinces				
Management measure	KPI	Time frame	Responsible Agencies*	Supporting Agencies*
1. Strengthen Provincial Fisheries Committees to resolve conflicts	<ul style="list-style-type: none"> Provincial Fisheries Committees be able to resolve conflicts in coastal 	<ul style="list-style-type: none"> 2020-2022 	<ul style="list-style-type: none"> DOF (FPO, MFRDD, RFMD, 	<ul style="list-style-type: none"> Local fisheries association

	areas		LAD)	
2. Establish demarcation areas for different gears based on participatory consultations with stakeholders	<ul style="list-style-type: none"> Public consultations undertaken in all provinces Provincial Fisheries Committees in all Provinces provide decisions through stakeholder consultations 	<ul style="list-style-type: none"> 2020-2022 2020-2022 	DOF (FPO, FDPD, SPD, MFRDD, FRMD, LAD)	Local fisheries association
3. Continue to implement community conservation zones	<ul style="list-style-type: none"> At least 10 communities per year 	<ul style="list-style-type: none"> 2020-2022 	DOF (FPO, FCSD MFRDD)	FTFA
4. Develop a VMS warning system to alert entry of commercial vessel into the coastal zone and protected areas	<ul style="list-style-type: none"> Vessel behavior in coastal zone and protected areas is monitored and analyzed 	<ul style="list-style-type: none"> 2020-2022 	DOF (FMD, FCSD)	International NGO
5. Strengthen existing co-management system and involve the fishers in integrated coastal management (ICM) activities	<ul style="list-style-type: none"> Enhanced knowledge of integrated coastal management for communities Number of communities involved in the ICM 	<ul style="list-style-type: none"> 2020-2024 	DOF (FCSD, FPO, MFRDD)	<ul style="list-style-type: none"> FTFA DMCR NGO
Objective 13: To improve the well-being of artisanal fishers and fishing communities				
Target: Increase the income derived from artisanal fishing and marketing fish and fish products by 10% by 2022				
Management measure	KPI	Time frame	Responsible Agencies*	Supporting Agencies*
1. Provide territorial use rights for fishing	<ul style="list-style-type: none"> TURFs allocated to at least 1 	<ul style="list-style-type: none"> 2022 	DOF (FPO, FDPD,	FTFA

(TURFs) to coastal/waterfront areas with equitable, socially and culturally appropriate	community in coastal province		SPD, MFRDD, FRMD, FCSD)	• NGO
2. Establish a system to record and maintain artisanal vessel numbers	<ul style="list-style-type: none"> • Survey of artisanal vessels completed and register developed and maintained 	• 2020-2022	<ul style="list-style-type: none"> • MD • DOF (FPO, FRMD) 	• FTFA
3. Continue to improve the post-harvest sector through appropriate infrastructure and technology investments, value-addition activities, and reduce post-harvest loss and waste reduction as well as increase marketing channels for selling fishery products.	<ul style="list-style-type: none"> • The post-harvest sector has been improving at least 2 fisher communities per year • The fisherman has a marketing channel at least 2 channels. 	• 2020-2022	• DOF (FPO, FITDD)	• FTFA
4. Continue to provide support to groups of fishers and fish-workers and stress the key role that women play in post-harvest activities	<ul style="list-style-type: none"> • Budget and support of fishers and fish-workers groups • Two groups of fisher and fish workers 	• 2020-2022	• DOF (FPO)	• FTFA
Objective 14: To improve the quality and accessibility of fisheries data and information				
Target: Improve data collection and information dissemination systems to a level that can be easily used to monitor the performance of this FMP in two years				
Management measure	KPI	Time frame	Responsible Agencies*	Supporting Agencies*
1. Conduct an analysis of preliminary data and	• One set of data analysis completed	• 2020-2021	• DOF (MFRDD,	• DMCR

information needed to assess progress towards achieving the objectives of the FMP			FDPD, FMD)	<ul style="list-style-type: none"> • MD
2. Develop a FMIS that links different sources of data for use in both stock assessment and fisheries management	<ul style="list-style-type: none"> • Web-Portal accessing system is operational • FMIS that links different sources of data is operational 	<ul style="list-style-type: none"> • 2021-2022 • 2021-2022 	<ul style="list-style-type: none"> • DOF (ICT, FDPD, MFRDD) • DOF (ICT, FDPD, MFRDD, FMD, FRMD) 	<ul style="list-style-type: none"> • University • University
3. Develop a biennial assessment report of progress of the FMP by comparing indicators against the bench marks as outlined in the targets	<ul style="list-style-type: none"> • Biennial assessment report published and disseminated 	<ul style="list-style-type: none"> • 2020-2021 	<ul style="list-style-type: none"> • DOF (FRMD, FDPD) 	<ul style="list-style-type: none"> • DMCR • MD
4. Continue training of provincial and district staff in data collection, verification and collation	<ul style="list-style-type: none"> • Trained motivated provincial and district staff 	<ul style="list-style-type: none"> • 2022 	<ul style="list-style-type: none"> • DOF (FDPD, FMD, FPO) 	<ul style="list-style-type: none"> • FMO
5. Strengthen data quality assurance systems by automatic cross-validating data from different sources	<ul style="list-style-type: none"> • Automatic Data validation systems is in place and operating 	<ul style="list-style-type: none"> • 2022 	<ul style="list-style-type: none"> • DOF (MFRDD, ICT) 	<ul style="list-style-type: none"> • MD • DOF (FIQD, FFID, FMD)
6. Ensure that data required by RFMOs is of high quality and timeliness	<ul style="list-style-type: none"> • Maintain the quality control system in place for data going to RFMOs and all reporting information requirement for RFMOs is on time 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (FMD, FRMD, MFRDD) 	

Objective 15: To increase financial and human capacity of officials, NGOs and key stakeholders				
Target: An effective and efficient fisheries management capacity within three years				
Management measure	KPI	Time frame	Responsible Agencies*	Supporting Agencies*
1. Conduct an analysis between the required system to be in place for effective fisheries management and the current organization structure and the capacity of personnel	<ul style="list-style-type: none"> • Plan for organization improvement • Manpower Capacity Building Program 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (HRD, ASDG) 	
2. Increase training and hands-on experience in fisheries management for stakeholder	<ul style="list-style-type: none"> • Training and knowledge provided for stakeholder; especially in the area of maritime policy and regulation 	<ul style="list-style-type: none"> • 2020-2022 	<ul style="list-style-type: none"> • DOF (HRD, FCSD, FPO) 	<ul style="list-style-type: none"> • NFAT • FTFA • Thai-MECC • MD • ML • DLA
3. Implement continuous capacity development for government officials	<ul style="list-style-type: none"> • Training and knowledge provided for the key staffs; especially in the area of maritime policy and fisheries management 	<ul style="list-style-type: none"> • 2020-2024 	<ul style="list-style-type: none"> • DOF (HRD, FDPD, SPD, FCSD, FPO) 	<ul style="list-style-type: none"> • NFAT • FTFA • Thai-MECC • MD • ML • DLA

*** Acronyms of responsible agencies**

DOF internal agencies

LAD	Legal Affairs Division
FCSD	Fishing Control and Surveillance Division
FIQD	Fish Inspection and Quality Control Division
FDPD	Fisheries Development Policy and Planning Division
HRD	Human Resource Management Division
FRMD	Fisheries Resources Management and Measures Determination Division
FMD	Fishing and Fleets Management Division
FAD	Fisheries Foreign Affairs Division
IFRD	Inland Fisheries Research and Development Division
CARD	Coastal Aquaculture Research and Development Division
MFRDD	Marine Fisheries Research and Development Division
ASDG	Administrative System Development Group
AHRD	Aquatic Animal Health Research and Development Division
AFRD	Aquatic Animal Feed Research and Development Division
FCTD	Fisheries Commodity Standard System and Traceability Division
SPD	Strategy and Planning Division

