

Towards Sustainable Fisheries Development in Southeast Asia: the Twenty-Year Japanese Trust Fund Saga in SEAFDEC

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After the establishment of the Southeast Asian Fisheries Development Center (SEAFDEC) in 1967, the Government of Japan through its Ministry of Foreign Affairs provided funds for the operations of SEAFDEC and the Departments in accordance with the Agreement Establishing SEAFDEC until 2006. In 1998 and in addition to these funds, the Fisheries Agency of Japan started to provide SEAFDEC with the Japanese Trust Fund (JTF). The continued financial assistance from the Government of Japan through the JTF enabled SEAFDEC to pursue the implementation of its regional projects and activities in Southeast Asia.

The Japanese Trust Fund at SEAFDEC

To date, six phases of SEAFDEC projects funded through the Japanese Trust Fund (JTF) had been implemented in the Southeast Asian region starting in 1998 and extending until 2019 (**Box 1**). Throughout this 20-year journey of the JTF at SEAFDEC, a number of activities carried out by the SEAFDEC Secretariat and Departments (SEAFDEC, 2008) had been completed resulting in developed fisheries and aquaculture technologies and transferred to the Southeast Asian countries through enhanced capacity building, as well as policy recommendations and guidelines that were used by the countries to revise their respective laws and regulations for the sustainable development of their fisheries. Under the JTF, the project activities carried out in the region had been formulated taking into consideration the global Code of Conduct for Responsible Fisheries (CCRF) which was regionalized by SEAFDEC starting in 1998 to facilitate its adoption by the Southeast Asian countries, as well as the series of two Resolutions and Plans of Action for Sustainable Fisheries in the ASEAN Region (SEAFDEC, 2001; SEAFDEC, 2011) that were adopted during the *ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security in the New Millennium: “Fish for the People”* in November 2001 and the subsequent *ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 “Fish for the People 2020: Adaptation to a Changing Environment”* in June 2011.

Specifically, the implementation of the projects and activities under the JTF-6 (**Box 1**) had been enhanced following the Joint ASEAN-SEAFDEC Declaration which was adopted during the *High-level Consultation on Regional Cooperation in Sustainable Fisheries Development Towards the ASEAN Economic Community: Combating IUU Fishing and*

Enhancing the Competitiveness of ASEAN Fish and Fishery Products conducted in August 2016 (SEAFDEC, 2016). The most significant advances and achievements attained by SEAFDEC through the implementation of the numerous projects funded by the JTF are summarized in this article.

Regionalization and Promotion of the Code of Conduct for Responsible Fisheries

The SEAFDEC Strategic Plans adopted by the SEAFDEC Council in 1997 on the occasion of the 30th Anniversary of SEAFDEC, included provisions directed towards the sustainable utilization of the region’s fishery resources. The Strategic Plans also outlined policy issues that include the promotion of responsible fisheries in the region taking into consideration the global CCRF which was adopted during the FAO Conference in 1995 (FAO, 1995). Since the global CCRF had not considered some areas related to fisheries development and management applicable in the Southeast Asian region, the SEAFDEC Council in 1998 endorsed the implementation of the proposed Regionalization of the CCRF to be spearheaded by SEAFDEC with funding support from the Government of Japan through the JTF. Regionalization of the CCRF was aimed at clarifying the requirements of the CCRF; identifying and prioritizing the required actions; identifying the issues that require special consideration from the regional point of view; formulating regional policies that would help the Southeast Asian countries in implementing the global CCRF; and facilitating the formulation and implementation by the Southeast Asian countries of national codes of practices for responsible fishing operations, fisheries management, aquaculture, and fisheries post-harvest and trade (Ekmaharaj, 2007).

The outputs of the JTF-funded Regionalization of the CCRF (RCCRF) were published as a series of “Regional Guidelines for Responsible Fisheries in Southeast Asia,” namely: “Responsible Fishing Operations” (SEAFDEC, 2000); “Responsible Fisheries Management” (SEAFDEC, 2003), “Responsible Post-harvest Practices and Trade” (SEAFDEC, 2005); “Responsible Aquaculture” (SEAFDEC, 2001a (1st Ed); SEAFDEC, 2005a (2nd Ed)); and “Supplementary Guidelines on Co-management Using Group User Rights, Fishery Statistics, Indicators and Fisheries *Refugia*” (SEAFDEC, 2006). The Regional Guidelines had since then been used by the Southeast Asian countries, as reference in revising their respective laws and regulations aiming towards the promotion of responsible fisheries and aquaculture. A

Box 1. JTF projects implemented by SEAFDEC in Southeast Asia (1998-2019)

