

FISH for the PEOPLE

A Special Publication for the Promotion of Sustainable Fisheries for Food Security in the ASEAN Region

Volume 18 Number 3: 2020

Bangkok, Thailand, ISSN: 1685-6546

**Propelling Southeast Asian Fisheries
towards Sustainability**



Southeast Asian Fisheries Development Center

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The Southeast Asian Fisheries Development Center (SEAFDEC) has been implementing programs and projects that are meant to address various concerns and issues related to the sustainable development of fisheries in Southeast Asia. Using funds provided by the Government of Japan through the Japanese Trust Fund (JTF) which was launched in 1998, various activities had since then been carried out starting with what was known as JTF1 in 1998 until JTF6-Phase 1 in 2019. SEAFDEC is now implementing projects under JTF6-Phase 2 which started in early 2020.

With continued support from the JTF, the SEAFDEC Secretariat and Technical Departments have been intensifying the development and management of the fisheries potentials of the region with the main objective of attaining sustainability in fisheries for food security and poverty alleviation. This is being achieved through rational utilization of the resources, as well as intensified transfer of new technologies from research outputs, and training and information dissemination for the benefit of the Southeast Asian countries. Guided by the ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 that was adopted in June 2011, and its updated version, the ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 adopted in October 2020, the programs and projects of SEAFDEC have been developed to also support the ASEAN in its efforts towards the realization of the ASEAN Economic Community.

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Call for Articles

FISH for the PEOPLE is a policy-oriented special publication of SEAFDEC. Now on its 18th year, the Publication is intended to promote the activities of SEAFDEC and other relevant fisheries concerns in the Member Countries. We are inviting contributors from the SEAFDEC Departments, Member Countries, and partner organizations to submit articles that could be included in the forthcoming issues of the special publication. The articles could cover fisheries management, marine fisheries, aquaculture, fisheries postharvest technology, fish trade, gender equity in fisheries, among others. Written in popular language and in layman's terms for easy reading by our stakeholders, the articles are not intended to provide detailed technical and typical scientific information as it is not a forum for research findings. Please submit your articles to the Editorial Team of Fish for the People through the SEAFDEC Secretariat at fish@seafdec.org. The article should be written in Microsoft Word with a maximum of 10 (ten) pages using Times New Roman font 11 including tables, graphs, maps, and photographs.



Production of this publication is supported by the Japanese Trust Fund.

C O N T E N T S

Specifically, SEAFDEC continues to work towards the sustainable utilization of the fishery resources through the development of measures to counter IUU fishing activities that include among others the promotion of catch documentation scheme to ensure that fish and fishery products traded in the market by the ASEAN Member States (AMSs) do not come from IUU fishing activities. SEAFDEC also makes sure that the fishing pressure in coastal areas is reduced by exploring the potentials of utilizing the offshore resources, while also securing the safety and quality of fish and fishery products for human consumption. Aiding all these actions of SEAFDEC is the intensified effort to improve the collection and compilation of fisheries data and information for efficient utilization in policy-making, especially those that pertain to the development of the inland fisheries of Southeast Asia. All these are expected to propel the fisheries of the AMSs towards sustainability.

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FISH for the **PEOPLE** is a special publication produced by the Southeast Asian Fisheries Development Center (SEAFDEC) to promote sustainable fisheries for food security in the Southeast Asian region.

The contents of this publication do not necessarily reflect the views or policies of SEAFDEC or the editors, nor are they an official record. The designations employed and the presentation do not imply the expression of opinion whatsoever on the part of SEAFDEC concerning the legal status of any country, territory, city, or area of its authorities, or concerning the legal status of fisheries, marine and aquatic resource uses and the delimitation of boundaries.

Pushing for the Elimination of IUU Fishing in the Southeast Asian Region

Malinee Smithrithee, Akito Sato, Worawit Wanchana, Nualanong Tongdee, Virgilia T. Sulit, and Kongpathai Saraphaivanich

The global Code of Conduct for Responsible Fisheries (CCRF) adopted in 1995 provides the framework for dovetailing national and international efforts with sustainable utilization of the living aquatic resources and ensuring that the objectives for conservation, management, and development of such resources are achieved. The Southeast Asian Fisheries Development Center (SEAFDEC) has been supporting the ASEAN Member States (AMSs) in the implementation of the global CCRF through its project “Regionalization of the CCRF (RCCRF),” which received financial assistance from the Government of Japan Trust Fund (JTF) and took into consideration the characteristics of the fisheries in Southeast Asia which is multi-species and small-scale in nature. Series of Regional Guidelines corresponding to the CCRF had then emanated from the RCCRF, one of which is the “Regional Guidelines for Responsible Fisheries in Southeast Asia: Responsible Fisheries Management” aimed at capacitating the AMSs to be able to formulate and implement their respective national codes of practice for responsible fisheries management.

SEAFDEC also promoted the adoption in the Southeast Asian region of the “International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated (IUU) Fishing” or the IPOA-IUU, developed by FAO and adopted in 2001 as a voluntary instrument that provides the comprehensive, effective, and transparent measures by which the countries must act and establish their respective National Plans of Action on IUU Fishing (NPOAs-IUU). Subsequently, when the European Community (EC) issued the EC Regulation establishing a “Community System to Prevent, Deter and Eliminate IUU Fishing,” which took effect on 1 January 2010, SEAFDEC also commenced new activity to facilitate exchanging of information among the AMSs on the progress as well as on the obstacles encountered in the implementation of the EC Regulation, considering its

impact on the AMSs that export fish and fishery products to the EU. Parallel with the global and international initiatives, SEAFDEC also fostered stronger cooperation among the AMSs in combating IUU fishing, especially in compiling relevant information on the structure of the region’s fisheries as among the prerequisites in ensuring effective fisheries management and combating IUU fishing in the waters of Southeast Asia. Through the JTF-funded project “Promotion of Sustainable Fisheries and IUU Fishing-related Countermeasures in Southeast Asia” implemented by SEAFDEC from 2010 to 2013, the subsequent JTF-funded projects “Promotion of Countermeasures to Reduce IUU Fishing” implemented by the SEAFDEC Training Department (SEAFDEC/TD) and “Combating IUU Fishing in the Southeast Asian Region through Application of Catch Certification for Trading of Fish and Fishery Products” by the Marine Fishery Resources Development and Management Department (SEAFDEC/MFRDMD) during 2014-2019, as well as the activities carried out through the seven-year SEAFDEC-Sweden Project “Fisheries and Habitat Management, Climate Change and Social Well-being in Southeast Asia” implemented during 2013-2019, several measures have been developed by SEAFDEC together with the AMSs and in collaboration with regional and international organizations, to effectively address IUU fishing concerns in the region. In order to share the experiences of SEAFDEC in the development and adoption of the measures for combating IUU fishing, and explore new ideas and the ways forward to combat IUU fishing in the Southeast Asian region, SEAFDEC/TD virtually convened in Samut Prakan, Thailand, the “Teleseminar on the Way Forward for Combating IUU Fishing in Southeast Asia” on 24-26 August 2020 followed by the “Teleworkshop on Development and Improvement of Regional Tools (RFVR and PSM) for Combating IUU Fishing in Southeast Asia” on 27-28 August 2020.

While conforming to a provision stipulated in the 2001 Resolution on Sustainable Fisheries for Food Security for the ASEAN Region (SEAFDEC, 2001), viz: “*formulate regional guidelines to implement the Code of Conduct for Responsible Fisheries, taking into account the specific social, economic, cultural, ecological, and institutional contexts and diversity of ASEAN fisheries,*” SEAFDEC and the ASEAN Member States (AMSs) developed a series of Regional Guidelines based on the results of the Project “Regionalization of the CCRF (RCCRF),” which was financially supported by the Government of Japan Trust Fund (JTF). As one of the Project’s outputs, the Regional Guidelines for Responsible Fisheries in Southeast Asia: Responsible Fisheries Management (SEAFDEC, 2003) includes stipulations not only on responsible fisheries management towards sustainable development of fisheries, but also on the need to address international fisheries issues that

could impede such sustainability, e.g. combating IUU fishing through the development of respective countries’ National Plans of Action on IUU Fishing (NPOAs-IUU).

SEAFDEC has always worked closely with the AMSs in the implementation of programs and activities that support the sustainable development of fisheries in the Southeast Asian region. With continued assistance from the JTF, SEAFDEC has been able to attain significant achievements that are being used by the AMSs as basis for formulating their respective fisheries policies, especially on the promotion of sustainable fisheries. It should be noted that starting early 2000s, the Southeast Asian region emerged as a major contributor to the total fisheries production of the world (**Table 1**), and that some Southeast Asian countries (e.g. Indonesia, Thailand, Viet Nam) became major exporters of fish and fishery products to

Table 1. Contribution of Southeast Asia to world's total fisheries production (in million t) in early 2000s

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
World's total fisheries production*	117.2	125.2	131.0	130.7	133.0	132.2	134.3	136.4	137.1	139.8
Fisheries production of Southeast Asia**	14.7	15.8	16.9	17.9	18.9	20.2	21.1	22.9	24.4	25.2
Total contribution of Southeast Asian countries to world's total fisheries production (%)	12.5	12.6	12.9	13.7	14.1	15.2	15.7	16.8	17.8	18.0

* FAO (2002a; 2002b; 2004; 2010)

** SEAFDEC (2005; 2006; 2010)

the world market (FAO, 2002a; 2002b; 2004; 2007). However, such development may have been threatened in mid-2000s when issues on illegal, unreported and unregulated (IUU) fishing activities in world fisheries became a major concern, especially in the context of the CCRF and its overall objective of attaining sustainability in fisheries.

Meanwhile, the persistent operations of IUU fishing continue to undermine all efforts to conserve and manage the fishery resources utilized by capture fisheries. As IUU fishing ensues, national and regional fisheries management organizations could fail to achieve their management goals. This situation leads to the loss of both short- and long-term social and economic opportunities, negatively impacting on food security and environmental well-being. IUU fishing also results in the possible collapse of a fishery or seriously impairing all efforts to rebuild stocks that might have already been depleted due to overfishing. To address such concerns, a number of international instruments that aim to address the issues on IUU fishing have been promoted but many countries are unable to effectively adopt such existing instruments in a timely manner due to many constraints that include lack of national policy and legal frameworks, and inadequate capacity and resources to ratify or accede to and implement such instruments.

Efforts to Purge IUU Fishing: Southeast Asian Perspective

Confronted by the aforementioned predicaments, the AMSs have therefore considered combating IUU fishing as one of their top priority actions to make sure that the fishery resources are sustainably utilized and guarantee that trading of fish and fishery products from the Southeast Asian region complies with the requirements stipulated in relevant international instruments. When IUU fishing became a global crisis in early 2000s risking the sustainability of Southeast Asian fisheries, the AMSs agreed to strengthen regional and sub-regional efforts to combat IUU fishing, and supported the Work Plan developed by the ASEAN in early 2000s that included “key cluster areas” for each AMS, with Indonesia designated as the lead country for the Cluster on Combating IUU Fishing (Poernomo *et al.*, 2011). Under such Work Plan, the “Regional Plan of Action to Promote Responsible Fishing Practices including Combating Illegal, Unreported and Unregulated Fishing in the Region” or (RPOA-IUU) was established and

endorsed by the ASEAN Ministers responsible for fisheries in May 2007. Eleven countries, namely: Australia, Brunei Darussalam, Cambodia, Indonesia, Malaysia, Papua New Guinea, Philippines, Singapore, Thailand, Timor-Leste, and Viet Nam, and four regional fisheries organizations, *i.e.* FAO/Asia-Pacific Fishery Commission (APFIC), SEAFDEC, the Intergovernmental Organization for Marketing Information and Technical Advisory Services for Fishery Products in the Asian and Pacific Region (InfoFish), and Worldfish Center, agreed to collaborate with the RPOA-IUU by providing technical advice and assistance.

The RPOA-IUU is aimed at enhancing and strengthening the overall level of fisheries management in the region in order to sustain the fishery resources and the marine environment, and to optimize the benefit of adopting responsible fishing practices. The plan of action of RPOA-IUU includes conservation of fishery resources and their environment, management of fishing capacity, and combating IUU fishing, especially in the sub-regional areas of the southern and eastern South China Sea and Sulu-Sulawesi Seas, the sub-regional area of the Gulf of Thailand, and sub-regional area of the Arafura-Timor Seas (RPOA-IUU, 2020).

In June 2011, the ASEAN-SEAFDEC Conference “Fish for the People 2020: Adaptation to a Changing Environment” co-organized by the ASEAN and SEAFDEC in Bangkok, Thailand, paved the way for the adoption of the “Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020” or RES&POA-2020. This instrument had been used as policy framework and guiding principles for the AMSs in strengthening their efforts towards the sustainable development of fisheries while adapting to the changes in climatic as well as trade environments (Pongsri *et al.*, 2011). Also set out in the RES&POA-2020 are provisions that direct the AMSs towards attaining sustainability in fisheries, especially in combating IUU fishing (SEAFDEC, 2011). Such relevant provisions are shown in **Box 1**.