External agencies

MFA	Ministry of Foreign Affairs
PAT	Port Authority of Thailand
CD	Customs Department
DNP	Department of National Parks, Wildlife and Plant Conservation
MD	Marine Department
DMCR	Department of Marine and Coastal Resources
RTN	Royal Thai Navy
ML	Ministry of Labor
Thai-	Thai Maritime Enforcement Command Center
MECC	
RTP	Royal Thai Police
NFAT	National Fisheries Association of Thailand
TOFA	Thai Overseas Fisheries Association
FTFA	Federation of Thai Fisherfolk Associations
DGDA	Digital Government Development Agency (Public Organization)
DLA	Department of Local Administration

FFID	Fish Quarantine and Fishing Vessels Inspection Division	NGO	Non-governmental Organizations
FITDD	Fisheries Industrial Technology Research and Development Division	OAG	Office of the Attorney General
FPO	Fisheries Provincial Office	FMO	Fish Marketing Organization
ICT	Information and Communication Technology Center		

6. FINANCING

The implementation of the Marine Fisheries Management Plan of Thailand 2020-2022 requires the provision of adequate financial, technical and human resources. The Thai Government will allocate the following budget in order to achieve each of the 2020-2022 FMP objectives (Table 10).

Table 10 Budget for implementing the Marine Fisheries Management Plan of Thailand 2020-2022

FMP objective	Budget (million Baht)			
	2020	2021	2022	Total
<i>Goal: Fisheries resources restored to a level that can support the MSY in Thai waters and sustainable fishing expanded into deep-sea and overseas waters</i>	68,288,500	1,351,274,100	1,354,059,500	2,773,622,100
Objective 1: To control fishing effort to a level that can support the MSY in Thai waters	42,814,000	1,323,314,000	1,323,314,000	2,689,442,000
Measure 1: Based on the MSY and F_{MSY} estimates, restrict vessel numbers to a fishing effort not greater than the TAE every two years, giving priority to low efficiency fishing gears	1,051,000	1,051,000	1,051,000	3,153,000
Measure 2: Allocate the number of allowable fishing days to each fishing vessel, monitor and control the days that are allowed	38,611,000	38,611,000	38,611,000	115,833,000
Measure 3: Obtain an accurate number of commercial and artisanal fishing vessels and maintain a register of vessels	370,000	370,000	370,000	1,110,000
Measure 4: Implement a vessel buyback scheme to remove excess fishing capacity	-	1,280,000,000	1,280,000,000	2,560,000,000
Measure 5: Implement a license combination scheme, where allocated catch of a vessel which will be removed from the fishing system will be combined with another vessel	1,421,000	1,421,000	1,421,000	4,263,000
Measure 6: Continue to restrict vessels to the standard fishing gear	-	-	-	-
Measure 7: Introduce area-based management to some fisheries	310,000	310,000	310,000	930,000

FMP objective	Budget (million Baht)			
	2020	2021	2022	Total
Measure 8: Introduce fishery improvement projects (FIPs) for some fisheries	1,051,000	1,551,000	1,551,000	4,153,000
Objective 2: To reduce the catch of juvenile economic species	1,499,500	1,499,500	5,499,500	8,498,500
Measure 1: Maintain or increase the legal mesh size of trawl nets and other gears	448,500	448,500	448,500	1,345,500
Measure 2: Introduce more seasonal and spatial closures based on research that shows that these times and areas protect juvenile nursery and spawning stock areas	1,051,000	1,051,000	1,051,000	3,153,000
Measure 3: Encourage research to find fish meal substitutes	-	-	4,000,000	4,000,000
Objective 3: To rebuild fish resources through artificial reefs and restocking programs	15,825,000	15,825,000	15,825,000	47,475,000
Measure 1: Continue to build artificial reefs, especially along the artisanal and commercial fishing border, by encourage private-public partnerships	15,000,000	15,000,000	15,000,000	45,000,000
Measure 2: Continue with the “Marine Animal Bank” scheme for promoting stock enhancement	825,000	825,000	825,000	2,475,000
Objective 4: To promote and control a deep-sea fishery in Thai waters	5,000,000	7,285,600	6,051,000	18,336,600
Measure 1: Conduct and disseminate information on the potential deep-sea resources in the Andaman Sea	-	1,234,600	-	1,234,600
Measure 2: Demonstrate deep-sea fishing gears and operations by research vessels and raise awareness of these with the fishing industry	5,000,000	6,051,000	6,051,000	17,102,000
Measure 3: Issue a limited number of licenses to keep fishing effort to a level commensurate with the MSY in deep-sea	-	-	-	-

FMP objective	Budget (million Baht)			
	2020	2021	2022	Total
Objective 5: To promote and control a more diversified overseas fishery	3,150,000	3,350,000	3,370,000	9,870,000
Measure 1: Explore access arrangements and develop MOUs with coastal States.	50,000	50,000	50,000	150,000
Measure 2: Issue overseas licenses ensuring strict adherence to Thailand's MCS requirements and those of coastal States and RFMOs	500,000	500,000	500,000	1,500,000
Measure 3: Encourage diversification of fishing gears and methods by demonstration using research vessels and providing technical advice to fisheries associations and fishers	-	-	20,000	20,000
Measure 4: Increase collaboration and cooperation with RFMOs	2,300,000	2,300,000	2,300,000	6,900,000
Measure 5: Raise awareness of RFMO conservation and management measures	300,000	500,000	500,000	1,300,000
Goal: IUU-free fishery	27,129,800	29,643,000	23,008,000	79,780,800
Objective 6: To develop/improve MCS to be more efficient	24,039,800	24,253,000	17,018,000	65,310,800
I. General measures	335,000	335,000	-	670,000
Measure 1: Conduct a review of progress against the Thailand National Plan of Action to Prevent, Deter, and Eliminate Illegal, Unreported and Unregulated (Thailand NPOA-IUU) 2015-2019	335,000	335,000	-	670,000
Measure 2: Continue to strengthen coordination across DOF, DMCR, Customs Department, Royal Thai Navy, Marine Police Division, Marine Department, Provincial Administration Department, Ministry of Labor, and Thailand Maritime Enforcement Coordinating Centre (Thai-MECC)	-	-	-	-

FMP objective	Budget (million Baht)			
	2020	2021	2022	Total
II. Thailand's Coastal State responsibilities	8,140,800	54,000	54,000	8,248,800
Measure 1: Strengthen MCS in Thai waters through the full implementation of the National Plan of Control and Inspection (NPCI)	-	-	-	-
Measure 2: Maintain the fishing information database containing fisher, fishing vessel registration, fishing crews, fishing operators, licenses and fishery infringements	8,086,800	-	-	8,086,800
Measure 3: Increase awareness and support for preventing IUU fishing with local communities.	54,000	54,000	54,000	162,000
III. Thailand's Flag State responsibilities	3,660,000	11,960,000	5,060,000	20,680,000
Measure 1: Maintain the requirement for vessels operating in other States/RFMO must to have a valid authorization from a foreign State or an international organization to fish in their waters	520,000	520,000	520,000	1,560,000
Measure 2: Maintain the requirement for all vessels fishing in the waters of another State or on the high seas to have a registration and a license to fish outside Thai waters	1,040,000	1,040,000	1,040,000	3,120,000
Measure 3: Further develop the Electronic Reporting System (ERS), and the Electronic Monitoring System (EMS) and implement on all authorized vessels operating in other State's waters or on the high seas	1,000,000	5,000,000	1,000,000	7,000,000
Measure 4: Maintain the integrated database system of Thai vessels operating outside Thai waters	370,000	370,000	370,000	1,110,000