JTF-1: Establishment of Regional Fisheries Policy in Southeast Asia (1998-2003)
<ul style="list-style-type: none"> • Promotion of regional fisheries management (Sec, TD, AQD, MFRD, MFRDMD) • Development of fish disease inspection methodologies for artificially-bred seeds (AQD) • Development of monitoring system for substances contained in fish bodies (Sec, TD, MFRD) • Development of mangrove-friendly shrimp aquaculture in Southeast Asian countries (AQD) • Conservation and management of sea turtles (MFRDMD, TD)
JTF-2: Promotion of Sustainable Fisheries of Migratory Fish Stocks in Southeast Asia (2002-2007)
<ul style="list-style-type: none"> • Information collection for sustainable pelagic fisheries in the South China Sea and Andaman Sea (MFRDMD, TD, MFRD) • Development of demersal fishery resources living in untrawlable fishing grounds in Southeast Asian waters (TD) • Resources research of shared stocks in Southeast Asian waters (TD) • Research for the safety of fisheries products in Southeast Asia (MFRD)
JTF-3: Establishment of Sustainable Regional Fisheries Systems in Southeast Asia (2003-2006)
<ul style="list-style-type: none"> • Environment related task in Southeast Asian region (Sec, MFRD, TD) • Publication to enhance awareness of SEAFDEC activities on sustainable fisheries (Sec) • Collection of information about international support in fisheries in the region (TD) • Towards better utilization and harmonized information for fisheries management in Southeast Asia (Sec)
JTF-4: Promotion of Environment-friendly Regional Developments in Southeast Asia (2004-2009)
<ul style="list-style-type: none"> • Resources Conservation Program: Research and Development (R&D) of stock enhancement for species under international concern (AQD, MFRDMD, TD) • Environment-friendly Aquaculture & Fish Disease Program: Development of fish disease surveillance system & Promotion of sustainable aquaculture (AQD, Sec) • Research for safety of fisheries products in Southeast Asia (MFRD) • Fishing Community Development Program: Capacity improvement of fisheries community on fisheries management and poverty alleviation (TD, Sec)
JTF-5: Promotion of Sustainable Aquaculture and Resource Enhancement (2008-2012)
<ul style="list-style-type: none"> • Promotion of sustainable and region-oriented aquaculture practices (AQD) • Resource enhancement of internationally threatened and over-exploited species in Southeast Asia through stock release (AQD) • Research and management of sea turtles in foraging habitat in the Southeast Asian waters (MFRDMD, TD) • Research and management of sharks and rays in the Southeast Asian waters (MFRDMD, TD) • Rehabilitation of fisheries resources and habitat/fishing grounds for resources enhancement (TD) • Promotion of sustainable fisheries and IUU fishing-related countermeasures in Southeast Asia (TD) • Traceability systems for aquaculture products in the ASEAN region (MFRD) • Accelerating awareness and capacity-building in fish health management in Southeast Asia (AQD) • Food safety of aquaculture products in Southeast Asia (AQD, MFRD)
JTF-6: Promotion of Sustainable Fisheries Management (2013-2019)
<ul style="list-style-type: none"> • Assistance for capacity building in the region to address international fish trade-related issues (Sec) • Improving the data collection of the commercially-exploited aquatic species and threaten species (TD) • Facilitating fisheries activities information gathering through introduction of community-based resources management/co-management (TD) • Harmonization of fishery statistics in Southeast Asian region (Sec) • Promotion of countermeasures to reduce IUU fishing (TD) • Combating IUU fishing in the Southeast Asian region through application of Catch Certification for international trade in fish and fishery products (MFRDMD) • Offshore fisheries resources exploration in the Southeast Asia (TD) • Improving post-harvest technology (MFRD) • Comparative studies for management of purse seine fisheries in the Southeast Asian region (MFRDMD) • Human resource development for sustainable fisheries (TD) • Optimizing energy use and improving safety in fishing activities (TD) • Strengthening SEAFDEC network for sustainable fisheries (Sec) • Reinforcement and optimization of fish health management and the effective dissemination in the Southeast Asian region (AQD) • Environment-friendly, sustainable utilization and management of fisheries and aquaculture resources (AQD) • Research for enhancement of sustainable utilization and management of sharks and rays in the Southeast Asian region (MFRDMD) • Promotion of sustainable fisheries resources enhancement measures in critical habitats/fishing grounds in Southeast Asia (TD) • Enhancement of sustainability of catadromous eel resources in Southeast Asia (IFRDMD) • Promotion of responsible utilization of inland fisheries in Southeast Asia (IFRDMD)

Note: Sec = SEAFDEC Secretariat; TD = SEAFDEC Training Department, MFRD = SEAFDEC Marine Fisheries Research Department, AQD = SEAFDEC Aquaculture Department, MFRDMD = SEAFDEC Marine Fishery Resources Development and Management Department, IFRDMD = SEAFDEC Inland Fishery Resources Development and Management Department



The Regional Guidelines for Responsible Fisheries in Southeast Asia

platform for capacity building of the human and institutional resources of the region was also provided by SEAFDEC with partial funding support from the JTF in 1998-2004, which had enabled the Southeast Asian countries to adopt the Regional Guidelines (Wanchana, 2007).