Furthermore, on the occasion of 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” convened on 3 August 2016, Senior

Box 1. Relevant provisions in the Resolution (RES) and Plan of Action (POA) on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 that provide directives for confronting IUU fishing in the Southeast Asian region

RES 08: Foster cooperation among ASEAN Member Countries and with international and regional organizations in combating IUU fishing;

POA 09: Take measures to prevent unauthorized fishing and eliminate the use of illegal fishing practices by building awareness of their adverse impacts, strengthening law enforcement, developing and promoting responsible and selective fishing gears and practices, enforcing regulations and encouraging alternative means of livelihoods;

POA 20: Adjust existing programs to take into consideration the effects of climate change, focusing on the programs for (i) managing fisheries and habitats; (ii) reducing fishing capacity and combating Illegal, Unreported and Unregulated (IUU) fishing; (iii) strengthening local organizations; and (iv) promoting safety at sea and other priority areas. Develop indicators and reporting measures to assess how actions of the programs build resilience to climate change;

POA 21: Strengthen regional and national policy and legislation to implement measures and activities to combat IUU fishing, including the development and implementation of national plans of action to combat IUU fishing, and promote the awareness and understanding of international and regional instruments and agreements through information dissemination campaigns;

POA 22: Establish and strengthen regional and sub-regional coordination on fisheries management and efforts to combat IUU fishing including the development of regional/sub-regional Monitoring, Control and Surveillance (MCS) networks;

POA 23: Facilitate consultative dialogue among fisheries legal officers to share, at the sub-regional/regional level, perspectives of the respective legal and regulatory framework in terms of developing MCS-networks and to implement efforts to combating IUU fishing;

Source: SEAFDEC (2011)

Officials of the ASEAN-SEAFDEC Member Countries signed the “Joint ASEAN-SEAFDEC Declaration on Regional Cooperation for Combating Illegal, Unreported and Unregulated (IUU) Fishing and Enhancing the Competitiveness of ASEAN Fish and Fishery Products.” The Senior Officials also declared their countries’ intent to: *combat IUU fishing in the Southeast Asian region and enhance the competitiveness of ASEAN fish and fishery products without prejudice to the sovereign rights, obligations, and responsibilities of ASEAN-SEAFDEC Member Countries under relevant international laws and arrangements* (SEAFDEC, 2016).

Initiatives in Combating IUU Fishing in the Waters of Southeast Asia

If not rooted out, IUU fishing could continue to contribute to overexploitation of the fish stocks, hinder the recovery of fish populations and ecosystems, put fishers operating legally at a disadvantage, and in the end, adversely affect the economic and social well-being of fishing communities. Thus, in the Southeast Asian region, the countries have been promoting

sustainable fisheries management and implementing appropriate countermeasures against IUU fishing. Increased recognition of the importance of fisheries management schemes such as fishing gear licensing, fishing vessels registration, among others, has been eminent in the region, recognizing that these could serve as effective measures to promote sustainable use and long-term conservation of the marine fishery resources.

In 2010 and in support of the adoption of the Regional Guidelines for Responsible Fisheries in Southeast Asia: Responsible Management by the AMSs, SEAFDEC launched the three-year JTF-funded project “Promotion of Sustainable Fisheries and IUU Fishing-related Countermeasures in Southeast Asia.” Comprising activities that included fishing licensing, fishing vessels registration, and promotion of port State measures, the Project paved the way for the development of fisheries management tools to combat IUU fishing in the Southeast Asian region (Matsumoto *et al.*, 2012). This was made possible through the compilation of information on the procedures of fishing licensing and vessels registration in the Southeast Asian region including the corresponding minimum requirements for obtaining fishing license and vessel registration certificates. In addition, the ways and means of preventing the export of IUU fishing products by the AMSs were also identified. Such information provided the inputs for the proposed establishment of the Regional Record of Fishing Vessels starting with vessels 24 meters in length and over.

The Project also provided assistance to the AMSs to make sure that their respective systems of fishing licensing are in accordance with the regional and international requirements for combating IUU fishing. Therefore, as envisioned, the establishment of regional fishing vessels record together with the refined fishing licensing systems would serve as fisheries management tools in combating IUU fishing in the Southeast Asian region (Pongsri *et al.*, 2014).

Along the lines of the relevant stipulations in RES&POA-2020, SEAFDEC implemented in 2014 the five-year project “Promotion of Countermeasures to Reduce IUU Fishing” as means of strengthening the collaboration among the AMSs in reducing IUU fishing in the region. Led by SEAFDEC/TD and promoted as a collaborative effort among the AMSs as well as with regional and international organizations, the Project was instrumental in the development of additional measures that could be used to effectively address IUU fishing concerns in the waters of Southeast Asia.

In the subsequent RES&POA-2030, which was adopted in October 2020 to be used as a regional framework for the sustainable development of fisheries and enhancing the contribution of fisheries to food security and livelihood of peoples in the ASEAN region in the next decade, provisions that follow up on the need to combat IUU fishing in Southeast

Asia have also been stipulated (Smithrithee *et al.*, 2020; SEAFDEC, 2020a). The provisions relevant to combating IUU fishing in RES&POA-2030 are shown in **Box 2**.

Box 2. Relevant provisions in the Resolution (RES) and Plan of Action (POA) on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 that provide directives for addressing the issues on IUU fishing in the Southeast Asian region
<p>RES 08: Strengthen cooperation among AMSs and with international and regional organizations in combating IUU fishing and management of fishing capacity to balance available resources;</p>
<p>POA 12: Implement measures to prevent unauthorized fishing and eliminate illegal fishing practices, e.g. strengthening enforcement of laws and regulations, establishing monitoring control and surveillance (MCS) mechanisms and network, developing and promoting responsible fishing practices, encouraging supplementary livelihood option;</p>
<p>POA 13: Enhance implementation of comprehensive policies for fisheries management through (i) licensing systems (boats, gear, and people); (ii) rights-based fisheries; (iii) supportive legal and institutional frameworks; (iv) strengthened institutional cooperation; and (v) streamlined co-management;</p>
<p>POA 28: Strengthen the implementation of measures and activities to combat IUU fishing by ensuring compliance with national laws and regulations, and with the provisions of relevant international instruments; encourage the development and implementation of national plans of action to combat IUU fishing; promote inter-agency coordination for effective implementation of laws and regulations; and enhance awareness and understanding of applicable international and regional instruments and agreements through information dissemination campaigns;</p>
<p>POA 29: Establish and strengthen regional, sub-regional, and bi-lateral coordination on fisheries management and efforts to combat IUU fishing; and where appropriate promote the establishment of Monitoring, Control and Surveillance (MCS) network through inter-agency coordination and information sharing;</p>
<p>POA 30: Mobilize regional/sub-regional collaboration frameworks and tools for combating IUU fishing, e.g. <i>Regional Plan of Action to Promote Responsible Fishing Practices</i> including Combating Illegal, Unreported and Unregulated Fishing (RPOA-IUU); ASEAN Regional Plan of Action for the Management of Fishing Capacity (RPOA-Capacity); Regional Fishing Vessels Record (RFVR); ASEAN Catch Documentation Scheme (ACDS), and the use of technologies;</p>

Source: SEAFDEC (2020a)

During the implementation the project “Promotion of Countermeasures to Reduce IUU Fishing” from 2014 until its completion in 2019, the project objectives of improving countermeasures to reduce IUU fishing and enhancing awareness and common understanding of the countermeasures to reduce IUU fishing, had been attained through the implementation of three main activities, namely: Promotion and Development of the Regional Fishing Vessels Record; Strengthening of Port State Measures; and Promotion of Information Technology to Combat IUU Fishing. From such activities, various measures had been established for combating IUU fishing. Moreover, other relevant projects

implemented by SEAFDEC through the other SEAFDEC Departments and in collaboration with various donors, also came up with additional measures to combat IUU fishing in the Southeast Asian region. It should be noted that all these measures and tools (**Box 3**) also dovetail with the relevant provisions in RES&POA-2030.

Conclusion

Considerable efforts had been made by the AMSs towards improving governance in fisheries with the main objective of attaining sustainability in the region’s fisheries. However, this has not yet been completely achieved because of many factors that include continued practice of IUU fishing activities brought about by large numbers of fishing vessels and fishers, weak law enforcement, and poverty in fishing communities, among others. Isa *et al.* (2011) suggested that enhancing governance in the regions’ fisheries sector could be pursued through the context of management based on an ecosystem approach, as provided for in the Regional Guidelines for Responsible Fisheries in Southeast Asia: Responsible Fisheries Management (SEAFDEC, 2003). Moreover, in promoting the implementation of MCS which is a key factor in pursuing effective fisheries management, the involvement of small-scale fishers in the planning and implementation of the relevant activities, should be enhanced. This would also address the concerns on continued practices of IUU fishing not only by commercial fishers but also by small-scale fishers.

Way Forward

The “Teleseminar on the Way Forward for Combating IUU Fishing in Southeast Asia” organized virtually by SEAFDEC/TD from 24 to 26 August 2020 (SEAFDEC/TD, 2020a) facilitated the sharing of experiences in adopting the measures for combating IUU fishing, and explored new ideas and the suggested ways forward for combating IUU fishing in the Southeast Asian region as shown in **Box 4**.

Furthermore, during the abovementioned Teleseminar, the fundamental elements necessary to eliminate IUU fishing in the Southeast Asian region were identified (SEAFDEC/TD, 2020a). Specifically, the AMSs have been encouraged to consider mainstreaming these elements in their respective programs and activities relevant to combating IUU fishing in their countries’ waters. These elements are summarized in **Box 5**.

Meanwhile, guided by the directive of the SEAFDEC Council during its Fifty-second Meeting in May 2020, SEAFDEC/TD virtually organized the Teleworkshop on the Development and Improvement of Regional Tools (RFVR and PSM) for Combating IUU Fishing in Southeast Asia on 27-28 August 2020 (SEAFDEC/TD, 2020b). The Teleworkshop discussed the issues and concerns on the management of

Box 3. Continuing initiatives of SEAFDEC and the AMSs to counter IUU fishing in Southeast Asian waters

Listing of Fishing Vessels in the Global and Regional Records

The series of meetings and consultations among the ASEAN-SEAFDEC Member Countries agreed to compile data and information for the establishment of the Regional Fishing Vessels Record (RFVR) with initial focus on fishing vessels measuring 24 meters in length and over (Saraphaivanich *et al.*, 2016a). Upon the endorsement of the proposed establishment of the RFVR by the SEAFDEC Council at its Forty-fifth Meeting in April 2013, and subsequently by the Special Senior Officers Meeting of the Thirty-fourth Meeting of the ASEAN Ministers on Agriculture and Forestry, the RFVR Database was launched as a collaborative effort of the AMSs and as a channel of sharing information on fishing vessels identification, and other relevant data and information. Being maintained by SEAFDEC/TD as an online system, the RFVR would be expanded later to cover fishing vessels measuring less than 24 meters in length (Kawamura & Siriraksophon, 2014). Now serving as a platform to facilitate the compilation and exchange of information on registered fishing vessels of the AMSs, starting with vessels 24 meters in length and over, the RFVR Database has been used as a practical tool for relevant authorities of the AMSs for monitoring all registered fishing vessels and taking corrective actions against their inappropriate behavior, thereby supporting the elimination of IUU fishing in the region. The RFVR also provides information for the “Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels” or Global Record developed by FAO and similar efforts of relevant RFMOs, to be used in updating the lists of vessels believed to be engaged in IUU fishing. The RFVR Database also supports the effective implementation of the Port State Measures Agreement (PSMA), which requires that information on fishing vessels, either legally registered or IUU vessels should be shared. Presently, the RFVR Database is mainly for the AMSs only, so that for security purposes, accessing the RFVR Database System requires a Username and Password from SEAFDEC/TD. The following data and information on fishing vessels 24 meters in length from the AMSs, are shared with the RFVR Database (Saraphaivanich *et al.*, 2016a).