FMP objective	Budget (million Baht)			
	2020	2021	2022	Total
Measure 5: Update the database of IUU fishing vessels (Thai blacklist)	60,000	60,000	60,000	180,000
Measure 6: Continue with the development of the Observer on board Program for both fishing vessels and transshipment vessels operating outside Thai waters	400,000	4,700,000	1,800,000	6,900,000
Measure 7: Maintain the requirement that vessels that operate outside Thai waters comply with the law, regulation and rules as prescribed by the State or RFMO where they are fishing	270,000	270,000	270,000	810,000
IV. Thailand's Port State responsibilities	11,904,000	11,904,000	11,904,000	35,712,000
Measure 1: Thailand to implement the FAO Port State Measures Agreement (PSMA)	11,904,000	11,904,000	11,904,000	35,712,000
Objective 7: To strengthen traceability systems	2,600,000	4,900,000	5,500,000	13,000,000
Measure 1: Import and export goods must comply with the laws under the CITES convention	-	-	-	-
Measure 2: Strengthen traceability to verify the origin of raw material before it enters the whole supply chain.	2,600,000	4,900,000	5,500,000	13,000,000
Measure 3: Collaborate with SEAFDEC in implementing the ASEAN Catch Documentation Scheme (ACDS)	-	-	-	-
Objective 8: To improve international and regional cooperation in combatting IUU	490,000	490,000	490,000	1,470,000

FMP objective	Budget (million Baht)			
	2020	2021	2022	Total
Measure 1: Compile and exchange information among States and RFMOs (except VMS data)	60,000	60,000	60,000	180,000
Measure 2: Exchange information on vessels >24 m through the ASEAN Regional Vessel Record	370,000	370,000	370,000	1,110,000
Measure 3: Continue to provide information on IUU vessels under the RPOA-IUU and share the IUU list (blacklist) with other RFMOs	60,000	60,000	60,000	180,000
Measure 4: Set up a regional information exchange system on IUU violations from AIS/VMS through the MCS network initiative	-	-	-	-
Goal: Healthy habitats and environment	24,940,000	25,460,000	24,940,000	75,340,000
Objective 9: To restore and maintain critical habitats	6,440,000	6,440,000	6,440,000	19,320,000
Measure 1: Mangroves, seagrass beds and coral reefs are restored or subject to proper management interventions through collaboration with DMCR and other agencies	-	-	-	-
Measure 2: Initiate Ecosystem Approach to Fisheries Management (EAFM) Programs for coastal communities	6,440,000	6,440,000	6,440,000	19,320,000
Measure 3: Fisheries refugia are managed for Thailand's sustainable fisheries	-	-	-	-
Objective 10: To rebuild marine biodiversity	8,000,000	8,000,000	8,000,000	24,000,000
Measure 1: Through collaboration with DMCR and other agencies, conserve at least 10% of coastal and marine areas consistent with national and international law	8,000,000	8,000,000	8,000,000	24,000,000

FMP objective	Budget (million Baht)			
	2020	2021	2022	Total
Objective 11: To reduce marine debris	10,500,000	11,020,000	10,500,000	32,020,000
Measure 1: Marine debris brought back to the land by commercial fishing vessels	3,000,000	3,000,000	3,000,000	9,000,000
Measure 2: Marine debris bank prototype established at fishing ports	4,500,000	4,500,000	4,500,000	13,500,000
Measure 3: Reduce the use of plastic bag in commercial fishing vessels	3,000,000	3,000,000	3,000,000	9,000,000
Measure 4: Study on types and amount of marine debris	-	520,000	-	520,000
Goal: Improved livelihoods of artisanal fishers and fishing communities	3,170,000	3,170,000	3,070,000	9,410,000
Objective 12: To resolve conflicts between resource users	900,000	900,000	900,000	2,700,000
Measure 1: Strengthen Provincial Fisheries Committees to resolve conflicts	-	-	-	-
Measure 2: Establish demarcation areas for different gears based on participatory consultations with stakeholders	-	-	-	-
Measure 3: Continue to implement community conservation zones	-	-	-	-
Measure 4: Develop a VMS warning system to alert entry of commercial vessel into the coastal zone and protected areas	-	-	-	-
Measure 5: Strengthen existing co-management system and involve the fishers in integrated coastal management (ICM) activities	900,000	900,000	900,000	2,700,000
Objective 13: To improve the well-being of artisanal fishers and fishing communities	2,270,000	2,270,000	2,170,000	6,710,000
Measure 1: Provide territorial use rights for fishing (TURFs) to coastal/waterfront areas with equitable, socially and culturally appropriate	1,000,000	1,000,000	1,000,000	3,000,000

FMP objective	Budget (million Baht)			
	2020	2021	2022	Total
Measure 2: Establish a system to record and maintain artisanal vessel numbers	370,000	370,000	370,000	1,110,000
Measure 3: Continue to improve the post-harvest sector through appropriate infrastructure and technology investments, value-addition activities, and reduce post-harvest loss and waste reduction	-	-	-	-
Measure 4: Continue to provide support to groups of fishers and fish-workers and stress the key role that women play in post-harvest activities	900,000	900,000	800,000	2,600,000
Goal: Effective fisheries management capacity	550,000	12,550,000	18,825,200	31,925,200
Objective 14: To improve the quality and accessibility of fisheries data and information	370,000	12,370,000	18,645,200	31,385,200
Measure 1: Conduct an analysis of preliminary data and information needed to assess progress towards achieving the objectives of the FMP	50,000	50,000	-	100,000
Measure 2: Develop a FMIS that links different sources of data for use in both stock assessment and fisheries management	-	12,000,000	8,000,000	20,000,000
Measure 3: Develop a biennial assessment report of progress of the FMP by comparing indicators against the bench marks as outlined in the targets	50,000	50,000	-	100,000
Measure 4: Continue training of provincial and district staff in data collection, verification and collation	-	-	375,200	375,200
Measure 5: Strengthen data quality assurance systems by automatic cross-validating data from different sources	-	-	10,000,000	10,000,000

FMP objective	Budget (million Baht)			
	2020	2021	2022	Total
Measure 6: Ensure that data required by RFMOs is of high quality and timeliness	270,000	270,000	270,000	810,000
Objective 15: To increase financial and human capacity of officials, NGOs and key stakeholders	180,000	180,000	180,000	540,000
Measure 1: Conduct an analysis between the required system to be in place for effective fisheries management and the current organization structure and the capacity of personnel	-	-	-	-
Measure 2: Increase training and hands-on experience in fisheries management for stakeholder	180,000	180,000	180,000	540,000
Measure 3: Implement continuous capacity development for government officials	-	-	-	-
Grand total	124,078,300	1,422,097,100	1,423,902,700	2,970,078,100

7. Management mechanism of the plan

7.1 Mechanism of the Thailand FMP

This FMP will operate from 2020 to 2022. During this period the Thailand Department of Fisheries will use this plan to implement the measures and to develop the regulations for the fishery. The FMP will cautiously be reviewed biennially, based on the best scientific information available, with a report to the Minister of Agriculture and Cooperatives and the National Committee on Fisheries Policy on the performance of the fishery against all indicators and benchmarks. An assessment team will be formed and the Fisheries Management Information System, which would be able to alert, monitor and evaluate the performance, will be developed.

7.2 Review of the plan

An evaluation of the performance of this plan against its objectives will be made every second year and submitted to the National Committee on Fisheries Policy. The biennial evaluations may trigger a review and adaptive responses in the management and MCS arrangements.

8. Monitoring and evaluation

Table 11 lists all the critical indicators that need to be monitored to be able to access the success of the FMP 2020 – 2022.