The efforts of SEAFDEC in regionalizing the CCRF received an outstanding recognition from the international community leading to the awarding of the FAO Margarita Lizárraga Medal for the Biennium 2006-2007 to SEAFDEC during its 40th Anniversary in December 2007. The Medal Award was given to SEAFDEC for its efforts in promoting the adoption of the CCRF in the Southeast Asian region, and specifically for having “served with distinction in the application of the Code of Conduct for Responsible Fisheries through the RCCRF.”

Promotion of Countermeasures to Combat IUU Fishing

The continued practice of illegal, unreported and unregulated (IUU) fishing is a world-wide concern that prompted the international and regional organizations to develop and promote measures and instruments to combat IUU fishing. Developed based on the framework of the global CCRF, the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU) being promoted by FAO, provides the comprehensive, effective and transparent measures to combat IUU fishing which the countries are encouraged to undertake for the sustainability of their fisheries in accordance with international laws.

Patterned after the IPOA-IUU, the EC Regulation 1005/2008 to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (EC IUU Regulation) is also meant to address IUU fishing problems worldwide, by requiring fish and fishery products exported to the European Union (EU) to comply with the EC IUU Regulation. Through its Presidential Task Force on Combating IUU Fishing and Seafood Fraud, the United States is also taking steps to address the IUU problems

worldwide by enforcing the use of risk-based traceability systems that could track seafood from harvest until its entry to the markets in the U.S.A (Silapajarn *et al.*, 2016).

In the Southeast Asian region during the 2000s, many countries have begun to recognize the severity of the impacts of IUU fishing on the sustainable development of their respective fisheries, and thus, have been supporting the initiatives of SEAFDEC in combating IUU fishing in the region. When SEAFDEC embarked on a three-year JTF-funded project “Promotion of Sustainable Fisheries and IUU Fishing-related Countermeasures in Southeast Asia” in 2010 as a rejoinder to the Regional Guidelines for Responsible Fisheries in Southeast Asia: Responsible Fisheries Management, the ASEAN Member States (AMSs) cooperated in the project implementation by promoting in their respective fisheries sectors the need to enhance fishing licensing, boats registration and port State measures as the strategies to combat IUU fishing in the region (Torell *et al.*, 2010; Matsumoto *et al.*, 2012). Since then, SEAFDEC had been working closely with the AMSs through the mechanism established by the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) for the implementation of JTF-funded projects and activities on sustainable fisheries development. The technologies and outputs that emanate from such projects and activities have been disseminated to the region through training, workshops, seminars, and information dissemination activities that mostly received funding from the JTF (Pongsri *et al.*, 2011).

When the implementation of the JTF-funded project “Promotion of Countermeasures to Reduce IUU Fishing” was intensified, the AMSs sustained their efforts to collaborate with SEAFDEC for the development of management tools and measures to combat IUU fishing in the Southeast Asian region and enhance the competitiveness of the ASEAN fish and fishery products (Kawamura and Siriraksophon, 2014; Silapajarn *et al.*, 2016). Such management tools and measures include the: (1) ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain; (2) Regional Fishing Vessels Record Database for Vessels 24 Meters in Length and Over (RFVR Database-24 m); (3) Regional Plan of Action for Management of Fishing Capacity (RPOA-Capacity); (4) Regional Cooperation to Support the Implementation of Port State Measures; (5) ASEAN Catch Documentation Scheme (ACDS) for Marine Capture Fisheries; (6) Regional Guidelines on Traceability System for ASEAN Aquaculture Products; and (7) Strengthening of the Fishery Resources Rehabilitation Strategies to Mitigate the Impacts of IUU Fishing.

ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain

In accordance with the ASEAN-SEAFDEC Resolution and Plan of Action for Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 (RES and POA), SEAFDEC

with funding support from JTF, has been implementing various activities that are directed towards combating IUU fishing in the region. These included “Preventing Export of IUU Fishing Products from the Southeast Asian Region” spearheaded by MFRDMD (Latun *et al.*, 2013), which came up with the *ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain*. This ASEAN Guidelines is aimed at establishing the foundation for the formulation of relevant policies at national level for preventing the entry of IUU fish and fishery products into the supply chain (Kawamura and Siriraksophon, 2014; Latun *et al.*, 2016). In an effort to promote the implementation of the Guidelines in the region, MFRDMD has been assisting the AMSs since 2015, in addressing the issues and concerns that impede the adoption of the Guidelines in their respective countries (Latun *et al.*, 2016a; Silapajarn *et al.*, 2016).

Regional Fishing Vessels Record Database for Vessels 24 Meters in Length and Over

With funding support from the JTF, SEAFDEC convened a series of meetings and consultations to compile the necessary inputs for the development of a regional record of fishing vessels measuring 24 meters in length and over, to be used as a management tool for combating IUU fishing in the region (Matsumoto *et al.*, 2012). Compiled by TD, the information on Regional Fishing Vessels Record (RFVR) would be used to monitor IUU fishing vessels through sharing of information on fishing vessels among the AMSs, initially focusing on large fishing vessels with length from 24 meters and over.

The corresponding RFVR Database, which is an online system is also being managed by TD (Kawamura and Siriraksophon, 2014; Pongsri *et al.*, 2014). Moreover, the RFVR Database includes information on fishing vessels identification and other relevant data comprising the basic 28 elements of fishing vessels that could be shared among the AMSs (Saraphaivanich *et al.*, 2016; Silapajarn *et al.*, 2016).



The RFVR Database for Vessels 24 Meters in Length and Over

Regional Plan of Action for Management of Fishing Capacity

Management of fishing capacity, which is crucial for the sustainability of the fishery resources, has been given focus in the RES and POA. As a result of the series of meetings convened by SEAFDEC with partial funding support from JTF, it was agreed that the *Regional Plan of Action for the Management of Fishing Capacity (RPOA-Capacity)* should be developed as guide for the management of fishing capacity in an ASEAN perspective and to support the AMSs in the development and implementation of their respective National Plans of Action for the Management of Fishing Capacity (Amornpiyakrit and Siriraksophon, 2016; Silapajarn *et al.*, 2016).

Regional Cooperation to Support the Implementation of Port State Measures in the ASEAN Region

During the series of meetings convened by SEAFDEC through TD with support from the JTF, it was agreed that regional cooperation should be established to support the implementation of port State measures, to prevent the entry of illegally-caught fish into the international markets through the countries’ ports. This would also facilitate the adoption by the AMSs, of the newly-ratified Port State Measures Agreement being promoted by FAO (Saraphaivanich *et al.*, 2016a; Silapajarn *et al.*, 2016).

ASEAN Catch Documentation Scheme for Marine Capture Fisheries

With partial support from the JTF, the ASEAN Catch Documentation Scheme (ACDS) for Marine Capture Fisheries is being developed and promoted by SEAFDEC in the region to secure the niche of the ASEAN fish and fishery products in the global market and to serve as a unified framework in enhancing their traceability for effective marine fisheries management (Siriraksophon *et al.*, 2016; Silapajarn *et al.*, 2016). At the initial stage, the ACDS shall be voluntary for all AMSs but could be made mandatory later. Moreover, the implementation of the electronic format of the ACDS (eACDS) is currently being pilot-tested in the AMSs.

Strengthening Fishery Resources Rehabilitation Strategies to Mitigate the Impacts of IUU Fishing

Considering that IUU fishing activities impede the recovery of fish stocks and degrade the fishery resources, SEAFDEC with support from JTF exerted efforts in mitigating the impacts of IUU fishing on the fishery resources by improving critical habitats and enhancing the fishery resources. These had been made possible via the adoption of appropriate strategies for rehabilitating degraded fishery resources that had been developed through the JTF-funded project “Rehabilitation of Fisheries Resources and Habitats/Fishing Grounds through Resources Enhancement” implemented by TD, and “Resource Enhancement of Internationally Threatened and Over-

exploited Species in Southeast Asia through Stock Release” by AQD (Theparoonrat *et al.*, 2016; Silapajarn *et al.*, 2016).

Regional Guidelines on Traceability System for ASEAN Aquaculture Products

From 2010 to 2014, the JTF supported MFRD in the implementation of the project “Traceability Systems for Aquaculture Products in the ASEAN Region” which came up with the *Regional Guidelines on Traceability Systems for Aquaculture Products in Southeast Asia* (Yeap, 2016). Mainly aimed at securing the niche of ASEAN fish and fishery products in the global market, the Regional Guidelines also serves as guide in implementing traceability systems for aquaculture products which had been included as part of the requirements for the trading of these products in the global market, as well as in formulating national programs and activities that aim to promote fishery products’ traceability (Yeap, 2016; Silapajarn *et al.*, 2016).