The following are the information on fishing vessels 24 meters in length and over from the AMSs shared with the RFVR Database:

- | | |
|--|---|
| 1. Name of vessel | 15. International Radio Call sign |
| 2. Vessel Registration Number | 16. Engine Brand |
| 3. Owner's Name | 17. Serial number of engine |
| 4. Type of fishing method/gear | 18. Hull material |
| 5. Fishing License Number | 19. Date of registration |
| 6. Expiration date of fishing licenses | 20. Area (country) of fishing operation |
| 7. Port of registry | 21. Nationality of vessel (flag) |
| 8. Gross tonnage (GRT/GT) | 22. Previous name (if any) |
| 9. Length (L) | 23. Previous flag (if any) |
| 10. Breadth (B) | 24. Name of captain/master |
| 11. Depth (D) | 25. Nationality of captain/master |
| 12. Engine Power | 26. Number of crew (maximum/minimum) |
| 13. Shipyard/Ship Builder | 27. Nationality of crew |
| 14. Date of launching/Year built | 28. IMO Number (If available) |

Intensifying the Promotion of Port State Measures

The RES&POA-2020 stipulated the need to “*build up capacity among Member Countries, including functions for regional and sub-regional cooperation to effectively meet the requirements of Port State measures and Flag State responsibilities.*” Towards this end, SEAFDEC in collaboration with partner organizations, has been supporting the efforts of the AMSs to ensure that Port State Measures (PSM) are successfully carried out, through capacity building of the countries’ fishery officers and inspectors. As envisioned, the continued capacity building of concerned officers would enable the AMSs to effectively adopt the “Agreement on Port State Measures to Prevent, Deter, and Eliminate Illegal, Unreported and Unregulated Fishing” or PSMA which provides that foreign vessels engaged in IUU fishing are denied from using ports and landing their catches, thus warranting that fish caught from IUU fishing activities would not reach the markets. Southeast Asia has emerged as one of the major fish producing regions of the world, and also is a leading exporter of fish and fishery products supporting the world’s requirements for food fish. In order to secure the niche of the region’s seafood products in the world market, the Southeast Asian region has been adopting PSM as one of the means for sustaining fair seafood trading in the global market arena. Meanwhile, capacity building has also been sustained to support the AMSs in complying with the requirements of the PSMA (Saraphaivanich *et al.*, 2016b). This is also in accordance with the relevant provisions in the RES&POA-2030 shown in **Box 2**.

As stipulated in the IPOA-IUU, the implementation of PSM is one of the effective means for combating IUU fishing. However, recognizing that human resources development is necessary to support the implementation of the PSM, FAO developed the “Model Scheme on Port State Measures” in 2005 where the international minimum standards for PSM are stipulated (FAO, 2007). Upon the adoption of the PSMA, it has become necessary that port States should take actions to restrict the entry into port, use of port, access to port services, among others, by foreign-flagged fishing vessels, as well as to conduct inspection and other enforcement activities. The concerned AMSs have already established their respective national PSM systems and designated ports, and reviewed the required legal frameworks to support the implementation of the PSMA. SEAFDEC, for its part, had intensified its awareness-raising activities to ensure deeper understanding of the implications of enforcing the PSMA, including the institutional responsibilities that are relevant to the laws and regulations of each of the AMSs. Six AMSs have already become Parties to the PSMA, namely: Cambodia, Indonesia, Myanmar, Philippines, Thailand, and Viet Nam (SEAFDEC, 2017a; Saraphaivanich *et al.*, 2017a).

Strengthening MCS and Regional MCS Networks

Proper management of the fishery resources would sustain their contributions to the nutritional, economic, and social well-being of the growing population. Effective fisheries management measures such as the implementation of the MCS systems would ensure that appropriate controls are properly set, monitored, and complied with. The MCS, where M (Monitoring) refers to data collection and analysis, C (Control) touches on the legislation and administrative ordinances, and S (Surveillance) denotes law enforcement, comprise the basic elements in developing the MCS systems, and are tools that could be used to track the implementation of fisheries management plans ensuring that the economic opportunities and benefits are maximized. MCS systems also encompass the development and establishment of modern data collection systems that incorporate information from traditional coastal fisherfolk (SEAFDEC, 2017a). To supplement and enhance the effectiveness of MCS measures in the respective AMSs, strengthening of cooperation among relevant agencies (e.g. fisheries, transportation, customs, navy, etc.) through Regional MCS Networks, has also been pushed forward. Many AMSs have already initiated some efforts to counter IUU fishing including the development and establishment of national MCS systems as well as strengthening of regional and sub-regional coordination on fisheries management for the promotion of the MCS Networks. Sub-regional cooperation through such MCS Networks

Box 3. Continuing initiatives of SEAFDEC and the AMSs to counter IUU fishing in Southeast Asian waters (Cont'd)

Strengthening MCS and Regional MCS Networks (Cont'd)

could also lead towards improved verification and certification of the legal status of catch and landing of fish and fishery products, enhanced effectiveness of sub-regional/bilateral coordination for facilitating trade, and strengthened product traceability; improved scientific assessment for transboundary species; and the development of new coordinating body and cooperation for MCS that could be linked through the existing cooperation on surveillance (Yleña and Velasco, 2012).

In a similar development, when SEAFDEC in collaboration with the ASEAN-SEAFDEC Member Countries and with joint support from the JTF and the SEAFDEC-Sweden Project established the “ASEAN Regional Plan of Action for the Management of Fishing Capacity” or RPOA-Capacity, it was clarified that in order to achieve the specific objectives of the RPOA-Capacity, it would be necessary to strengthen the aspect of MCS at the sub-regional level. It should be noted that the SEAFDEC-Sweden Project defined four sub-regional areas in Southeast Asia, namely: Gulf of Thailand, Andaman Sea, Sulu-Sulawesi Seas, and Lower Mekong River Basin. From the series of consultations among the bordering countries of the sub-regional areas, multilateral cooperation had been identified as a platform to promote fishing capacity management through the sub-regional cooperation in MCS. Moving towards this direction, a common understanding of the scopes and the provisions stipulated in legislations of the countries in the region, was reached among the AMSs, where various government agencies not necessarily directly concerned with fisheries (e.g. environment authorities, national defense, coast guard, customs, and immigration) had been encouraged to be involved in dialogues that discuss these relevant matters, especially in sharing of information during the development of MCS practices and MCS Networks in the sub-regions (Wanchana *et al.*, 2016). This is considering that creating a network for sharing of information on the monitoring, control, and surveillance of fisheries and fisheries-related activities among the Southeast Asian countries, is deemed essential (Jaya *et al.*, 2019). The development of MCS networks as a major tool to combat IUU fishing in the sub-regional areas and the Southeast Asian region as a whole, could positively reduce the long-term damages on fish stocks and marine ecosystems that otherwise might be inevitable. Moreover, one of the key actions to combat illegal fishing in the region more effectively is to strengthen coordination on the development of the MCS Networks among relevant line agencies in each country as well as between the countries of the region.

Promoting the “ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain” in the Southeast Asian region

Many fishers still continue to catch more fish to supply the increasing demand for fish to the extent that IUU fishing is possibly practiced. Such intentions could lead to overexploitation of the fish stocks, hindering the recovery of fish populations and the ecosystems; and damaging the marine habitats. Occurring in virtually any fisheries from inland waters, shallow coastal or even in offshore areas, IUU fishing is difficult to quantify. Nevertheless, strengthening of fisheries management strategies could address the concerns related to the inadequacy of resources for landing controls and vessel inspections, and the limited number of patrol vessels to enforce the necessary regulations (Latun *et al.*, 2017). While most countries in Southeast Asia have developed and/or enhanced their respective regulations in fisheries management based on the Regional Guidelines for Responsible Fisheries in Southeast Asia: Responsible Fisheries Management, such endeavor has enabled the AMSs to support all efforts to implement the necessary trade measures to counter IUU fishing in the region. In this connection, it is also crucial that the countries should be willing to take on the primary responsibility of adopting such measures in order to combat IUU fishing in the region. Given such premise, the SEAFDEC Marine Fishery Resources Development and Management Department (SEAFDEC/MFRDMD) collaborated with the AMSs for the implementation of the JTF-funded Project “Combating IUU Fishing in the Southeast Asian Region through the Application of Catch Certification for International Trade in Fish and Fishery Products” from 2013 to 2019. Mainly focusing on the identification of existing trade practices and mechanisms in small-scale fisheries, and the associated problems encountered by the AMSs in complying with the international and regional frameworks for combating IUU fishing, the Project compiled the relevant information that could serve as inputs for the development of the necessary regional guidelines that aim to prevent the trading of fish and fishery products from IUU fishing activities (Latun *et al.*, 2013).

Known as the “ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain,” this regional framework for combating IUU fishing in the Southeast Asian region, also identifies the forms of IUU fishing activities in the region, viz: (1) illegal fishing activities within a country; (2) unauthorized transshipment and landing of fish/catch across borders; (3) poaching in the EEZs of other countries; (4) illegal fishing and trading practices of live reef food fish and reef-based ornamental and endangered aquatic species; (5) IUU fishing in the high seas and RFMO areas (Latun *et al.*, 2016a). While providing full support to the development of such Guidelines that was spearheaded by SEAFDEC/MFRDMD and promotion of the implementation of the Guidelines in the region, the AMSs also recognized that regional cooperation should be strengthened to address the various issues, concerns, and anticipated difficulties that the countries encounter in the implementation of the Guidelines. Nonetheless, as agreed during the series of consultations on the development of the ASEAN Guidelines, implementation of the Guidelines implies that the AMSs should undertake all the actions necessary for combating IUU fishing, e.g. illegal fish and fishery products from IUU fishing activities should not be traded, since the ASEAN Guidelines is the central measure which covers not only market measures such as documentation of catches but also incorporates the MCS approaches including registration of fishing vessels, licensing of fishing gears used for fishing operation, recording of catch, and designation of landing areas and control of foreign fishing vessels through the implementation of port State measures. In the process of developing the Guidelines, SEAFDEC/MFRDMD was able to establish that IUU fishing activities in the region had expanded to include illegal trading of IUU fishes, which could have emanated from the weak enforcement of regulations and frameworks aimed at combating IUU fishing (Kawamura and Siraksophon, 2014). For such reason, the AMSs agreed to intensify the promotion of the ASEAN Guidelines in the whole Southeast Asian region as means of countering IUU fishing activities (Latun *et al.*, 2016b).

Advocating the Adoption of RPOA-Capacity to Manage Fishing Capacity in Southeast Asia

Fishing capacity, as defined by FAO, is the “amount of fish (or fishing effort) that could be produced over a period of time (e.g. a year or a fishing season) by a vessel or a fleet if fully utilized and for a given resource condition.” The existence of too many fishing vessels operating over limited fishery resources is one of the major contributors to the depletion of fishery resources due to overcapacity. Insufficient management, regulation, and control of fishing capacity espouse the continued operation of fisheries in “open-access” regime resulting not only in increased numbers of fishing vessels but also the number of people engaged in fisheries. Fishing capacity should therefore be managed by controlling access to the fisheries to ensure that utilization of the resources is sustainable. Uncontrolled exploitation of the fishery resources could end up with overcapacity, which in turn lures fishers to be engaged in illegal fishing operations resulting in overfishing, and ultimately to resources depletion. The task of managing the fishery resources on a sustainable basis has therefore become increasingly challenging, and the immeasurable threats of over-exploitation and degradation of aquatic habitats have become serious problems. Recognizing the severity of such a situation, SEAFDEC has exerted continuous efforts to address this serious issue by organizing

Advocating the Adoption of RPOA-Capacity to Manage Fishing Capacity in Southeast Asia (Cont'd)

series of consultations. With funding support from the JTF and the SEAFDEC-Sweden Project, the ASEAN-SEAFDEC Member Countries came up with the Regional Plan of Action for the Management of Fishing Capacity (RPOA-Capacity) to serve as management tool and voluntary guidelines for preventing the over-exploitation of the fishery resources and consequently combating IUU fishing in the region (Amornpiyakrit and Siriraksophon, 2016). The RPOA-Capacity, which specifies the need for States to establish registration and licensing systems, and records of fishing vessels and gears, would be fundamental for the management of fishing capacity as well as implementation of several measures for combating IUU fishing in the Southeast Asian region (SEAFDEC, 2017b). Specifically, Malaysia as a maritime nation in Southeast Asia spearheaded the action to address this concern by putting in place its National Plan of Action for the Management of Fishing Capacity or the NPOA-Fishing Capacity (Shaupi *et al.*, 2011). Other AMSs also have other forms of national policy in relation to management of fishing capacity or are in the process of developing their respective NPOA-Capacity. Meanwhile, Hagberg (2018) suggested that the use of Harvest Control Rule (HCR) could be also pursued in the Southeast Asian region where capture fisheries are catching more than one species in what is known as multi-species fisheries. Since some countries have started to adopt fishing capacity to control the catch of fish corresponding to the available amounts of fish, the adoption of HCR could be pursued in such multi-species fisheries situations, and especially in circumstances where effort or quota regulation is being promoted.