Table 11 Indicators, benchmarks, and data sources for monitoring and evaluation of the Thailand Marine Fisheries Management Plan 2020-2022

Indicator	Benchmark	Data source
<i>Goal: Fisheries resources restored to a level that can support the MSY in Thai waters and sustainable fishing expanded into deep-sea and overseas waters</i>		
<i>Objective 1: To control fishing effort to a level that can support the MSY in Thai waters</i>		
i. Fishing effort	i. Fishing effort below the F_{MSY} for next three years	i. Annual stock assessment based on DOF statistics (MFRDD)

Indicator	Benchmark	Data source
ii. Area-based fisheries management for some species	ii. Area-based management developed and adopted for clams, shrimps, and red frog crab	ii. Management developed through a participatory process with stakeholders (MFRDD)
iii. FIPs developed for some fisheries	iii. FIPs in place for crab fishery, neritic tuna, purse seine fishery, and trawl fishery	iii. Report with activities under the FIPs (FCTD)
<i>Objective 2: To reduce the catch of juvenile economic species</i>		
Percentage of juvenile fish	25% of current level in three years	Port sampling (MFRDD)
<i>Objective 3: To rebuild fish resources through artificial reefs and restocking programs</i>		
i. Number of artificial reefs installed	i. At least 5 artificial reefs per year	i. MFRDD reports
ii. Stock enhancement projects with community participation	ii. At least 5 communities per year	ii. MFRDD reports
<i>Objective 4: To promote and control a deep-sea fishery in Thai waters</i>		
i. MSY of deep-sea resources	i. Fishing effort and license number commensurate with MSY	i. Analysis and sharing of deep-sea resources survey data (MFRDD)
ii. Information on appropriate technologies	ii. Appropriate technology and fishing gear shared with fishing industry	ii. Resource survey conducted by DOF research vessel (MFRDD)
<i>Objective 5: To promote and control a more diversified overseas fishery</i>		
i. MSY of overseas resources	i. Fishing effort and license number commensurate with MSY	i. Analysis and sharing of overseas resource status (RFMOs and coastal States)
ii. Information on appropriate technologies and fishing gears	ii. Appropriate technology and fishing gear shared with fishing industry	ii. Resource survey conducted by DOF research vessel (MFRDD)

Indicator	Benchmark	Data source
<i>Goal: IUU-free fishery</i>		
<i>Objective 6: To develop/improve MCS to be more efficient</i>		
i. Thai waters: Compliance with laws, rules and regulations	i. Level that can be controlled through regular MCS activities	i. Compliance reports (Thai-MECC)
ii. Outside Thai waters: Compliance of Thai-flagged vessels to coastal State and RFMO arrangements	ii. Level that can be controlled through regular MCS activities	ii. Compliance reports (RFMOs, coastal States, Thai-MECC, FMD)
<i>Objective 7: To strengthen traceability systems</i>		
i. Origin of raw material through the whole supply chain	i. All fish caught from Thai flagged vessel and from importation	i. Traceability database (FIQD)
ii. Regional data on origin of fish and fisheries products	ii. Thailand's traceability data available in the ASEAN Catch Documentation Scheme (ACDS)	ii. ASEAN Catch Documentation Scheme (ACDS) (FIQD)
<i>Objective 8: To improve international and regional cooperation in combatting IUU</i>		
i. Information on IUU vessels under the RPOA-IUU and RFMOs	i. Exchange information on IUU vessel list	i. IUU vessel list (Thailand, RPOA-IUU and RFMOs) (FMD, LAD)
ii. Information to share among States and RFMOs (except VMS data)	ii. Information exchange mechanism with coastal State/port State/RFMOs is operational.	ii. Agreed list of relevant data (FMD)
iii. VMS information demonstrating IUU violations through the MCS network	iii. Active participation and information sharing through regional MCS network	iii. VMS information demonstrating IUU violations (FMD)
<i>Goal: Healthy habitats and environment</i>		
<i>Objective 9: To restore and maintain critical habitats</i>		

Indicator	Benchmark	Data source
i. Mangrove and seagrass area	i. Increase of the area of mangrove by 2,000 rai by 2022	i. Report on the surveys of mangrove and seagrass areas (DMCR)
ii. Status of coral reefs	ii. Reports on coral reef status	ii. DMCR reports
iii. Training of local fishers in EAFM	iii. Increase of five community project per year	iii. Training reports (MFRDD)
iv. Establishment of fisheries refugia	iv. Two fisheries refugia	iv. DOF reports
<i>Objective 10: To rebuild marine biodiversity</i>		
Area covered by MPAs	Area of MPA increased to 10% by 2022	DMCR reports
<i>Objective 11: To reduce marine debris</i>		
i. Marine debris brought back to the land by commercial fishing vessels	i. Marine debris brought back to the land by at least 60% commercial fishing vessels	i. DOF reports (FMD)
ii. Marine debris bank prototype at fishing ports	ii. Marine debris bank prototype in coastal provinces 30 places per year	ii. DOF reports (FMD)
Goal: Improved livelihoods of artisanal fishers and fishing communities		
<i>Objective 12: To resolve conflicts between resource users</i>		
i. Demarcation areas for different gears based on participatory consultations with stakeholders	i. Provincial Fisheries Committees in all provinces provide decisions to all stakeholders	i. Reports from Fisheries Provincial Committees (FPO)
ii. Community marine and coastal resource conservation zones	ii. At least 2 communities per year	ii. Reports on community marine and coastal resource conservation zone (MFRDD)

Indicator	Benchmark	Data source
<i>Objective 13: To improve the well-being of artisanal fishers and fishing communities</i>		
i. Income from fishing and marketing	i. Income in 2019	i. Socio-economic surveys
ii. Number of communities obtaining Territorial Use Rights for Fisheries	ii. At least one community in each province.	ii. Community fishing reports (MFRDD)
iii. Number of artisanal fishing vessels	iii. Register developed and maintained	iii. DOF statistics
iv. Number of post-harvest technologies adopted	iv. Number of new technologies	iv. FITDD reports
v. Budget and support for fishers and fish-workers	v. Budget allocated in 2020	v. FITDD reports
<i>Goal: Effective fisheries management capacity</i>		
<i>Objective 14: To improve the quality and accessibility of fisheries data and information</i>		
i. Information on all indicators in a FMFIS	i. FMIS database system developed and web-portal accessing system operational	i. Report on installation and operation of the systems (MFRDD, ICT)
ii. Biennial assessment report	ii. Assessment report published and shared every two years	ii. Assessment report (MFRDD)
<i>Objective 15: To increase financial and human capacity of officials, NGOs and key stakeholders</i>		
i. Gap analysis and possible restructure	i. Gap analysis published in 2020	i. Gap analysis report
ii. Training courses in fisheries management	ii. At least two trainings conducted each year	ii. Training materials

9. Outcome

Thailand will achieve good governance in the management and conservation of marine fisheries resources and promote the participation of stakeholders in order to manage the fisheries resources to maintain appropriate condition and be able to sustainably fishing by economic, social, and environmental considerations in line with the ecosystem-based approach.

The outcome is as followings:

- 1) Maintain fisheries resources at a level that can produce the maximum sustainable yield (MSY) as well as control the level of fishing effort not exceed the level that can produce MSY
- 2) Increase and maintain economic stability in marine fisheries sector and the country's downstream industry
- 3) Improve quality of life and fisher communities, elevate livelihood, and strengthen fishing occupation particularly artisanal fishers

Appendix A: Abbreviations and definitions

Abbreviations

ASEAN	Association of Southeast Asian Nations
CBD	Convention on Biological Diversity
CCCIF	Command Center for Combating Illegal Fishing
CCRF	Code of Conduct for Responsible Fisheries
CHARM	Coastal Habitats and Resources Management Project
CPUE	Catch per unit effort
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DOF	Department of Fisheries, Ministry of Agriculture and Cooperatives
DMCR	Department of Marine and Coastal Resources, Ministry of Natural Resources and Environment
DNP	Department of National Parks and Wildlife and Plant Conservation
F _{MSY}	Fishing effort at the maximum sustainable yield
FAO	Food and Agriculture Organization of the United Nations
FAO SSF Guidelines	FAO Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication
FCCC or UNFCCC	United Nations Framework Convention on Climate Change
FiP	Forward Inspection Points
FIPs	Fisheries Improvement Projects
FMIS	Fisheries Management Information System
ICCAT	International Commission for the Conservation of Atlantic Tunas
ILO	International Labor Organization
IOTC	Indian Ocean Tuna Commission
IUU fishing	Illegal, Unreported and Unregulated Fishing
KPI	Key Performance Indicator
MCS	Monitoring, Control and Surveillance
MPA	Marine Protected Area
MSY	Maximum Sustainable Yield
NESDP	National Economic and Social Development Plan