Conservation of Commercially-exploited Aquatic Species: Sharks and Rays

During the recently-conducted Conferences of Parties (CoP) to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), several species of sharks and rays have been listed in the CITES Appendices. In an attempt to address this concern, SEAFDEC through TD has organized several JTF-funded fora to establish data collection methodology for the assessment of the stocks of sharks and rays in the Southeast Asian region. Although sharks and rays are not target species of the region’s fisheries, a standardized catch per unit effort (CPUE) for specific types of fishing gear, *e.g.* trawl, gill net, purse seine, long line, hand line, had been developed (Chamsai *et al.*, 2013).

Efforts have also been exerted by TD to improve the collection of information on sharks and rays including the compilation of conservation measures to obtain the necessary scientific evidence on the status of the stocks of sharks and rays in Southeast Asia. In order to provide guidance to the AMSs in improving the compilation of their national landings of sharks and rays up to species level, MFRDMD published a number of elasmobranchs taxonomy books and learning materials starting in 2006 (Wanchana *et al.*, 2016). Thus, SEAFDEC with support from JTF continued to organize a series of technical meetings since 2011 to enable the AMSs to develop their respective National Plans of Action on Conservation and Management of Sharks and Rays (NPOA-Sharks) based on the International Plan of Action of the Conservation and Management of Sharks (IPOA-Sharks) promoted by FAO since 1999. Starting in 2015, the JTF also co-funded with the EU-CITES a one-year project on sharks and rays data collection in seven countries of Southeast Asia, which came up with the *Standard Operating Procedures (SOPs) on Sharks Data Collection in Southeast Asia*. The SOPs serves as guide



Training of enumerators for identifying species of sharks and rays

and reference for enumerators from the project participating countries during their activities related to the compilation of the landing data on sharks and rays (Wanchana *et al.*, 2016a).

Conservation of Commercially-exploited Aquatic Species: Sea Turtles

Concerns on the indiscriminate exploitation of sea turtles worldwide had become quite severe prompting the International Union for Conservation of Nature (IUCN) to declare that all species of sea turtles are endangered. To address such concern, SEAFDEC through its MFRDMD embarked in 1998, a 10-year JTF-funded project “Conservation and Management of Sea Turtles” (Mohd. Isa *et al.*, 2008). During its implementation, the project had not only compiled the information on the status of research, conservation and management activities of sea turtles in Southeast Asia, but also established a mechanism for regional collaboration on the research and conservation of sea turtles.

Six of the seven sea turtle species found in the world are inhabiting the Southeast Asian waters (Talib *et al.*, 2003), and the AMSs have exerted efforts to conserve these important aquatic species considered as threatened and faced the risks of being unable to maintain their stocks. The sea turtles found in the region are the leatherback turtle (*Dermochelys coriacea*), green turtle (*Chelonia mydas*), hawksbill turtle (*Eretmochelys imbricata*), olive Ridley (*Lapidochelys olivacea*), loggerhead turtle (*Caretta caretta*), and the flatback turtle (*Natator depressus*). Specifically, these six species are nesting across the Southeast Asian waters except for the flatback which is reported to mostly inhabit the Indonesian waters (Talib *et al.*, 2003).



Leatherback turtle



Green turtle



Hawksbill turtle



Olive Ridley turtle



Loggerhead turtle



Flatback turtle

populations of female green turtles are found in the Southeast Asian waters. In order to guide the Southeast Asian countries in collecting turtle tissue samples, MFRDMD published the *Standard Operating Procedure: Sampling Tissue of Sea Turtles in the Southeast Asian Region* (Syed *et al.*, 2006). In addition, the *Conceptual Framework on Cloning of Sea Turtles* that contains the methodologies and techniques of cloning sea turtles (MFRDMD, 2006) and the *Master Plan: Cloning of Sea Turtles* describing the establishment of advanced reproductive biotechnology and captive breeding for the sustainable management of sea turtles (MFRDMD, 2006a) were published.



Turtle tagging experiments

During the first phase of the project implementation, MFRDMD developed the techniques for sustainable hatchery management of the green turtle that were published in *A Guide to Set and Manage Sea Turtle Hatcheries in the Southeast Asian Region* (Mohd. Isa *et al.*, 2008; Ali *et al.*, 2004).