Promoting Catch Documentation and Traceability of Fish and Fishery Products

Catch documentation schemes (CDS) are market-related measures developed specifically to combat IUU fishing by documenting the verifiable information on fish catch from point of capture to their final destination. The IPOA-IUU has called for the countries to develop internationally-agreed market-related measures to prevent, deter and eliminate IUU fishing that could encompass several types of controls on trading of fish and fishery products derived from IUU fishing. Some examples of such measures are catch certification and trade documentation requirements, and import and export restrictions and prohibitions (FAO, 2002c). In response to such call, SEAFDEC/TD and SEAFDEC/MFRDMD had initiated a collaborative JTF-funded project which includes an activity on preventing the export of fish and fishery products from IUU fishing operations. In the process of developing the necessary regional guidelines, it was considered that preventing the landings, export and import of IUU fishing products, could be the first step towards creating a catch certification scheme to eliminate IUU fishing. Under such scheme, all imports would be considered legal if the flag State could certify that the fish has been harvested in accordance with the requirements or from an area governed by an RFMO or other regional bodies, or in the high seas that comply with international standards (Latun *et al.*, 2013). In response therefore to the provision in Resolution # 19 of the RES&POA-2020, viz: "Support the competitiveness of the ASEAN fish trade through the development of procedures and programs that would certify, validate or otherwise indicate the origin of fish to reflect the need for traceability, sustainable fishing practices and food safety, in accordance with international and national requirements," SEAFDEC in collaboration with the AMSs developed the ASEAN Catch Documentation Scheme or ACDS as a regional scheme to improve the traceability of fish and fishery products, and enhance the international as well as intra-regional trade of fish and fishery products of the Southeast Asian countries. Under the ACDS, five main documents are issued. These are: Catch Declaration (CD), Movement Document (MD), Catch Certification for Export (CC), Processing Statement (PS), and Re-export Certification (RE) (Saraphaivanich *et al.*, 2017b).

Included in the ACDS is the Info-graphic on the Usage of the ACDS in Various Scenarios of Catch Flows of Fish and Fishery Products into the ASEAN Region (SEAFDEC/MFRDMD, 2013). Moreover, SEAFDEC has also made sure that the ACDS is in line with the systems that are already being implemented by the AMSs. As an essential part of the ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain (Ali *et al.*, 2015), the ACDS records the catch data and information from all steps of the supply chain for traceability of the fish and fishery products.

As a part of ACDS, an electronic catch documentation system or the eACDS has been developed to reduce the burden of the AMSs in the implementation of the ACDS (Siriraksophon *et al.*, 2016). The eACDS consists of three main processes, namely: (1) Issuance of Catch Declaration (CD); (2) Issuance of Movement Document (MD); and (3) Issuance of Catch Certification (CC). Based on these processes, the importer would be able to make clearance on the CC and trace the origin of fish and fish products along the supply chain. For marine capture fisheries, the eACDS requires basic data and information known as "Key Data Elements" (KDEs) to ensure and enhance the efficiency of the system and support more effective fisheries management and good governance. The KDEs include: 1) Point of Catch; 2) Buyers/Receivers and Sellers (Broker/Wholesale); 3) Processors; 4) Exporters and International Shipping; 5) Importers; and 6) End Consumers. Web-based and mobile applications of the eACDS had also been developed to support the users from different sectors throughout the supply chain of fish and fishery products. The eACDS Web-based Application consists of five (5) modules, namely: (1) list of fish species, (2) list of vessels, (3) list of fishing zones/areas, (4) Manage User, and (5) System Setting, while Mobile Application of the eACDS can be downloaded from Play Store of the Android operating system. The eACDS Mobile Application has been developed mainly for relevant users, such as fishing masters, buyers or fisheries agencies, and other concerned stakeholders. In the process of catch reporting onboard fishing vessels or at sea, fishing masters should report their catch by species and weight to the eACDS system via the Mobile Application (Siriraksophon *et al.*, 2017).

Applying the Novel Satellite Technologies to Track Activities of Fishing Vessels

Flag States have critical roles in controlling and monitoring the activities of their respective flagged fishing vessels to make sure that their operations within and beyond their national jurisdictions are legal. Several technologies have been developed and promoted in the region e.g. VMS, AIS, among others, to support the monitoring and surveillance of fishing vessels' activities, including their positions, and eventually detecting any alleged IUU fishing activities.

Vessel Monitoring System (VMS), a satellite-based system, allows national regulatory agencies or RFMOs to track and monitor a vessel's position, course, and speed, thereby detecting possible IUU fishing activities at sea. To ensure that flag State vessels are fishing within the authorized fishing areas/zones and not to engage in IUU fishing activities, the use of VMS has been promoted in the Southeast Asian region at the country level. In the case of Viet Nam, which has been encountering several difficulties, in monitoring its fishing vessels that could have been engaged in IUU fishing activities, and consequently resulted in the issuance of a "yellow card" by the European Union (EU), the installation of vessel monitoring system (VMS) on fishing vessels has been recommended as one of the essential actions to address the concerns on continued IUU fishing activities. A pilot research study was therefore carried out to assess the impacts of installing VMS on the offshore fishing vessels of Khanh Hoa Province in Viet Nam (Phuong and Nguyen, 2019).

Automatic Identification System (AIS), an automated system that transmits ship's position to other ships, could also be used to reveal a fishing vessel's activities especially in the high seas. AIS could also retrace the routes and activities of fishing vessels, including those suspected of doing illegal fishing operations. The use of AIS in the Southeast Asian region is still being explored.

Box 3. Continuing initiatives of SEAFDEC and the AMSs to counter IUU fishing in Southeast Asian waters (Cont'd)

Strengthening Cooperation for Information Exchange to Combat IUU Fishing

Cooperation in fisheries surveillance and law enforcement could be an effective means of dealing with IUU fishing activities, especially where the fisheries is transboundary. In the Southeast Asian region, exchange of relevant information is being promoted through the utilization of the Regional Fishing Vessels Record (RFVR) Database, strengthening of regional cooperation for the implementation of Port State Measures, and creation of platforms for sharing relevant information including legal frameworks among the countries. In accordance with relevant provisions stipulated in RES&POA-2030 (SEAFDEC, 2020a), SEAFDEC and the AMSs have been encouraged to: “Support consultative dialogues at regional/sub-regional level among fisheries legal officers to share and exchange information on updated legal and regulatory frameworks in addressing issues in fisheries management” (POA # 31).

Strengthening of cooperation for information exchange is also along the lines of the IPOA-IUU, especially on the need to establish and maintain systems for the acquisition, storage, and dissemination of MCS data, taking into account applicable confidentiality requirements, and allow and enable their respective MCS practitioners or enforcement personnel to cooperate in investigations of cases involving IUU fishing activities. Moreover, this endeavor would also be in response to relevant provisions in RES&POA-2030 (SEAFDEC, 2020a) which stipulate the need to: “Strengthen fisheries governance, in line with international practices, by evaluating current constraints to ensure comparability and compatibility of the required practices and the operations of fisheries in the AMSs” (RES # 4); “Implement measures to prevent unauthorized fishing and eliminate illegal fishing practices, e.g. strengthening enforcement of laws and regulations, establishing monitoring control and surveillance (MCS) mechanisms and network, developing and promoting responsible fishing practices, encouraging supplementary livelihood options” (POA # 12); and “Establish and strengthen regional, sub-regional, and bi-lateral coordination on fisheries management and efforts to combat IUU fishing; and where appropriate promote the establishment of Monitoring, Control and Surveillance (MCS) network through inter-agency coordination and information sharing” (POA # 29).

Box 4. Summary of the Way Forward for Combating IUU Fishing in Southeast Asia (Adapted from SEAFDEC/TD (2020a))

National Level

- Strengthen the respective countries' capacity in undertaking their responsibilities as flag State, coastal State and port State, as well as in promoting the market-related measures for combating IUU fishing
- Apply the multiple tools for combating IUU fishing, taking into consideration different scenarios and requirements, e.g. in a domestic environment, territorial seas, EEZs, and RFMO areas, among others
- Consider countering not only IUU fishing in commercial/large-scale fisheries but also exploring appropriate approaches in dealing with IUU fishing in small-scale fisheries in coastal and inland waters
- Ensure that focus is placed not only on illegal fishing but also on unreported and unregulated fishing
- Adopt the innovations for more effective MCS programs, including the use of remote sensing (RS), and artificial intelligence (AI) to alert possible IUU fishing activities, and the conduct of risk assessment before fishing vessels enter the ports
- Enhance the effective adoption of the PSMA with implementation protocols, and identify designated ports taking into account inter-agency cooperation and coordination with relevant countries, for its effective implementation
- Develop and/or improve the respective countries' traceability systems to ensure that these could complement those of the importing countries
- Enhance cooperation and collaboration, including multi-national engagement in the investigation of IUU fishing, and public-private partnership in combating IUU fishing
- Encourage the development of NPOA-IUU that fits with the country's major roles, e.g. whether the country mainly plays the roles as flag State, coastal State or port State, to assist the implementation of the IPOA-IUU

Regional Level

- Strengthening global and regional information exchange, e.g. linking regional systems (e.g. RFVR) with the global system for combating IUU fishing, e.g. PSMA information systems, Global Record
- Enhancing collaboration between organizations in the region for information exchange, e.g. linking with RPOA-IUU Watchlist and RFVR (to enhance reporting of IUU fishing activities occurring in the region), and moving towards online reporting of information by the respective countries
- Furthering harmonization of catch documentation scheme importer's requirements (paper-based and electronic), including the IT Catch, and moving toward ensuring compatibility and linking of data in the future.
- Improving efforts to check unregulated fishing especially of shared stocks by establishing a monitoring plan (e.g. stock assessment) and management plan among concerned countries
- Facilitating the exchange of information on the progress of the various initiatives in combating IUU fishing undertaken by the AMSs
- Continuing dialogues on the establishment of ASEAN policies, the ASEAN General Fisheries Policy (AGFP), ASEAN Network for Combating IUU Fishing (AN-IUU)

the RFVR Database as a tool to combat IUU fishing in the Southeast Asian region that include the possible linking of the information from the RFVR Database with the FAO Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels (Global Record); the expansion of the RFVR Database to include vessels less than 24 meters in length; and the possibility of establishing the regional IUU fishing vessels watchlist, among others. In considering such issues and concerns, the AMSs on various occasions, such as

during the aforementioned Teleseminar and Teleworkshop, as well as during the Forty-third Meeting of the SEAFDEC Program Committee (SEAFDEC, 2020b) and the Twenty-third Meeting of the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (SEAFDEC, 2020c), raised some recommendations to address these issues and concerns, which are summarized in **Box 6**, and which SEAFDEC and the AMSs could take into consideration in their programs and activities relevant to combating IUU fishing.

Box 5. Fundamental elements for eliminating IUU fishing in the Southeast Asian region

<ul style="list-style-type: none"> • Political will and commitment: strong “political will” is very important for each country to combat IUU fishing, particularly in establishing the necessary legal frameworks and mechanisms for combating IUU fishing, and in allocating the necessary resources
<ul style="list-style-type: none"> • Cooperation and collaboration: since each country cannot work alone, cooperation among countries is necessary, e.g. in exchange for information among flag states, coastal states, and port states, etc.
<ul style="list-style-type: none"> • Transparency: sharing of plans and strategies among countries is crucial for countering IUU fishing, especially in transboundary waters
<ul style="list-style-type: none"> • Law enforcement: ensuring that compliance of the laws, regulations, and international and regional requirements is strictly practiced and monitored
<ul style="list-style-type: none"> • Mechanism: detections of IUU fishing activities should result in ACTIONS that include sanctions and punishments, to discourage further practices of IUU fishing (however penalty should be reasonable and comparable among the countries in the region)
<ul style="list-style-type: none"> • Capacity development: conduct of needs assessment in order to come up with proper capacity building programs, and to translate such capacity building programs into actual implementation
<ul style="list-style-type: none"> • Adoption of technologies and innovations: the use of new technologies and top-of-the-line innovations could facilitate monitoring large numbers of vessels including those of the small-scale fishers
<ul style="list-style-type: none"> • Sustainability: making sure that the initiatives and mechanisms for combating IUU fishing are sustained

Box 6. Way forward for the management of the RFVR Database as tool to combat IUU fishing (SEAFDEC/TD, 2020b)

Issues and Concerns	Recommendations of the AMSs (SEAFDEC/TD, 2020a & 2020b; SEAFDEC 2020b & 2020c)
<ul style="list-style-type: none"> • Linking of the RFVR Database with the FAO Global Record 	<ul style="list-style-type: none"> • protocol and mechanisms should be thoroughly discussed among the AMSs through a consultation meeting • burden of the AMSs should be minimized in providing the fishing vessels data to regional and international organizations
<ul style="list-style-type: none"> • Expansion of RFVR Database to include vessels less than 24 meters in length 	<ul style="list-style-type: none"> • utilization of RFVR Database on vessels more than 24 m in length should be enhanced before expanding this to include vessels less than 24 m in length • benefits of expanding the RFVR database to cover vessels less than 24 meters in length, should be carefully assessed as small-scale fishers usually do not operate very far from coastal areas • objectives of RFVR should be revisited as its expansion could pose challenges considering the large numbers of such vessels operating in the region (Note: agreed measurement of vessels less than 24 m in length during the Teleworkshop: 18.00-23.99 m or 50-100 GT)
<ul style="list-style-type: none"> • Establishment of a regional IUU vessels watchlist 	<ul style="list-style-type: none"> • the regional IUU vessels watchlist should be independent from the watchlist of RPOA-IUU, however, coordination between SEAFDEC and RPOA-IUU should be strengthened so that sharing of information for both watchlists is facilitated • AMSs to support the activities of the ASEAN Network for Combating IUU Fishing (AN-IUU)

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Towards Guaranteed Traceability of Fish and Fishery Products from Southeast Asia: the ASEAN Catch Documentation Scheme

Mazalina Ali, Masaya Katoh, and Kongpathai Saraphaivanich

During the implementation of the project “Combating IUU Fishing in the Southeast Asian Region through the Application of Catch Certification for International Trade in Fish and Fishery Products” by the SEAFDEC Marine Fishery Resources Development and Management Department (SEAFDEC/MFRDMD) with funding support from the Japanese Trust Fund (JTF)-II in 2011-2012 and JTF-VI during 2013-2019, the series of core experts meetings convened among SEAFDEC and the ASEAN Member States (AMSs) at the outset of the Project implementation agreed on the development and promotion of the **ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain** also known as the ASEAN Guidelines. Moreover, as part of the ASEAN Guidelines, a catch certification system for large- and small-scale fisheries should also be established for the Southeast Asian region to ensure that only non-IUU/legal fish and fishery products are traded in the supply chain. These tools had been envisioned to address the issues and concerns on IUU fishing activities directly or indirectly, in large- and small-scale fisheries in the Southeast Asian waters, as well as enhance and strengthen the traceability of the region’s fish and fishery products entering the supply chain.