NPCI	National Plan of Control and Inspection
NPOA-IUU	National Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing
PIPO	Port in – Port out
PSMA	Port State Measure Agreement
Ramsar	Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat
RFMO	Regional Fisheries Management Organization
RPOA-IUU	Regional Plan of Action against IUU Fishing
SDG	Sustainable Development Goal
SEAFDEC	Southeast Asian Fisheries Development Center
SIOFA	Southern Indian Ocean Fisheries Agreement
TAC	Total Allowable Catch
TAE	Total Allowable Effort
TURFs	Territorial Use Rights in Fishing
UNCLOS	United Nations Convention on the Law of the Sea
UNFSA	United Nations Fish Stock Agreement
WCPFC	Western and Central Pacific Fisheries Commission
VMS	Vessel Monitoring System

Definitions

Annual catch limit: The agreed maximum catch from all vessels for a given year. The annual catch level is less than the MSY to take into account uncertainty in the estimate (precautionary approach). Also known as the Allowable Biological Catch (ABC) in Japan and the USA.

https://definedterm.com/allowable_biological_catch

Catch per Unit Effort (CPUE): The amount of catch per one unit effort (also known as catch rate e.g. kilogram/day). When standardized, CPUE can be used as an indicator for measuring the change in the abundance of the fish resources.

<http://www.fao.org/docrep/005/y3427e/y3427e0c.htm>

Fishing effort at MSY (F_{MSY}): The fishing effort needed to catch the MSY.

Maximum Sustainable Yield (MSY): The highest theoretical equilibrium yield that can be continuously taken (on average) from a stock under existing (average) environmental conditions without affecting significantly the reproduction process.

<https://iss-foundation.org/glossary/total-allowable-effort/>

Overfishing: Recruitment overfishing: describes a situation where excessive fishing has produced a decline of the abundance of spawning fish and consequently low recruitment of young fish back into the population. This recruitment overfishing may lead to a temporary or long term collapse of the stock.

Growth overfishing: occurs when too many small fish are being harvested too early in their life history, through excessive fishing effort and poor selectivity (e.g. too small mesh sizes) and the fish are not given enough time to grow to the size that would produce the maximum yield (and price).

www.fao.org/publications/sofia/2016/en/

Overfished: a stock with an abundance below the sustainable level. A fish resource can remain overfished for a period of time after overfishing has been controlled.

www.fao.org/publications/sofia/2016/en/

Management measure: Specific controls applied in the fishery to contribute to achieving the objectives, including technical measures (gear regulations, closed areas and time closures), input controls, output controls and user rights.

<http://www.fao.org/docrep/005/y3427e/y3427e0c.htm>

Marine ranching: Restocking an area to establish a fishery in a new man-made water body, or to increase the yield beyond that achievable with existing natural recruitment. Marine ranching usually implies a degree of ownership of the enhanced stock.

<http://www.fao.org/docrep/008/y4783e/y4783e00.HTM>

Territorial Use Rights in Fishing (TURFs): A fishery management methods that assign rights to individuals and/or groups to fish in certain locations, generally, although not necessarily, based on long-standing tradition (‘customary usage’).

<http://www.fao.org/docrep/005/y3427e/y3427e0c.htm>

Total Allowable Catch (TAC): An output control management measure that sets the limit on the total catch that can be taken from the resource in a given period of time (usually one year). The TAC may be allocated to the stakeholders in the form of quotas as specific quantities or proportions.

<http://www.fao.org/docrep/005/y3427e/y3427e0c.htm>

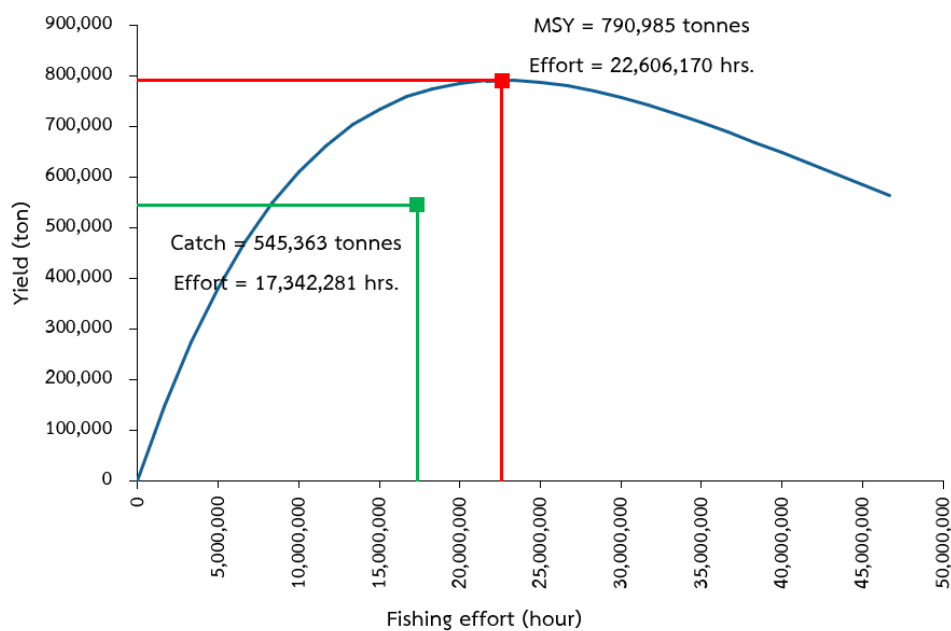
Total Allowable Effort (TAE): An input control measure that specifies the maximum level of fishing effort that can be applied to a fish stock during a specific period, agreed to by fishery managers to achieve certain objectives. It is usually expressed in terms of limits on the number of fishing days and/or the number of operating vessels in the regulated area. It can be allocated as individual transferable quotas. *<https://iss-foundation.org/glossary/total-allowable-effort/>*

Appendix B: Stock assessment results, 2019

1. Demersal fish

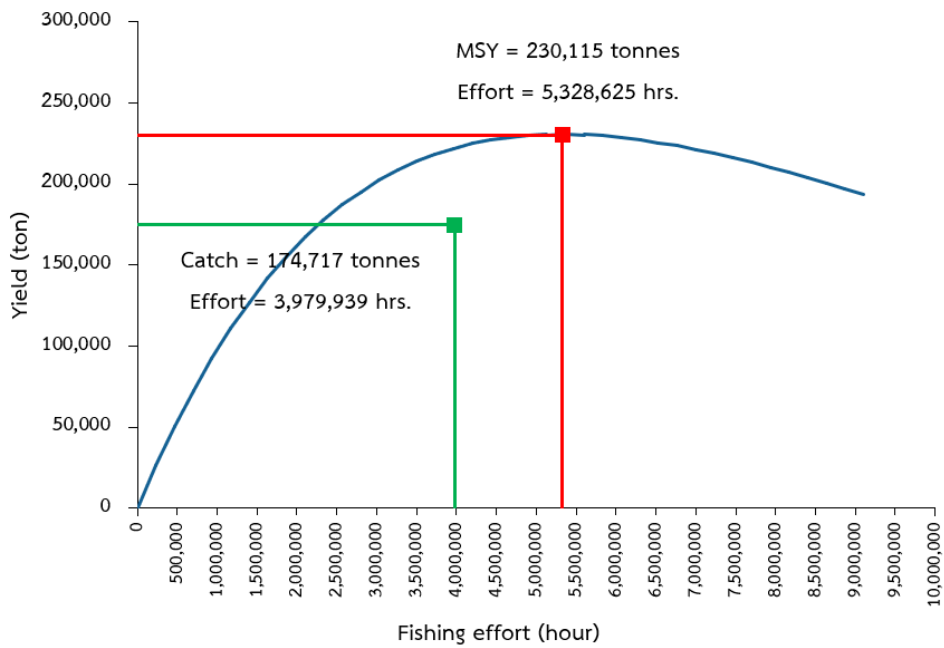
Location	MSY (tonnes)	F _{MSY}	Current Catch (tonnes)	Current Fishing Effort	Current effort as percentage of F _{MSY}
Gulf of Thailand	790,985	22.61 million hours	545,363	17.34 million hours	76.7%
Andaman Sea	230,115	5.33 million hours	174,717	3.98 million hours	74.7%

1.1 Gulf of Thailand



Following a period of severe overfishing in the Gulf of Thailand in the 1990s up to 2015, the fishing effort has now been reduced to a level that produces the MSY. The catch is still less than the MSY, indicating that although overfishing has been controlled, the fisheries resources are still overfished and will take time to recover.