Since sea turtles are highly migratory, MFRDMD also carried out sea turtle tagging experiments in the waters of many Southeast Asian countries. The outputs of the experiments included information on migration patterns, growth and mortality rates, reproduction and population estimates, among others (Ali *et al.*, 2006), especially for the green, hawksbill and olive Ridley turtles. While the results indicated that these sea turtles share the same resources, MFRDMD was also able to identify their foraging areas in the Southeast Asian region.

TD also collaborated with MFRDMD through the implementation of the activity “Reducing Interactions and Mortality of Sea Turtles due to Fishing.” This led to the development of Turtle Excluder Devices (TEDs) that is suitable for the region and promotion of the TEDs in the Southeast Asian Region through capacity and awareness building leading to the adoption of the TEDs in many Southeast Asian countries (Chokesanguan, 2008).

For the second phase of the project, studies on the stock and population of sea turtles were carried out by MFRDMD. In green turtles, the results showed that their frequency distributions have eight genetically distinct breeding stocks, the female adult green turtles laying eggs at particular nesting beaches belong to one sub-population, and that several sub-



Turtle released from fishing gear installed with TED

The enhanced regional collaboration and partnerships in sea turtle conservation and management in the region has been a significant impact of this JTF-funded project. During the implementation of the project, the ASEAN Network on Sea Turtles was established as a regional task force in the promotion of conservation and management of sea turtles in the region, while the Turtle Database System was developed which had since then been promoted in the Southeast Asian region in cooperation with SEASTAR2000 for the satellite tracking of sea turtles. Results of the studies conducted under the project were compiled and published in the *Conservation and Enhancement of Sea Turtles in the Southeast Asian Region* (Zulkifli *et al.* (eds), 2004). Based on the results of this JTF-funded project, MFRDMD in collaboration with the SEAFDEC Member Countries developed the *Regional Plan of Action of Marine Turtle Foraging Habitats in Southeast Asian Waters* which is meant to ensure that the sea turtles and the ecosystem of their foraging habitats are well managed

and protected, and that poaching of sea turtle eggs in nesting areas is reduced.

Promotion of Selective Fishing Gears

In the promotion of responsible fishing operations in the region, SEAFDEC through TD and with support from the JTF intensified the development of measures and regulations that included the adoption of selective fishing gears and practices in the Southeast Asian countries. Advocated as means of minimizing the catch of juveniles and immature fishes by trawlers, the use of Juvenile and Trash Fish Excluder Devices (JTEDs) had been demonstrated in the region in collaboration with concerned Southeast Asian countries (Tsubata, 2008). The successful demonstration in the Philippines prompted the Philippine Government to issue a regulation on the installation and use of JTEDs in all trawlers operating in the country (Chokesanguan *et al.*, 2010).



Intensifying the Promotion of the Regional Fish Disease Project

With the continued support from the JTF, SEAFDEC has been promoting responsible aquaculture as a long-term strategy for economic development in the Southeast Asian region, considering that aquaculture has the potential of stabilizing the supply of fish and fishery products as production from capture fisheries had been dwindling. Issues and concerns on the sustainability of aquaculture have been continuously addressed by SEAFDEC through AQD so that aquaculture would remain sustainable, technically feasible

and economically viable, as well as environment-friendly and socially equitable (Platon *et al.*, 2007).

One of the major concerns in the promotion of sustainable aquaculture in Southeast Asia is the occurrence and speedy spread of aquatic diseases that could threaten the sustainability of the region's aquaculture industry. In an effort to address this concern, AQD with support from the JTF implemented the "Regional Fish Disease Project" in order that healthy and wholesome aquaculture products are generated from the region's aquaculture sector, and that emerging viral diseases in aquatic animals are prevented and controlled. The Project was implemented in two phases, *i.e.* Development of Fish Disease Inspection Methodologies for Artificially-bred Seeds, and Development of Surveillance Systems of Diseases in Aquatic Animals. Implemented from 2000 to 2005, the "Development of Fish Disease Inspection Methodologies for Artificially-bred Seeds" included a study on the diagnosis of the koi herpes virus (KHV) disease which had caused mass mortalities of carps in the Southeast Asian region threatening the sustainability of the region's freshwater aquaculture industry (Nagasawa, 2005).

Results of the Project Phase 1 included the establishment and standardization of diagnostic methods for the various viral diseases in cultured shrimps and fishes which had caused devastations of the region's aquaculture production. These viral diseases include among others, the white spot syndrome virus (WSSV) of the black tiger shrimp *Penaeus monodon*, and viral nervous necrosis (VNN) of marine fishes (Ogata, 2009). Specifically, the diagnostic methods, *i.e.* polymerase chain reaction (PCR) for the WSSV had been standardized; the methods for preventing and controlling VNN infection in marine fish hatcheries developed; and the husbandry techniques to control the luminous vibriosis caused by *Vibrio* spp., a common bacterial disease that affected the shrimp



aquaculture industry of the region, had been established. The findings from Project have been disseminated to the region through training that includes not only classroom-type training but also distance-learning style that allows the learners to acquire knowledge and skills in fish health management at their respective work stations (Ogata, 2009).