The Resolution and Plan of Action on Responsible Fisheries for Food Security for the ASEAN Region Towards 2020 (RES&POA-2020) adopted in June 2011 included provisions that were used as basis for the ASEAN-SEAFDEC Member Countries in pursuing their objectives of attaining sustainability in fisheries (SEAFDEC, 2011). Specifically, the project “Combating IUU Fishing in the Southeast Asian Region through the Application of Catch Certification for International Trade in Fish and Fishery Products” was implemented by SEAFDEC/MFRDMD in response to the directives indicated in the RES&POA-2020: Resolution No. 8 on the need to: “Foster cooperation among ASEAN Member Countries and with international and regional organizations in combating IUU fishing,” and Plan of Action No. 67 to: “Strengthen cooperation among Member Countries to implement international standards with regards to trading on fish and fishery products within the ASEAN region.” Thus, during the series of core experts meetings involving the AMSs and organized through the Project, the status of the existing trade of fish and fishery products from the region had been assessed, while the existing practices of small-scale fisheries in the region including the existing mechanisms and associated problems in complying with the trade measures imposed by the importing countries, had been compiled. Such information had been used as inputs for the development of regional guidelines that aim to prevent IUU fish and fishery products from being traded.

The ASEAN Guidelines had been envisioned as a first step towards creating a catch certification scheme for non-IUU fishing products, and as a form of mandatory certification requirement to eliminate IUU fishing. Under this scheme, all imports would be considered legal if the flag State could certify that the fish had been harvested in accordance with their own fisheries management regime/requirements or from an area governed by an RFMO or other regional bodies, or in the high seas that comply with international standards. Moreover, such trade measures in support of national and international conservation goals should be transparent and administered in a fair and nondiscriminatory manner, with the underlying conservation goals which must be based on best available scientific evidence (Abdul-Razak *et al.*, 2013a; Abdul-Razak *et al.*, 2013b).

Meanwhile, in compliance with the requirements stipulated in the EC Regulation 1005/2008 establishing a “Community System to Prevent, Deter and Eliminate IUU Fishing,” which took effect on 1 January 2010, the Southeast Asian countries most of which have recently emerged as major exporters of fish and fishery products to the world market, reviewed their respective fisheries regulations to ensure that provisions relevant to eliminating IUU fishing in their respective waters, are in place. Along the lines of the EC Regulation 1005/2008, the Southeast Asian countries have been able to support the worldwide efforts of using trade measures to counter IUU fishing activities in the Southeast Asian region. The analysis of the information gathered had served as basis for formulating solutions that could address the issues and concerns of the AMSs on the adoption of the EU catch certification as means of combating IUU fishing in the region. Moreover, cooperation among the AMSs had been strengthened allowing the countries to exchange information on their experiences in combating IUU fishing, facilitate trade within the region, and propose for the development of a catch certification system for large- and small-scale fisheries to ensure that only non-IUU or legal fish and fishery products are traded by the AMSs.

Development and Promotion of the ASEAN Guidelines

The AMSs have their respective fishery laws and regulations in place that include provisions on eliminating IUU fishing in their respective waters. However, strict enforcement of such regulations might not have been effective because of various constraints that include insufficient manpower and financial resources. Meanwhile, IUU fishing activities continue to take place that also led to illegal trading of IUU fish and fishery products in the Southeast Asian region (Abdul-Razak *et al.*,

2016a). In order to address this concern and in compliance with international requirements to counter IUU fishing to be able to trade fish and fishery products in the world market, the AMSs cooperated with SEAFDEC for the development of the ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain. As envisioned, the ASEAN Guidelines would serve as a foundation for the formulation of relevant policies at national level as well as for the development of clear direction and understanding of the need to prevent the entry of IUU fish and fishery products into the supply chain.

The development of this ASEAN Guidelines took into consideration relevant international instruments, *e.g.* IPOA-IUU Fishing, EC Regulation. However, implementation of the ASEAN Guidelines in the Southeast Asian region had been confronted with many issues in terms of legal framework, manpower and financial resources, and awareness building (Abdul-Razak *et al.*, 2016b). Specifically, additional budget would be required for capacity building of concerned

stakeholders in the respective AMSs. While some AMSs still have inadequate legal frameworks to be able to implement the ASEAN Guidelines, this would necessitate improvement of the existing systems and governance in fisheries management.

Finally, upon the consideration of the ASEAN Guidelines (**Figure 1**) by the SEAFDEC Council during its Forty-seventh Meeting in April 2015, the ASEAN Guidelines was endorsed by the 23rd Meeting of the ASEAN Sectoral Working Group on Fisheries (ASWGFi) in June 2015 for consideration by the higher level meetings of the ASEAN. In August 2015, the ASEAN Guidelines was endorsed by the 37th Senior Officials Meeting of the ASEAN Ministers on Agriculture and Forestry (SOM-AMAF) and finally by the 37th Meeting of AMAF in September 2015 (Mazalina *et al.*, 2015a). In order to strengthen national efforts in combating IUU fishing, the AMSs had been encouraged to develop their respective policies and National Plan of Action to Prevent the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain, based on the ASEAN Guidelines. The AMSs had also been encouraged to establish and/or strengthen bilateral or multi-lateral arrangements and measures in combating IUU fishing in their common or shared or transboundary waters based on the ASEAN Guidelines (Mazalina *et al.*, 2015b).

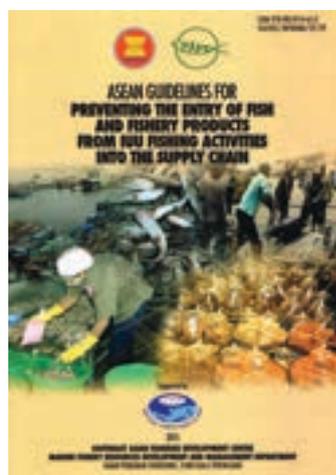


Figure 1. ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain (ASEAN Guidelines)

Self-evaluation of the Implementation of the ASEAN Guidelines

As the ASEAN Guidelines is voluntary in nature, its implementation was meant to be in accordance with the capacity of each AMS. Nonetheless, the status of implementation the ASEAN Guidelines was monitored through self-evaluation by each AMS in 2017, 2018, and

Table 1. Three-year self-evaluation scores of the status of implementation of the ASEAN Guidelines by the AMSs

AMSs	Percentage of actions in ASEAN Guidelines implemented per year in 2017, 2018, 2019 (%)		
	2017	2018	2019
Brunei Darussalam	68.1	-	84.8
Cambodia	65.8	84.8	86.4
Indonesia	87.8	96.4	97.6
Lao PDR	46.4	60.0	80.0
Malaysia	88.5	92.4	98.4
Myanmar	84.1	94.0	94.8
Philippines	80.7	96.4	99.6
Singapore	70.2	-	96.0
Thailand	90.9	98.0	98.0
Viet Nam	76.7	92.4	96.4
Events when respective self-evaluation scores were reported by the AMSs	Second Regional Technical Consultation on Promotion of the ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain, 21-23 November 2017, Kuala Lumpur, Malaysia (Abdul-Razak <i>et al.</i>, 2018)	Consultative visits to AMSs in 2018: Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Thailand, and Viet Nam.	Terminal Meeting of the JTF-6 Project on Combating IUU Fishing in Southeast Asia through the Application of Catch Certification for International Trade in Fish and Fishery Products, 3-5 September 2019, Kuala Lumpur, Malaysia (Abdul-Razak <i>et al.</i>, 2019a; Abdul-Razak <i>et al.</i>, 2019b)

2019, and carried out by giving a certain score to the actions they have undertaken to implement the ASEAN Guidelines (Table 1). Where possible, remarks were also recorded to explain why a certain score is given for particular action taken.

The score system used is 0.0 to 5.0 indicating the percentage of the action implemented, where score 0.0 indicates not applicable or the ASEAN Guidelines were not implemented, 1.0 means 1.0-20.0 percent was implemented, 2.0 means 21.0-40.0 percent implemented, 3.0 means 41.0-60.0 percent was implemented, 4.0 means 61.0-80.0 percent implemented, and 5 means 81.0-100.0 percent of the Guidelines was implemented. The ASEAN Guidelines has 50 sub-actions which means that a total score is 250 would imply that such particular AMS had implemented 81.0-100.0 percent of the actions to combat IUU fishing.

During the Project Terminal Meeting in September 2019, results of the self-evaluation had indicated that most AMSs implemented more than 80 % of the articles in the ASEAN Guidelines, and the increasing trend in the implementation of the ASEAN Guidelines from 2016 until 2019 (Table 1) suggests that the AMSs are committed to combat IUU fishing in the Southeast Asian region. Moreover, it was recommended that self-evaluation of the implementation of the ASEAN Guidelines should be conducted annually as part of the national initiatives, to keep track of the activities to combat IUU fishing in the respective countries.

Establishment and Dissemination of the ASEAN Catch Documentation Scheme

The project “Combating IUU Fishing in the Southeast Asian Region through the Application of Catch Certification for International Trade in Fish and Fishery Products” implemented by SEAFDEC/MFRDMD from 2011-2019, also included the conduct of study on the existing fishing and trading practices of small-scale fisheries in the Southeast Asian region, and on the issues and concerns encountered by the region’s large-scale fisheries in complying with the EC Regulation 1005/2008. The outputs of the activities carried out through the Project had provided the basis for possible promotion of the implementation of the EU catch certification in combating IUU fishing in the Southeast Asian region. During the series of consultations and dialogues among the AMSs, it was suggested that a catch certification or traceability system for large- and small-scale fisheries should be established to facilitate trading of fish and fishery products from the region, and ensure the international market that only non-IUU or legal fish and fishery products are being traded by the AMSs.

As an initial step, SEAFDEC/MFRDMD and the SEAFDEC Secretariat conducted a series of core experts meetings and consultative visits to the AMSs to identify the issues related to the existing fishing and trading practices in small-scale fisheries, the possible solutions for complying with the

EC Regulation 1005/2008 in large-scale fisheries, and the measures to counter IUU fishing activities in the Southeast Asian waters. Through such meetings and consultations, the ASEAN Guidelines was developed and promoted in the region, while the idea of establishing a catch documentation scheme for the region was also being formed.

Taking heed of the call of the “International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated (IUU) Fishing” or the IPOA-IUU, for the countries to develop internationally-agreed market-related measures to prevent, deter and eliminate IUU fishing that could encompass several types of controls on trading of fish and fishery products derived from IUU fishing, SEAFDEC/MFRDMD in collaboration with SEAFDEC/TD and the SEAFDEC Secretariat initiated an activity under the abovementioned SEAFDEC/MFRDMD Project, with the aim of developing a catch documentation scheme for the Southeast Asian region.