1.2 Andaman Sea

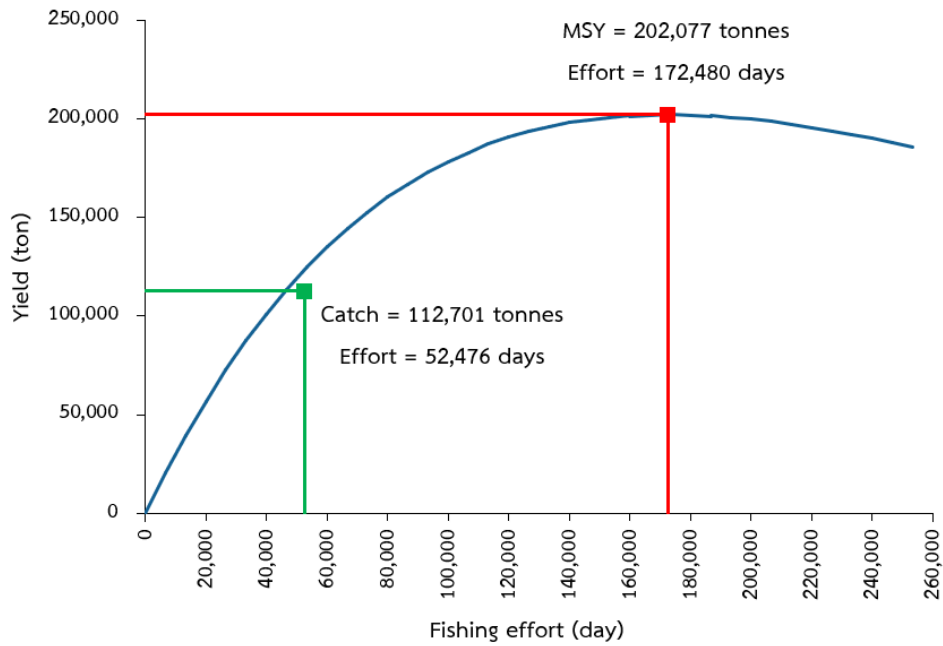


In the Andaman Sea, fishing effort has been reduced to a level below the fishing effort at MSY.

2. Anchovy

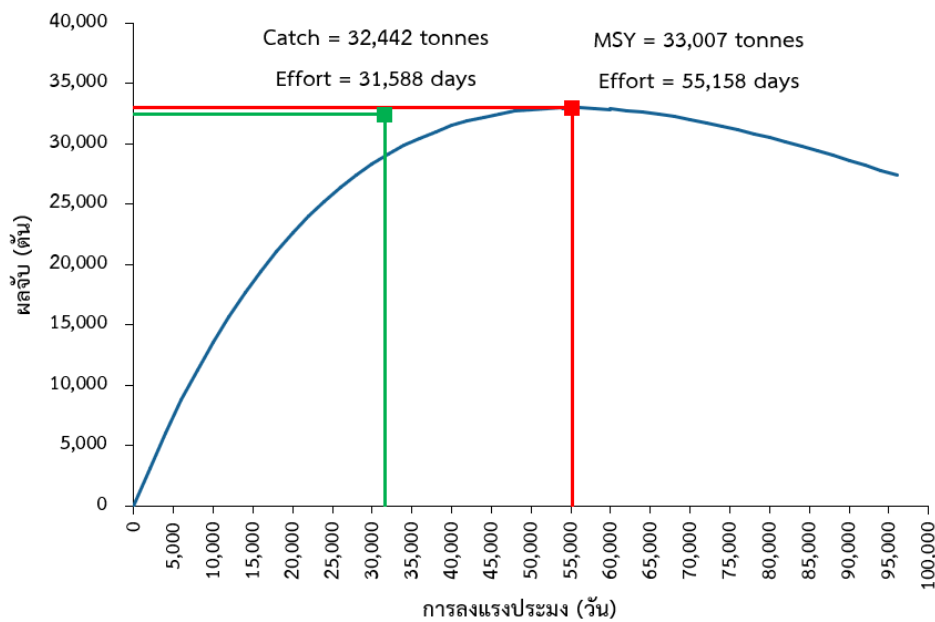
Location	MSY (tonnes)	F _{MSY}	Current Catch (tonnes)	Current Fishing Effort	Current effort as percentage of F _{MSY}
Gulf of Thailand	202,077	172,480 days	112,701	52,476 วัน	30.4%
Andaman Sea	33,007	55,158 days	32,442	31,588 วัน	95.7%

2.1 Gulf of Thailand



Anchovy fishing effort is now at a level well below the effort to produce the MSY.

2.2 Andaman Sea

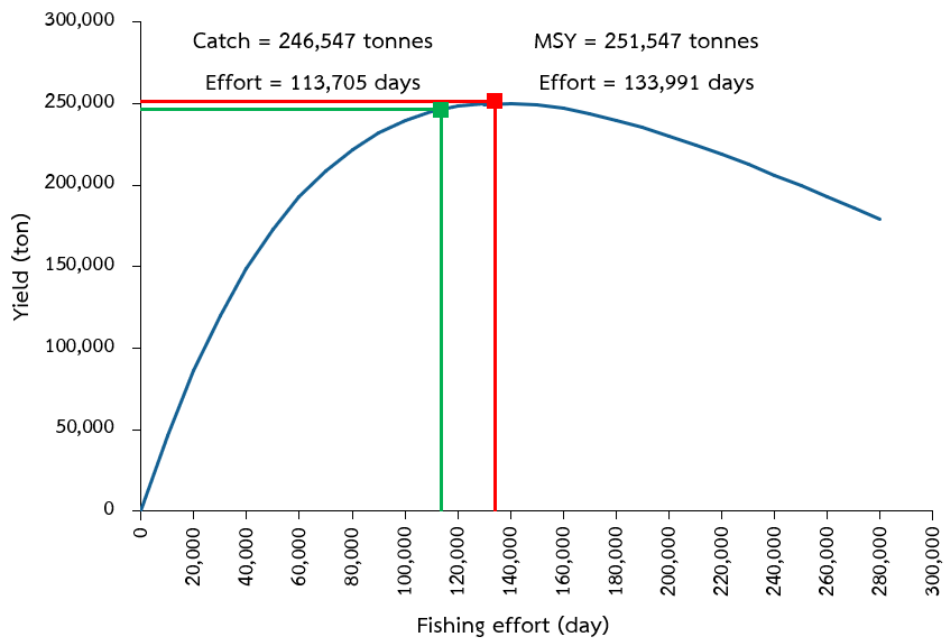


As is the case in the Gulf of Thailand, the fishing effort for anchovies in the Andaman Sea is well below the effort at MSY. Catch of anchovy increased close to MSY level indicating that anchovy has recovered to be high abundance.