Implemented from 2004 to 2009, the “Development of Fish Disease Surveillance System in Southeast Asia” was aimed at assisting the AMSs in their efforts in fish health management, especially in instituting surveillance systems for important viral diseases for cultured shrimps and fishes. As a result, the countries have developed a well-coordinated network for the timely and efficient reporting on aquatic animal diseases outbreaks in the region (Ogata, 2009), and have sustained their efforts in monitoring and surveillance of the occurrence of emerging aquatic animal diseases. From 2008 to 2012, AQD with support from JTF continued to refine the diagnostic methods and kept abreast with the new preventive methods for emerging aquatic animal diseases.

The recent outbreaks of the acute hepatopancreatic necrosis disease (AHPND) that causes early mortality syndrome (EMS) in shrimps in the region, the newly emerging disease known as the hepatopancreatic microsporidiosis (HPM) caused by enterocytozoon hepatopenaei (EHP) that leads to severe growth retardation in cultured shrimps, and other transboundary diseases that threaten the sustainability of the region’s aquaculture industry, prompted SEAFDEC through AQD with support from JTF, to implement the five-year project “Reinforcement and Optimization of Fish Health Management and their Effective Dissemination” starting in 2013. This five-year project generally aims to address the concerns of the AMSs in preventing and controlling the occurrence of emerging aquaculture diseases (Pakingking and de Jesus-Ayson, 2016). Based on these developments, the SEAFDEC Council of Directors recommended that cooperation among the countries should be strengthened to immediately address the incidence of aquatic animal diseases and that a regional early warning system should be established by SEAFDEC through the AQD in collaboration with the Bangkok-based ASEAN Network of Aquatic Animal Health Centres (ANAAHC) to alert the countries in the region should an outbreak of aquatic animal disease occur in one country.

Maximizing the Utilization of Fish Catch

The full support that the JTF has accorded to SEAFDEC for the promotion of responsible post-harvest practices and trade in the region has enabled the AMSs to advance the production of safe and wholesome fish and fishery products, and maximize the utilization of fish catch. Through the efforts of MFRD, SEAFDEC has been able to assist the region’s fish processing industries in meeting the quality assurance requirements through the application of Hazard Analysis and Critical Control Point (HACCP), Good Manufacturing



Practices (GMPs) and Standard Sanitation Operation Procedures (SSOPs), among others (Goh and Yeap, 2007). As a result, GMPs and SSOPs have been practiced for small and medium-sized fish processing establishments (SMEs) in many countries of the region, especially in Indonesia (Mulyani and Idawati, 2007).

In the late 1970s, the region’s landings of low-value fishes had increased due to the expansion of trawl fisheries in the region. This had prompted SEAFDEC through its MFRD to find the ways and means of promoting the efficient utilization of the fish catch for human consumption. Thus, with support from JTF, SEAFDEC has promoted the production of safe and wholesome fishery products such as the frozen surimi, through improved fisheries post-harvest technology, which generally aims for the maximum utilization of the fish catch, development of fishery products from low-value fish resources to minimize wastage, and improvement of the handling, preservation and quality of the region’s fish and fishery products (Goh and Tan-Low, 2008). At the outset of the refinement of fisheries post-harvest technologies, MFRD made use of low-value fish as raw materials to produce not only the comminuted fishery products but also surimi. With continued support from the JTF, MFRD had perfected the technology of producing frozen surimi which had been transferred to the Southeast Asian countries through training and extension activities (Siriraksophon *et al.*, 2009).

Such efforts of MFRD resulted in the successful promotion of surimi and surimi-based products for domestic consumption as well as for export, and brisk growth of the surimi industry in many Southeast Asian countries (Goh and Yeap, 2007). This is considering that surimi production in Southeast Asia in early 1970s was almost nil and the fishery products then comprised only fish balls and fish cakes (Yeap and Chow, 2011; Pongsri *et al.*, 2015).

Production of traditional fishery products is an age-old backyard industry in many Southeast Asian countries, where the products had been originally meant for domestic consumption. The increasing demand of these products not only in domestic market but also in the global market



necessitated their improvement to comply with the safety and quality standards, and other requirements to secure a niche for such products in the global market (Goh and Yeap, 2007). With continued support from JTF, MFRD developed and promoted various guidelines on food safety measures such as good manufacturing practices (GMPs) and standard sanitation operating procedures (SSOPs), and assisted the small and medium enterprises in implementing such measures through training and extension (Yeap and Chow, 2011).