Intended as a market-related measure to combat IUU fishing in the region and to document the verifiable information on the fish catch from point of capture to their final destination (Smithrithee *et al.*, 2020), the ASEAN Catch Documentation Scheme (ACDS) was launched during the Meeting of SEAFDEC Council in Brunei Darussalam in April 2017. In addressing the difficulties encountered by the AMSs in adopting the ACDS, the Project sustained the conduct of on-site training sessions in the AMSs. The need to establish the ACDS became eminent considering that many of the AMSs have emerged as major contributors to the world’s total fisheries production as well as major exporters of fish and fishery products to the world market.

As developed, the ACDS was initially intended to improve the traceability of marine capture fisheries in the AMSs in order to enhance intra-regional and international trade of fish and fishery products from the AMSs. In the process of developing the ACDS, its scope had been identified and its provisions and coverage including the catch flow and movement of the





ACDS, had been formulated (Siriraksophon *et al.*, 2016). Although still voluntary for the AMSs, the ACDS could be applied for trading of marine fish and fishery products, *i.e.* fresh or processed, which means that a catch certificate including the details of transshipments shall accompany all catch under the jurisdiction of the AMSs (Siriraksophon *et al.*, 2017). Since the ACDS could also be applied for catch from small-scale fishing vessels that contribute to trading among the AMSs, the ACDS Guide that includes Infographics was published by SEAFDEC (SEAFDEC, 2018).

In order to enhance the adoption of the ACDS, an electronic catch documentation system, the eACDS has been developed with the main objective of simplifying the processes of the ACDS to ease the burden of the stakeholders. Two applications had been developed for the eACDS: web-based and mobile, which involve two phases, *i.e.* for domestic marine capture fisheries, and for the traceability of imported fish and fishery products including catch that had been moved through



Figure 2. KDEs required for the eACDS application software (adapted from Saraphaivanich *et al.*, 2019)

transshipment vessels (Saraphaivanich *et al.*, 2019). The key data elements (KDEs) required for the eACDS include: point of catch, buyers/receivers and sellers, processors, exporters and international shippers, importers, and end consumers (**Figure 2**).

As part of the development of the eACDS, the steps involved in the implementation of the eACDS with focus on the applications of the software (**Box 1**) had been summarized and disseminated to the AMSs (adapted from Saraphaivanich *et al.* 2019)). After having been pilot-tested in Brunei Darussalam, the eACDS would also be promoted in Malaysia, Myanmar, and Viet Nam.

Box 1. Steps involved in the implementation of the eACDS

Step 1: Port-out control
Fishing Master informs and gets permission from the Fishing Port Authority before going out for fishing operation, and is issued an initial Catch Declaration (CD) with password for accessing the mobile application for catch reporting at sea.
Step 2: Catch reporting at sea
After each fishing operation at sea, Fishing Master reports their estimated catch through the mobile eACDS application using the access accounts and password that appear on the initial CD form (features for offline reporting is also available if fishing vessel does not have communication signal)
Step 3: Port-in control and catch-weight verification
Fishing Master reports to the Port-in Control on the catch-weight and species, and is issued the CD by the Fishing Port Authority to guarantee that the catch is regulated and does not come from IUU fishing activities
Step 4: Catch movement to local market
For purchasing fish by buyers and processors for local markets and/or for processing, registered buyers report the necessary information to the center/port using the mobile application, while the movement document (MD) will be issued by the Fishing Port Authority (Note: At the markets, consumers would be able to trace the origin of the fish catch and other information from the QR-Code attached to the MD)
Step 5: Catch movement to processing plants
Movement Document (MD) is issued by authorized fishery officer at ports, for transferring of fish to either local markets or fish processing plants
Step 6: Issuance of CC to processors
Processors to request for Catch Certificate (CC) from competent authority using the web-based application fish that are sent to processing plants, especially in cases where the processed products are meant for export
Step 7: Issuance of the CC by Competent Authority (CA)
When CA receives request from processors, CA will validate all information and if found okay, CA will issue the CC to the processor for exportation of the products
Step 8: Issuance of CC and QR-Code
This is for exportation of fish and fishery products for tracing of the origin of the fish and fishery products
Step 9: Use of mobile QR-Code application
This is for consumers/importers to trace the origin of the fish and fishery products

Conclusion and Recommendations

Results of the implementation of the JTF-funded project “Combating IUU Fishing in the Southeast Asian Region through the Application of Catch Certification for International Trade in Fish and Fishery Products” are shown in **Box 2**. It is desired that these results and the adoption of the ASEAN documentation scheme, could guarantee the quality of fish and fishery products from the Southeast Asian region, thus, enhancing the competitiveness of these products in the world market.

Box 2. Major outputs of the Project “Combating IUU Fishing in the Southeast Asian Region through the Application of Catch Certification for International Trade in Fish and Fishery Products”

- Existing fishing and trading practices in small-scale fisheries identified and compiled
- Issues that hinder the compliance with the EC Regulation 1005/2008 in large-scale fisheries identified
- The ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain, published
- The ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain promoted in the AMSs
- The implementation of the ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain in the AMSs monitored and feedbacks compiled
- Development of the ASEAN Catch Documentation Scheme (ACDS) initiated by SEAFDEC/MFRDMD in collaboration with the SEAFDEC Secretariat
- On-site testing of the eACDS carried out in Brunei Darussalam in collaboration with SEAFDEC Secretariat and SEAFDEC/TD
- Follow-up trials for the implementation of the eACDS in Malaysia, Myanmar, and Viet Nam initiated, and their progress being continuously monitored

After the **ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain** was finalized in 2014, and promoted in the AMSs starting in 2015, some countries still need assistance to be able to adopt the ASEAN Guidelines. Although the AMSs recognized the importance of combating IUU fishing through the adoption of trading measures and are seriously tackling the issues on IUU fishing, the level of implementation of the ASEAN Guidelines differs from country to country based on the circumstances surrounding the respective fishery and trading industry in the countries. Therefore, in order to promote the ASEAN Guidelines in the AMSs, appropriate strategies and measures should be introduced to ensure that effective and practical national plans are formulated and their effective implementation is in place. Nevertheless, the AMSs are still encountering various issues, concerns and difficulties (**Box 3**) that need to be addressed to be able to fully implement the ASEAN Guidelines.

In an effort to address the aforementioned issues, the SEAFDEC/MFRDMD is committed to continue providing technical assistance through capacity building activities

Box 3: Issues, concerns and difficulties encountered by AMSs during the implementation of the ASEAN Guidelines

Legal framework
Some AMSs lack the necessary legal frameworks for implementing some parts of the ASEAN Guidelines, e.g. installation of VMS. Without any legal framework, the countries would not have any enforcement power. In some aspects, difficulties in establishing legal framework reflect the lack of technical guidance and assistance or lack of human and/or financial resources to follow the provisions stipulated in the ASEAN Guidelines. Moreover, there is also a need for the respective governments to look into issues related to the evaluation and improvement of existing systems and governance.
Inadequate resources
The ASEAN Guidelines covers very wide range of fishing and trading activities. In order that the AMSs could follow every aspect of the Guidelines, the countries should have certain amount of resources, which could include human and financial resources, to be able to monitor efficiently their fishing and trading activities
Awareness building
Another challenge that confronts the AMSs in the implementation of the Guidelines is awareness building of the stakeholders. The key stakeholders in the supply chain, e.g. of aquaculture products, are unaware about the benefits and advantages of using a traceability system in their operations. Also, some traditional stakeholders are averse to change and are reluctant to implement any traceability system

to enable the AMSs to adopt the ASEAN Guidelines at national level, considering that the effective and practical implementation of the ASEAN Guidelines depends primarily on the domestic circumstances in fishing, trading, and the socio-economic situation of each AMS. Nonetheless, promotion of the ASEAN Guidelines would be sustained as its total implementation would mean significant reduction in the IUU fishing activities in the Southeast Asian region. Furthermore, the SEAFDEC/MFRDMD would continue to assist the AMSs to carry out the self-evaluation of the implementation of the ASEAN Guidelines as part of their national initiatives, and to keep track of the activities to combat IUU fishing in their respective countries.

Way Forward

Although the ASEAN Guidelines has been disseminated since 2015, some AMSs still require assistance in preparing their respective implementation plans for adopting the ASEAN Guidelines at national levels. In this connection, the domestic circumstances in fishing and trading should be carefully examined taking into consideration each country’s situation, while appropriate strategies and measures should be introduced to ensure that effective and practical national plans are formulated. The varying situations surrounding fisheries and trading in the AMSs that differ country by country should be carefully taken into account when establishing the strategies. The countries’ self-initiatives to develop appropriate national implementation plans must be esteemed for the ASEAN Guidelines based on their own legal and governance frameworks. In addition, sharing of information among the

countries should be enhanced to facilitate discussions on the effective, practical, and appropriate actions and protocols in combating IUU fishing at national and local levels. Sharing of information would be advocated as the results would contribute to the harmonization of the measures that already exist in the AMSs, for combating IUU fishing by preventing the trade of fish and fishery products from IUU fishing. Furthermore, self-assessment of the ASEAN Guidelines by the AMSs would be sustained as the results could provide a better picture of the role played by the countries in promoting the ASEAN Guidelines. It is envisioned that the current results of the self-evaluation, showing the varying status of implementation of the ASEAN Guidelines in AMSs from 80 %, could be improved. It should also be noted that the variation was due to the existence of legal frameworks.

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Enhancing Regional Capability in Monitoring and Analysis of Contaminants in Seafood: Southeast Asian Perspective

Ong Yihang

The “Regional Guidelines for Responsible Fisheries in Southeast Asia: Post-harvest Practices and Trade” stipulates among others, the need to ensure the trading of “safe fish and fishery products” from the Southeast Asian region. As defined in the said Regional Guidelines, “safe fish and fishery products” refers to seafood that does not cause illness, injury, or death upon consumption by consumers. Moreover, any fish products can be “unsafe” for consumption because of the presence or growth of pathogenic organisms or their toxins (e.g. bacteria, viruses, fungi), the presence of biotoxins (e.g. biogenics, amines, and ciguatoxins) and parasites, or contaminated with chemicals, drug residues, or unsafe materials (e.g. heavy metals). In view of the prevailing presence of chemical contaminants and drug residues in seafood products and their serious implications to trade and human health, SEAFDEC launched in 2004 the five-year Program “Chemical and Drug Residues in Fish and Fish Products in Southeast Asia” which was implemented by the Marine Fisheries Research Department (MFRD) of SEAFDEC and funded by the Japanese Trust Fund (JTF)-II of the Government of Japan. Intended to obtain an understanding of the levels of chemical contaminants in fish and fish products in Southeast Asia, and to transfer the developed testing technologies and methodologies to the region through capacity building, the Program was implemented through regional consultations and training, and conduct of surveys to monitor and analyze the occurrence of chemical contaminants and drug residues in seafood products.

Furthermore, the consumption of shellfishes and fishes that had been contaminated by biotoxins could lead to incidence of human intoxications and even deaths. Comprising poisonous substances that are naturally present in fish and fishery products or accumulated by aquatic animals that feed on algae that produce toxins or through the water that contained such toxins, biotoxins when consumed represent a significant and expanding threat not only to public health risk worldwide but also to the risks of mass kills in fishes and shellfishes as well as deaths in marine mammals and birds. In an effort to address such concerns, MFRD continued to implement the aforementioned JTF Program from 2009

to 2012 with funding support from JTF-II, by focusing on biotoxins monitoring in the Southeast Asian region. The main objective of the program was to increase the attention of concerned stakeholders in expanding and improving the initiatives to monitor, detect, and share information on biotoxins to reduce the public health risks associated with the consumption of contaminated seafood. The Program was implemented through capacity building in the analytical methods for monitoring and analyzing the occurrence of the diarrhoeic shellfish poisoning (DSP) toxins, lipophilic toxins, paralytic shellfish poisoning (PSP) toxins, and tetrodotoxin (TTX), as exemplified through the conduct of monitoring surveys on PSP toxins in the ASEAN Member States (AMSs). Upon its completion in 2012, the Program was extended from 2013 to 2019 under the JTF-VI as a continuing effort to support and strengthen the regional capabilities in biotoxin monitoring. This extension had enabled the AMSs to enhance their capabilities in monitoring and analyzing other biotoxins such as the amnesic shellfish poisoning (ASP) toxin (domoic acid), azaspiracids (AZA) toxin, and brevetoxins (BTX) which causes neurotoxic shellfish poisoning (NSP), as well as in identifying and analyzing the occurrence of harmful algal blooms (HABs) in the AMSs.

As a result, this Program which was implemented for 15 years and received sustained funding from the JTF, had enabled the AMSs to gain greater understanding of and enhanced their knowledge of the occurrences and incidences of chemical and drug contaminants in seafood as well as those of biotoxins and on HABs. Through the Program’s capacity building activities, the regional capability of the national testing laboratories of the respective AMSs had been improved allowing them to monitor and analyze such contaminants in seafood. Eventually, the Program has empowered the AMSs to achieve high integrity of their respective laboratories and facilities as stipulated in the 2001 and 2011 Resolution and Plan of Action for Food Security for the ASEAN Region, especially in terms of analyzing the occurrence of chemical and drug contaminants, biotoxins, and HABs in seafood, and ensuring the quality and safety of the region’s fish and fishery products for local consumption as well as for export.