3. Pelagic fish

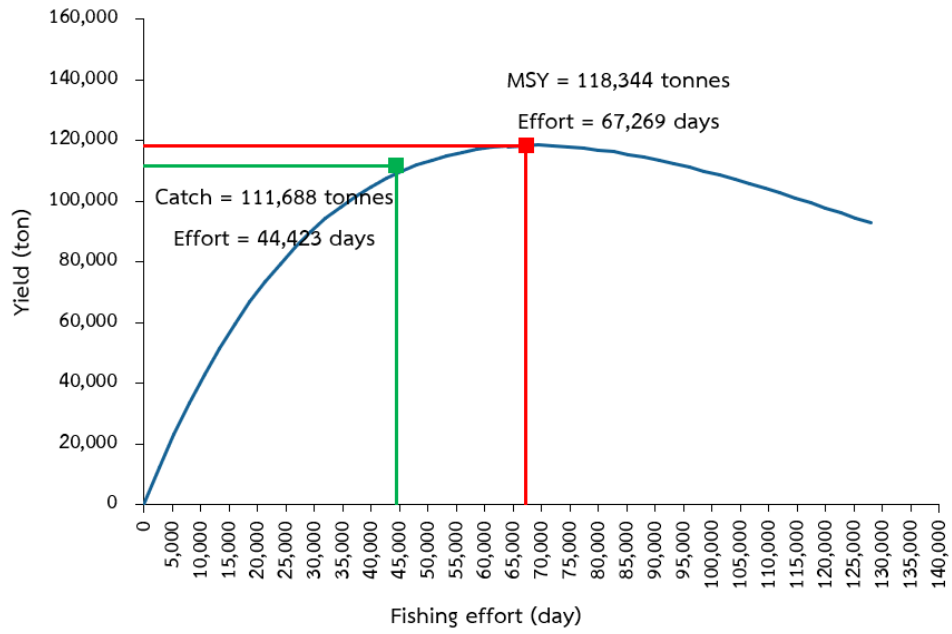
Location	MSY (tonnes)	F _{MSY}	Current Catch (tonnes)	Current Fishing Effort	Current effort as percentage of F _{MSY}
Gulf of Thailand	251,547	133,991 days	246,496	113,705 วัน	84.9%
Andaman Sea	118,344	67,269 days	111,688	44,423 วัน	66.0%

3.1 Gulf of Thailand



Pelagic fish in the Gulf of Thailand were significantly overfished in the 1990s up to 2016. The fishing effort is now below F_{MSY} and catch is close to MSY indicating that overfishing has been controlled and the abundance of pelagic fish is at MSY level.

3.2 Andaman Sea



In the Andaman Sea, the pelagic resources are now being fished at a level commensurate with the MSY.

Appendix C: Categories of fishing vessels in Thailand

Fishing vessel

The fishing fleet is categorized into five categories based on size of fishing vessels (gross tonnage (GT)), engine power (horse power), and gear type (high efficiency and low efficiency gear)

1. Artisanal fishing vessels are fishing vessels < 10 GT* with engine power less than 280 HP
2. Small commercial fishing vessels are fishing vessels between 10 – < 30 GT**
3. Medium commercial fishing vessels are fishing vessels between 30 – < 60 GT
4. Large commercial vessels are fishing vessels 60 – < 150 GT.
5. Extra-large commercial vessels are fishing vessels \geq 150 GT.

* If the HP >280, the vessel is classified as a commercial vessel regardless of GT.

** Any vessel using high efficiency gear is classified as a commercial vessel regardless of size and power.

High efficiency fishing gear	Low efficiency fishing gear
1. pair trawl	1. squid falling net
2. otter board trawl	2. pomfret lift net
3. beam trawl	3. gill net
4. purse seine	4. sergestid shrimp push net
5. anchovy purse seine	5. short-necked clam dredge
6. anchovy falling net	6. blood clam dredge
7. anchovy lift net	7. other shell dredge
8. light luring vessel	8. fish trap
	9. crab trap
	10. squid trap
	11. octopus trap
	12. longline
	13. red frog crab lift net
	14. handline

Support vessel

There is a number of different support vessels operating in Thailand. These include light luring vessels used to attract fish and squid also require a license, transshipment vessels and supply vessels.

Transshipment vessels are classified according to their area of operation.

1. Domestic transshipment vessels are transshipment vessels operating in Thai waters with a vessel capacity of > 30 GT. Ice is used to store and preserve the fish transshipped.

2. Transshipment vessels outside Thai waters are transshipment vessels with a vessel capacity > 60 GT operating outside Thai waters. A freezing system is used to store and preserve the fish transshipped.

Importing vessels

Vessels importing fish into Thailand consist of four types:

1. Thai vessels fishing in the EEZ of another State under an agreement or authorization of that State and brings fish back to Thailand;
2. Thai vessels fishing in the EEZ of another State and flying that State's flag;
3. Foreign fishing vessels that bring fish for sale in Thailand; and
4. Artisanal fishing vessels of neighboring States that land fish in Thailand for sale.

1. Artisanal fishing vessel



2. Small commercial fishing vessel



3. Medium commercial fishing vessel



4. Large commercial fishing vessel



5. Extra-large commercial fishing vessel



6. Support vessels



Inside Thai waters



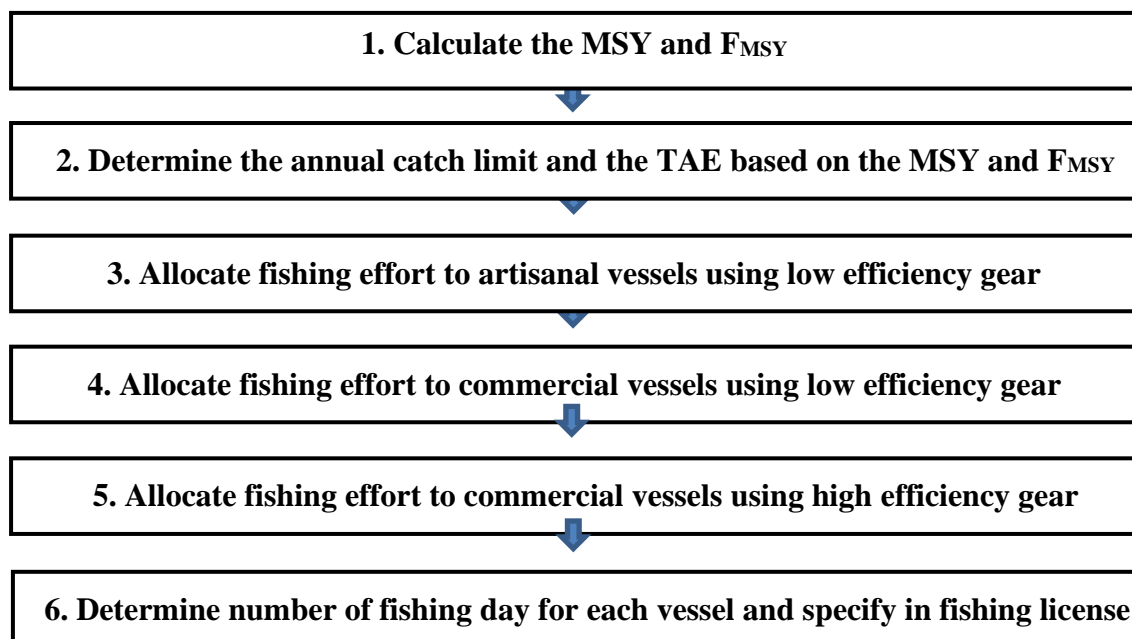
Outside Thai waters

Appendix D: Fleet management: controlling number of fishing vessels through licensing, allowable fishing days and fishing gears

As outlined in the Royal Ordinance on Fisheries B.E. 2558 (2015) and its amendment B.E.2560 (2017) the marine fisheries in Thailand are managed using input controls that limit the number of fishing vessels to ensure sustainable use as determined by the examination of best scientific evidence and balanced by economic, social and environmental considerations, in line with the ecosystem-based approach and precautionary approach. The input controls are also to ensure that fisheries resources are maintained or restored to a level that can produce the maximum sustainable yield, as well as to prevent and eliminate overfishing and overcapacity and ensure that the level of fishing effort does not undermine the sustainability of fisheries resources. Licenses are issued every two years.