Boosting the Sustainable Management of Fishery Resources

For better understanding of the region’s fishery resources as basis for sustainable fisheries management, SEAFDEC through its Marine Fishery Resources Development and Management Department (MFRDMD) and with support from JTF has enhanced the compilation of scientific and technical information that includes improvement of data collection, analysis, interpretation, and presentation.

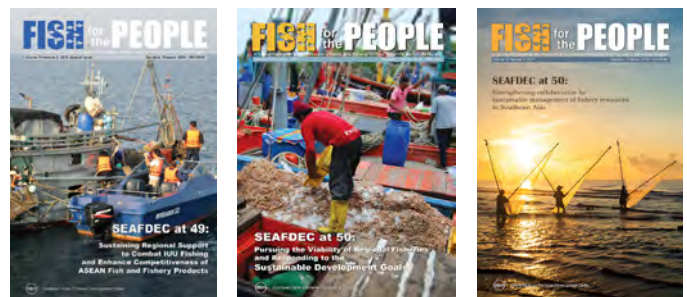
MFRDMD has also been assisting the Southeast Asian countries in the promotion of responsible fisheries management by strengthening the management of their respective coastal and inland fisheries. This has been attained by the countries through the adoption of the concepts of rights-based and co-management in fisheries, as well as management of overcapacity in coastal areas (Tsubata, 2008).

Upon the establishment of the SEAFDEC Inland Fishery Resources Development and Management Department (IFRDMD) in 2014, SEAFDEC with support from the JTF embarked on the implementation of projects that focused on the management of inland capture fisheries. These projects which are ongoing include “Enhancement of Sustainability of Catadromous Eel Resources in Southeast Asia” and “Promotion of Responsible Utilization of Inland Fisheries in Southeast Asia.” With funding support from the JTF, a survey of the catadromous eel resources in the Southeast Asian region had been initiated by IFRDMD to understand the current status of Anguillid eel resources in the region (Mutmainnah *et al.*, 2016). This activity is now being intensified through

the collaborative project between JTF and the Japan-ASEAN Integration Fund (JAIF). Moreover, with JTF support, a study on the sustainable management of inland capture fisheries in the Southeast Asian region is being pursued by IFRDMD taking into consideration the experience of Indonesia on this aspect (Utomo and Samuel, 2017).

Promoting the Outputs of the Implementation of JTF Projects

The Special Publication *Fish for the People* has been playing an important role in raising the awareness of the stakeholders on the achievements of SEAFDEC and the Member Countries from the implementation of regional projects and activities on responsible fisheries. Fully supported by the JTF, *Fish for the People* is published by the SEAFDEC Secretariat tri-annually and as of December 2017, 15 volumes with 43 issues had been produced.



Aimed to support the promotion of sustainable fisheries for food security in the Southeast Asian region, *Fish for the People* was launched in early 2003 with its maiden issue Volume 1 No. 1 (2003), intended to commemorate the first anniversary of the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security in the New Millennium: “Fish for the People” organized in November 2001, from which the Special Publication got its banner title *Fish for the People* (SEAFDEC, 2013). The Special Publication has been acclaimed by the academe, various organizations as well as by research and development institutions, as an important source of information that could be used as reference in their works related to the sustainable development of fisheries in the Southeast Asian region.

Way Forward

The role of the JTF in providing financial assistance that enabled SEAFDEC to implement projects and activities on sustainable fisheries in the Southeast Asian region is very significant, as the “return of JTF investments” during the past 20 years, has been very much profitable in terms of the efficient utilization by the SEAFDEC projects and activities of the available resources against the tangible results that have been disseminated to the Southeast Asian countries, leaving an indelible JTF imprints on the minds of the stakeholders. With the continued financial assistance provided by the Government of Japan through the JTF, SEAFDEC has been

successful in transforming the status of the region's fisheries from being production-oriented to sustainability. Thus, in the past 20 years, fisheries production from the Southeast Asian countries had continuously soared higher making the region one of most reputable in terms fisheries production.

Beyond its 20-year active involvement in the sustainable development of fisheries in Southeast Asia, the JTF would use the achievements of the SEAFDEC projects and activities to weigh the anchor for the seventh phase of the JTF, *i.e.* JTF-7. Although still undergoing negotiations with the Fisheries Agency of Japan, the JTF-7 is planned to start in 2020.

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