Monitoring Chemical and Drug Residues in Fish and Fish Products of Southeast Asia

This part of the long-running JTF Program focused on monitoring chemical and drug residues in seafood products of Southeast Asia, and included four main activities, namely: Survey of Heavy Metals in Fish and Fish Products in Southeast Asia; Survey of Pesticide Residues in Fish and Fish Products in Southeast Asia; Survey of Histamine Levels in Fish and Fish Products in Southeast Asia; and Survey on Drug Residues in Southeast Asian Fish and Fish Products (Tan &

Saw, 2008). The development of these activities was guided by the Regional Guidelines for Responsible Fisheries in Southeast Asia: Post-harvest Practices and Trade (SEAFDEC, 2005) which stipulated among others, the need to ensure the trading of “safe fish and fishery products” from the Southeast Asian region, as well as the relevant provisions in the series of Resolution and Plan of Action for Food Security for the ASEAN Region (SEAFDEC, 2001; SEAFDEC, 2011). Results of the surveys were used as inputs for the Technical Compilation that was produced as output of the Project, and were deposited in the Database of the Fish and Fish Products Safety Information Network.

After the five-year implementation of this part of the Program, an understanding was gained by the stakeholders on the levels of chemical contaminants in seafood, skills in monitoring the presence of such contaminants had been developed, and the methodologies in testing chemical contaminants were established and promoted in the Southeast Asian region through human resource capacity development activities. As its final output, the “Technical Compilation of Heavy Metals, Pesticide Residues, Histamine and Drug Residues in Fish and Fish Products in Southeast Asia” (Tan & Saw, 2008) was published, which includes the results of the surveys and the established technologies for testing the presence of chemical contaminants in seafood products of the Southeast Asian region. Having been disseminated through massive regional training sessions, the Technical Compilation had enabled the ASEAN Member States (AMSs) to enhance their capability in testing for contaminants in seafood, and in monitoring and analyzing their presence, especially in seafood bound for export to the European Union and other countries. Moreover, experiences had been shared through the meetings and seminars that were organized to confirm the reliability of the respective countries’ analyses, and help the exporting countries in identifying and addressing technical problems, and eventually, fulfill the requirements of importing countries that benefited the seafood trade of the Southeast Asian countries.

Survey of Heavy Metals in Fish and Fish Products of Southeast Asia

In determining the levels of contamination of heavy metals, *i.e.* total mercury, lead, and cadmium, in fish and fish products of the AMSs, a regional survey was carried out in seven (7) participating countries, namely: Cambodia, Indonesia, Malaysia, Myanmar, Singapore, Thailand, and Viet Nam. Economically and socially important fish and fish products of the participating countries were surveyed, and to ensure the accuracy and comparability of the different methods used by the AMSs in testing and analyses of the levels of the contaminants in fish and fish products, the countries were encouraged to participate in the Inter-laboratory Proficiency Testing which was aimed at harmonizing the test methods and standards. Furthermore, through the on-site training sessions provided by MFRD, the skills of personnel from the national laboratories had been enhanced, especially in the analysis of heavy metals contamination using the Atomic Absorption Spectrometry (AAS).

Results of the survey showed that in many cases, heavy metals were not detected in the samples otherwise the levels of heavy metals were lower than the national and international standards used by the AMSs, suggesting that the fish and fish products of the region were safe for consumption and export (Tan & Saw, 2008). However, the participating countries encountered some issues and concerns during the regional

surveys, but these had been addressed in the future relevant activities of SEAFDEC.

Survey of Pesticide Residues in Fish and Fish Products of Southeast Asia

Prior to the Regional Survey of Pesticide Residues in Fish and Fish Products, on-site training sessions on analyzing pesticide residues (organochlorines) were conducted to upgrade the skills of the staff of national laboratories in conducting the analysis using the gas chromatography-mass spectrometry (GC-MS). Fish and fish products that are of economical and social importance to the participating countries were targeted, where the samples were sent to their respective local/collaborating laboratories for analysis. Dried products from both marine and freshwater species, as well as dried fish and fish products from inland and estuarine waters, and rivers were also targeted for the survey. A total of 35 fish and fish products were surveyed in seven participating countries, namely: Cambodia, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam. Results of the survey had indicated that the level of contamination did not exceed the minimum residue levels (MRLs) set by the importing countries suggesting that the target species are safe for consumption and export (Tan & Saw, 2008).

Survey of Histamine Levels in Fish and Fish Products of Southeast Asia

Regional surveys were conducted on the naturally occurring toxins and histamine in fish and fish products of the AMSs involving the national laboratories in seven participating countries, namely: Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, and Viet Nam. Fish and fish products from scombroid species were targeted for the survey that also included the analysis of fermented fish and fish products such as prawn paste and fish sauce, although each country was free to decide on the type of fermented fish and fish products to be analyzed within the allocated budget. A total of 28 fish and fish products were surveyed.

Moreover, on-site training courses on histamine analysis using the fluorometric and high-performance liquid chromatography (HPLC) methods were conducted to upgrade the technical capability of the AMSs in histamine testing. The results of the survey showed that the histamine levels in fish and fish products from the AMSs were at the acceptable range (Tan & Saw, 2008).

Survey on Drug Residues in Fish and Fish Products of Southeast Asia

Regional surveys of chloramphenicol and nitrofurans in fish and fish products for seafood safety were conducted by the respective national laboratories of six participating countries,

namely: Indonesia, Malaysia, Myanmar, Philippines, Thailand, and Viet Nam. In addition to the aforementioned drugs, malachite green and leuco-malachite green were included in the survey. In view of the different analytical methods used in the survey, the countries participated in the Inter-laboratory Proficiency Testing for chloramphenicol in prawn samples, while the countries that surveyed malachite green and leuco-malachite green participated in the proficiency testing of fish muscle samples. This had ensured that the countries would come up with comparable and accurate results in spite of the different methods used. A total of 15 fish and fish products were surveyed, and the results of the survey showed that the drug residues in fish and fish products from almost all the AMSs were within the standard limits set by the EU and other importing countries (Tan & Saw, 2008). Training for laboratory personnel on the analysis of antibiotics especially in the detection of prohibited drugs such as chloramphenicol and nitrofurantoin used in aquaculture farms, was considered essential as the analysis requires the use of sophisticated instruments such as the liquid chromatography-tandem mass spectrometry (LC-MS/MS) for detection and determination of the residues.

From the results of the surveys on heavy metals, pesticide residues, histamine, and drug residues conducted in the participating AMSs, few samples were found to have exceeded the national or international regulatory limits. Nonetheless, the participating countries had been exerting efforts to improve their capabilities in surveillance and monitoring of heavy metal contents, pesticide residues, histamine contents, and drug residues in fish and fish products to ensure that the fish and fish products from the Southeast Asian region are safe not only for domestic consumption but also for export. It should be noted that only a few laboratories of the participating countries regularly took part in recognized inter-laboratory proficiency testing, notwithstanding the need for national laboratories to participate in proficiency testing as means of assessing the laboratories' proficiency and staff competency in conducting tests based on the prescribed analysis methods. The inability of laboratories to participate in inter-laboratory proficiency testing was mainly brought about by insufficient funds and lack of competent laboratory staff. Furthermore, other constraints encountered during the surveys were also identified, such as the small sampling size and limited sampling locations which could generate results that might not reflect the actual situation of the chemical contamination level in the countries. Thus, through this JTF-II Project, a number of on-site and regional training sessions had been organized generating more than 100 laboratory personnel who have been empowered to transfer the techniques in analyzing heavy metals, pesticide residues, histamine, and drug residues. However, there is a need to continuously train and upgrade the skills of laboratory personnel to ensure their competency and efficiency. In conclusion, the participating AMSs had benefited from this JTF-II Project through the baseline information compiled on the level of contamination

for heavy metals, pesticides, histamine, and drugs. Such information would be useful for the planning and monitoring of programs on chemical residues and contamination of fish and fish products in the region. The results of the surveys had also offered the assurance and confidence about the safety of the fish and fish products from the AMSs.

Biotoxins Monitoring in the ASEAN - Phase I

Upon the completion of the research and analysis of chemical residues and contamination in fish and fish products, the AMSs recommended during the 2008 JTF-II End-of-Program Meeting that SEAFDEC should consider extending the Program to also cover biotoxins that had caused increasing number of human intoxications upon consuming contaminated seafood. This led to the development of activities under the Program on biotoxins monitoring in the AMSs that continued to receive funding from JTF-II.

With the main objective of developing the methodologies for biotoxin analyses, biotoxin surveys, and training, the corresponding activities that focused on biotoxins monitoring and analyses, were implemented from 2009 to 2012 through consultations and meetings, capacity building, and surveys. As defined in the Codex Alimentarius Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003), biotoxins are poisonous substances naturally present in fish and fishery products or accumulated by the animals feeding on toxin producing algae, or in water containing toxins produced by such organisms. Therefore, biotoxins monitoring is essential to manage food risks and ensure food safety (Joint FAO/WHO Codex Alimentarius Commission, 2009). MFRD therefore worked together with the AMSs to carry out the activities on biotoxins monitoring in order to increase the awareness of the stakeholders on the need to monitor, detect, and share information on marine biotoxins so as to reduce the public health risks associated with the consumption of contaminated fishes and shellfishes.

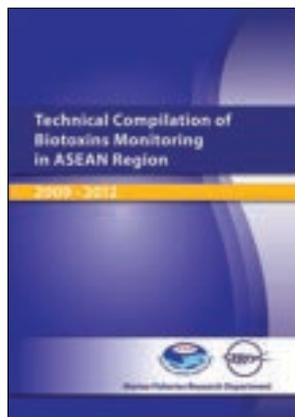
Under this phase of the JTF Program, five methods of analyzing various biotoxins were promoted, *i.e.* multi-component testing of diarrhetic shellfish poisoning (DSP) and lipophilic toxins (yessotoxin (YTX), pectenotoxins (PTX)) using LC-MS/MS method; rapid testing for DSP; paralytic shellfish poisoning (PSP) testing using HPLC; PSP ELISA rapid testing; and tetrodotoxin (TTX) testing using LC-MS/MS. Introduced through capacity building, these methods were selected to address the need for the AMSs in building up their respective capabilities (Neo *et al.*, 2012).

Moreover, the increased harvest of exotic species of shellfishes (*e.g.* moon snails, whelks, and barnacles) could also bring about new food safety issues and raise the responsibilities in managing them. Therefore, it has become important to manage

the risks that the biotoxins generate by monitoring the toxicity of seafood, although such process poses some challenges that could include: variations in toxin contents among individual fishes and shellfishes; different detection and extraction methods for various types of toxins; and awareness of the instances that would require prioritized decisions on the types of toxins to test for, the frequency of sampling, and the sampling locations.

In an effort to address such concerns, Biotoxins Survey was conducted from 2011 to 2012 in nine AMSs, namely: Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam, and targeted at monitoring the PSP in green mussels (*Perna viridis*), except for Indonesia and Viet Nam which monitored the PSP in baby clams (*Meritrix* spp.). Meanwhile, Myanmar and Singapore had also expanded their survey to include the monitoring of amnesic shellfish poisoning (ASP) and DSP in *P. viridis*. During the survey, the countries used the mouse bioassay (MBA) as the screening method followed by HPLC as the confirmation method (Neo *et al.*, 2012). Based on the results of the surveys, the participating AMSs had also been able to upgrade their respective national laboratory capabilities and enhance their credibility for testing and analyzing DSP, PSP, and TTX biotoxins, and subsequently established their respective countries' monitoring activities for routine surveillance and testing of fish and fishery products, which were of particular benefit to countries that still have not established their respective methodologies.

Meanwhile, the AMSs had also deepened their knowledge and understanding on the levels of biotoxin occurrences and incidences in fish and fish products in the Southeast Asian region, which in turn, facilitated the exchange of information among the AMSs through the establishment of a directory of biotoxin experts, and the responsible persons and national authorities in each AMS. Finally, the Program came up with the Technical Compilation of Biotoxins Monitoring in ASEAN Region, 2009-2012 (Neo *et al.*, 2012), which had been promoted in the Southeast Asian region. As the final output of the Project, this Technical Compilation would be beneficial to policy makers, technologists and scientists as well as regulatory personnel in the fisheries sector.