The underlying policy for licensing is to protect and assist the artisanal fishers by giving priority to applicants who use low efficiency gears (see Appendix C for the list of these gears). Commercial and artisanal fishing vessels that use high efficiency gears are limited to only one type of fishing gear and handline. Commercial fishing vessels that use low efficiency gears are restricted to a maximum of three with only one of these three fishing gear allowed for each fishing trip. A handline can be used as a fourth fishing gear on all vessels. Artisanal fishing vessels that use low efficiency gears are not required to have a license.

The steps taken to allocate licenses and fishing days are:



The MSY, annual catch limits, and TAEs for issuing licenses for 2018 are shown in Table 1.

Table 1 MSY, annual catch limits, F_{MSY} , TAE, allocated catches and allocated effort for 2018

Group	MSY (tonnes)	Annual catch limit (tonnes)*	F_{MSY}	TAE*	Catch allocated (tonnes)	Fishing effort allocated
Gulf of Thailand						
Demersal	795,869	711,265	22.80 mh**	14.59 mh	688,002	14.11 mh
Anchovy	201,564	169,621	171,378 days	66,766 days	168,641	66,380 days
Pelagic	250,739	230,124	135,882 days	86,125 days	226,018	84,588 days
Andaman Sea						
Demersal	240,916	211,481	5.69 mh	2.77 mh	209,396	2.74 mh
Anchovy	33,194	29,649	55,101 days	31,640 days	28,894	30,835 days
Pelagic	118,755	110,176	71,260 days	36,104 days	98,550	32,294 days

* *Catch and effort limits set at the levels used in 2016*

** mh = million hour

It is important to note that although the catch limit was around 90% of the MSY, because of the nature of the relationship between catch and effort (yield curve) the effort limit was around 55% of the effort at MSY. The allocated catch ranged from 83.0 to 90.1% of the estimated MSY, while the allocated fishing effort ranged from 38.7 to 62.3% of the estimated fishing effort at MSY.

A total of 10,765 fishing vessels applied for a commercial fishing license in 2018 and licenses were issued to 10,645. Commercial vessels using high efficiency gear were allocated 83% of the annual catch limit (Table 2).

Table 2 Summary of catch and effort allocation for 10,645 commercial vessels for 2018-2019 fishing years

Group	Artisanal vessels using low efficiency gear	Commercial vessels using low efficiency gear	Commercial vessels using high efficiency gear	Total allocation
Gulf of Thailand catch allocation (tonnes)				
Demersal	93,764	57,553	536,685	688,002
Anchovy	7,027	-	161,614	168,641
Pelagic	6,854	21,795	197,369	226,018
Andaman Sea catch allocation (tonnes)				
Demersal	46,144	5,519	157,733	209,396
Anchovy	277	-	28,617	28,894
Pelagic	4,544	227	93,779	98,550
Total	158,610	85,094	1,175,797	1,419,501
Percentage	11.17	5.99	82.83	100.00
Gulf of Thailand effort allocation				
Demersal	1.92 mh	1.18 mh	11.01 mh	14.11 mh
Anchovy	2,766 days	-	63,614 days	66,380 days
Pelagic	2,565 days	8,157 days	73,866 days	84,588 days
Andaman Sea effort allocation				
Demersal	0.61 mh	0.07 mh	2.06 mh	2.74 mh
Anchovy	295 days	-	30,539 days	30,834 days
Pelagic	1,489 days	74 days	30,731 days	32,294 days

To supplement fishing capacity reduction measures, in consultation with the Fisheries Association and fishers, a new standard for the number, size and characteristics of fishing gear has been agreed.

Appendix E: Current management measures

A combination of input controls, technical measures and broader ecosystem protection measures are used to manage the marine fisheries in Thai waters. Based on the Royal Ordinance on Fisheries B.E. 2558 (2015) and its amendment in B.E 2560 (2017), the Director General is authorized for issuing DOF notifications on seasonal and area closure. Therefore, adaptive management has been applied in the Thai marine fisheries management.

Input controls

- Licenses issued for commercial vessels up to the TAE based on the MSY and F_{MSY} ;
- Allocation of a number of fishing day for vessels using high efficiency gears; and
- Restrictions on the size and characteristics of fishing gear.

Technical measures

- Seasonal closures to protect Indo-Pacific mackerel and other economic species during their spawning season and juvenile stage in the Gulf of Thailand and the Andaman Sea;
- Demarcation zone where only artisanal vessels are allowed to fish (i.e. commercial fishing vessels are excluded) that ranges from 3 nm to 12 nm along the coast;
- Legal mesh size for trawl net cod end of 4 cm, for purse seines 2.5 cm and for anchovy purse seines 0.6 cm;
- Bans on fishing methods including electric currents, explosives, multi-entrance collapsible trap, set bag nets, push nets except for sergestid shrimp.
- Ban on some fishing gears in some areas, e.g. beam trawl not allowed in Chonburi Province; and
- Control of fishing through zoning, especially for anchovies.

Ecosystem measures

The Department of Marine and Coastal Resources (DMCR) is the government agency responsible for coastal habitat restoration. Management of National Parks is the responsibility of Department of National Parks, Wildlife and Plant Conservation, and mangrove protection is also a responsibility of the Royal Forest Department, all under the Ministry of Natural Resources and Environment. Thailand has 9.81% of its marine waters (territorial waters plus the EEZ) under some form of MPA. Of these, 38.1% are Fisheries Reserve Areas administered by the Thailand DOF.

To supplement the fleet and fishing effort reduction measures, rebuilding the fish resources is also occurring through constructing artificial reefs and restocking schemes. DOF has been installing artificial reefs in both the Gulf of Thailand and the Andaman Sea since 1978. The main objective is to rehabilitate the resources, but they also act as a deterrent from fishing close to the shore and can be very effective in preventing conflict between small-scale and commercial fisheries. Restocking programs have been implemented in the country through the DOF, local administration organizations, provincial agencies, the Electricity Generating Authority of Thailand and other private sector, and government agencies. ‘Crab banks’ are a popular tool for breeding gravid crabs, one of the most important economic species for coastal communities.

Co-management for artisanal fisheries

Artisanal fishing vessels need to be registered but not licensed. Artisanal fishing is managed through co-management activities involving fishing communities, local government and non-government organisations (NGOs). The Provincial Fisheries Committee, in collaboration with the Provincial Fisheries Office, provide a forum to discuss and develop local management arrangements. Trat is one of the first Provinces in the country to conduct a community-based consultative process following the FAO SSF Guidelines to discuss the implication of the Royal Ordinance on Fisheries (2015) for small-scale fisheries. The decisions and compromises made at the meetings of the Provincial Fisheries Committee of Trat, especially when the requests were well justified that included provisions made to minimize fishing impacts on ecosystems, illustrate how responsible fisheries and sustainable development, as promoted in the FAO SSF Guidelines, can potentially be achieved through a community-based consultative process.

Monitoring, control and surveillance (MCS)

Since 2015, a comprehensive set of MCS measures have been implemented to facilitate compliance with the new fisheries law and regulations to prevent and combat IUU fishing. This includes MCS measures at port (Port-In and Port-Out (PIPO) Control Centers), inspections at sea, logbooks, installation of vessel monitoring systems (VMS) for all vessels greater than or equal to 30 GT, observers on board operating outside of Thai waters, and tighter control at seafood processing establishments throughout the whole supply chain. A national traceability system for both marine catch from Thai-flagged vessels and imported fish and fisheries

products to ensure that their origin and movements (from vessels, landing and transport, entry into factories, processing and export) are accurately tracked, monitored and inspected has been developed. Transshipment control has also been strengthened and PSM for foreign-flagged vessels (both fishing and carrier) wishing to land their catch at Thai ports in accordance with the guidelines from FAO and the IOTC have been formalized.

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