From the results of the survey on PSP in green mussels (*Perna viridis*) and baby clams (*Meritrix meritrix*) conducted by the participating AMSs, a few samples were found to have exceeded the permitted regulatory limits. Nonetheless, it could be concluded that the shellfish products from the

AMSs were generally free of PSP toxin. Moreover, active participation in inter-laboratory proficiency testing has been strongly encouraged as it would ensure the credibility of the test results produced by the concerned laboratories and enhance the confidence level of the laboratory personnel.

During the survey, however, various constraints were encountered by the participating countries, *e.g.* insufficient funds for sampling and analysis, inadequate laboratory resources such as personnel with the scientific know-how, and in some countries, poor logistic arrangements resulting in undesirable preservation of samples collected from distant sampling areas. In order to address these issues, it had been recommended that the scope of investigation should be extended to cover other potential toxin hazards in fish and fish products; monitoring scheme should be established under the comprehensive quality management system; continuous upgrading of human resource capacity and laboratories' capability in biotoxins testing should be promoted; and advanced reliable rapid test method should be introduced to shorten the test cycle time.

Through this Project, the participating AMSs enhanced their respective capabilities in developing methodologies for biotoxin analyses and establishing monitoring schemes for biotoxins detection. The Project has also provided a platform for knowledge-sharing and networking not only among the participating countries but also among the AMSs, bringing about better understanding of the frequency of biotoxin occurrences and incidences in shellfishes of the Southeast Asian region.

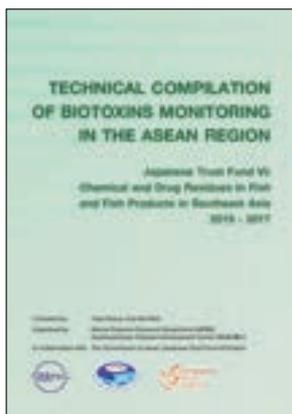
Biotoxins Monitoring in the ASEAN - Phase II

In response to the concerns of the AMSs, the JTF-II Project on biotoxins monitoring was extended from 2013 to 2019 under the JTF-VI as a continuing effort to support and strengthen the regional capabilities in biotoxin monitoring and analyses of other biotoxins such as the amnesic shellfish poisoning (ASP) toxin (domoic acid), azaspiracids (AZA) toxin, and brevetoxins (BTX) which causes neurotoxic shellfish poisoning (NSP), and also on the identification of toxic harmful algal bloom (HAB) species. Implemented mainly through regional technical consultations and meetings, regional training courses in biotoxin analyses, and biotoxins monitoring surveys, the Project had been able to enhance the capabilities of and confirm the credibility of the laboratories of the AMSs in testing for ASP, AZA, and BTX biotoxins, facilitate the establishment of biotoxins monitoring programs for routine surveillance testing of fish and fishery products in the AMSs, improve the knowledge and understanding of technical personnel from the AMSs on the levels of biotoxins occurrences and incidences as well as of toxic HABs in fish and fishery products, and enhance the capabilities of the AMSs

in the identification of toxic HABs to ensure that fish and fishery products of the region are safe for human consumption. Moreover, a number of technical persons from the AMSs have been trained on AZA, ASP, and BTX biotoxin analyses and in the identification of toxic HABs. Thus, technical personnel from the AMSs had acquired the skills in preparing samples and conducting instrumental analysis using HPLC for ASP and the LC-MS/MS method for AZA and BTX.

Thereafter, monitoring survey was conducted by seven AMSs, namely: Indonesia, Myanmar, Malaysia, Philippines, Singapore, Thailand, and Viet Nam, allowing the participating AMSs to put into practice the knowledge gained from the training in identifying and determining the biotoxin occurrences, and facilitated the establishment biotoxins monitoring programs in their respective countries.

The “Technical Compilation of Biotoxins Monitoring in the ASEAN Region” (Ong & Chai, 2019) was published at the end of the Project in 2019 as a collaborative effort of the participating AMSs to enhance regional capabilities for testing and analyzing ASP, AZA and BTX biotoxins as well as the identification of toxic HAB species.



This Technical Compilation would be beneficial to policy makers, technologists and scientists as well as regulatory personnel in the fisheries sector, and could serve as valuable learning tool for all AMSs by including the biotoxins analytical methods and outcomes of the biotoxins monitoring surveys, and the reports on toxic HABs occurrences and incidences that bridge the existing gaps in the management of HABs. The methodologies and recommendations of the biotoxin monitoring surveys contributed by respective AMSs with insightful sharing of problems and challenges encountered during the surveys are also included in the Technical Compilation. Moreover, the directory list of responsible national authorities and HABs experts in the SEAFDEC Member Countries also forms part of the said Compilation.

The successful completion of the Project under the JTF II and VI had resulted in the regional upgrading of the capabilities of national laboratories and heightened the credibility in testing and surveillance of eight types of biotoxins, as well as identification of the toxic HAB species (Yeap & Sulit, 2017). The Project also strengthened the fish quality and safety management systems that support the competitive position of the fish and fish products from the ASEAN in the global market, as provided for in the Resolution and Plan of Action for Food Security for the ASEAN Region Towards 2020 (SEAFDEC, 2011).

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Unveiling the Stock Status of Oceanic Tuna Resources in Sulu-Sulawesi Seas

Siriporn Pangson and Tom Nishida

Oceanic tuna species are the most economically-important commodities of the Southeast Asian region, not only because of their high export values, but also as source of nutrients for the local populace. In an effort towards advocating the sustainable utilization and management of oceanic tuna resources in the region, the Training Department (TD) of the Southeast Asian Fisheries Development Center (SEAFDEC) has been exerting efforts to determine the stock statuses of these tuna resources, especially for the skipjack (*Katsuwonus pelamis*), yellowfin (*Thunnus albacares*), and bigeye (*Thunnus obesus*) tuna resources. Considering that information on these highly migratory species remains limited, the six-year Project of SEAFDEC/TD “Offshore Fisheries Resources Exploration in Southeast Asia” launched in 2013, gave more focus on the “Development of Joint Research Program for Tuna Research Surveys in the Sulu-Sulawesi Sub-regional Area (SSS),” which included the important Activity, “Assessment and Management for Sustainable Utilization of Skipjack Tuna (SKJ), Yellowfin Tuna (YFT), and Bigeye Tuna (BET) Resources in the SSS.” Because the stocks of SKJ, YFT and BET in the SSS belong to the West-Central (WC) Pacific stock, the stock assessments would not be meaningful if focus is made solely in the SSS. Nonetheless, stock assessments were carried out to learn the local statuses in the SSS just as crude

references, along with capacity building for the three (3) countries exploiting SKJ, YFT, and BET, namely: Indonesia, Philippines, and Malaysia. Results of the stock assessment by “A Stock Production Model Incorporating Covariates (ASPIC)” suggested that the local stock statuses of these tuna species in the SSS were highly and likely much worse than in the whole WC Pacific Ocean for SKJ and BET in the past, *i.e.* there were likely strong local depletions by higher fishing pressures in the SSS. However, the most recent stock statuses based on the Kobe plot (the stock status projectory diagram) of YFT in 2015 and BET in 2017, indicated that these were in the safe (green) zones, although the stock status of SKJ was still in the unsafe (yellow) zone, but not too serious. From these facts and from the precautionary point of view, it is therefore recommended that the total catch limits of these tuna species in the SSS should not be increased from the localized MSY levels, *i.e.* 240,000 t for SKJ, 133,000 t for YFT, and 18,000 t for BET. Since SEAFDEC is not the international organization mandated to make recommendations on catch limits, these recommended catch limits could not be considered legally binding, but the countries harvesting these three (3) species should constructively bear these recommendations in mind for the sustainability of their respective oceanic tuna resources.

In the Southeast Asian region, skipjack tuna (*Katsuwonus pelamis*) (SKJ), yellowfin tuna (*Thunnus albacares*) (YFT), and bigeye tuna (*Thunnus obesus*) (BET) are the most commercially important oceanic tuna species (**Figure 1**) that inhabit their oceanic waters, especially in the north eastern Indian Ocean side of FAO Marine Fishing Area 57 (**Figure 2**) and the western Pacific Ocean side of the FAO 71 (**Figure 3**). It should also be noted, however, that from the perspectives of regional management, tuna fisheries in the waters of Southeast Asia are under the supervision of two tuna Regional Fisheries Management Organizations (RFMOs), *i.e.* the Indian Ocean Tuna Commission (IOTC) and the Western Central Pacific Fisheries Commission (WCPFC).

Although WCPFC and IOTC cover very wide management areas, while the Southeast Asian waters are much smaller, the production of SKJ, YFT and BET in the Southeast Asian waters are quite high (**Table 1**), *i.e.* the average catch of SKJ, YFT and BET during 2013-2017 was 714, 000 t, 334,000 t and 99,000 t, respectively, which were more than 30% of the WCPFC and IOTC combined productions for each species.

The high production of SKJ, YFT and BET resources, and the importance of the resources to the Southeast Asian region, prompted the Southeast Asian Fisheries Development Center (SEAFDEC) to promote the sustainable utilization and management of these tuna species. However, information



Figure 1. Most economically-important oceanic tuna species in the Southeast Asian region (*top to bottom*): skipjack tuna (SKJ), yellowfin tuna (YFT), and bigeye tuna (BET)

on their local situation in the Southeast Asian waters is limited, so that in its attempt to improve such a situation, the SEAFDEC Training Department (TD) launched the Project “Offshore Fisheries Resources Exploration in Southeast Asia (2013-2019),” which included the Activity “Assessment and



Figure 2. FAO Marine Fishing Area 57 in Southeast Asia covers the marine fishing areas of Myanmar, Thailand (Andaman Sea), Malaysia (West Coast of Peninsular Malaysia), and Indonesia (Malacca Strait, West Sumatra and South Java, and Bali-Nusa Tenggara)

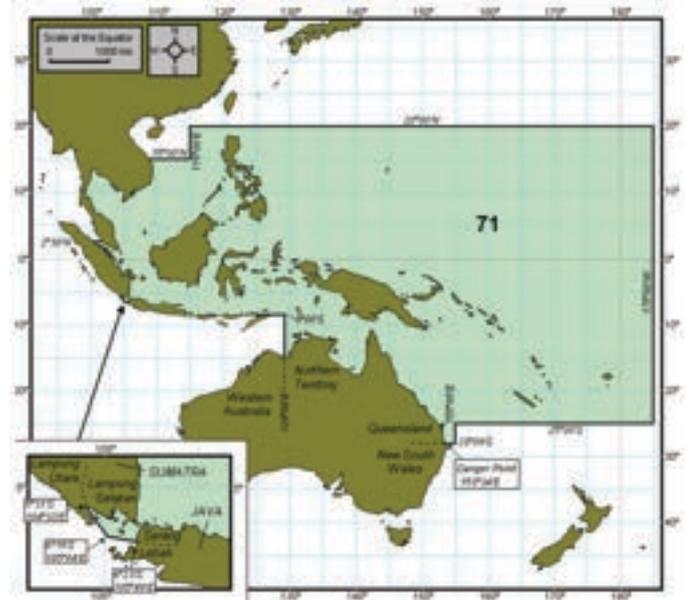


Figure 3. FAO Marine Fishing Area 71 in Southeast Asia covers the marine fishing areas of Thailand (Gulf of Thailand), Cambodia, Viet Nam (Southwest Viet Nam), Malaysia (East Coast of Peninsular Malaysia, Sarawak, and Sabah), Singapore, Brunei Darussalam, the Philippines (Luzon, Visayas, and Mindanao), and Indonesia (East Sumatra, North Java, Bali-Nusa Tenggara, South-West Kalimantan, East Kalimantan, South Sulawesi, North Sulawesi, and Maluku-Papua)

Table 1. Production of SKJ, YFT and BET from FAO Marine Fishing Areas 57 and 71 in Southeast Asian Waters ('000 tonnes)

Species	2013		2014			2015			2016			2017			5-year average (2013-17)	
	Fishing Area 57	Fishing Area 71	Total	Fishing Area 57	Fishing Area 71	Total	Fishing Area 57	Fishing Area 71	Total	Fishing Area 57	Fishing Area 71	Total	Fishing Area 57	Fishing Area 71		Total
Skipjack tuna (SKJ)	95	608	703	72	663	735	74	673	747	72	593	665	97	621	718	714
Yellowfin tuna (YFT)	61	290	351	45	318	363	46	322	368	37	277	314	40	247	287	334
Bigeye tuna (BET)	36	55	91	32	65	98	33	67	100	22	49	71	22	113	135	99
Total	192	953	1,145	149	1,046	1,196	153	1,062	1,215	131	919	1,050	159	981	1,140	1,147

Source: SEAFDEC (2015; 2017a; 2017b; 2018; 2019a)

Note: Production in Area 71 is much higher than in Area 57, i.e. the composition of catch between Area 71 vs. 57 in average for 5 years (2013-2017) by species are as follows: SKJ (89% vs. 11%), YFT (86% vs. 14%) and BET (69% vs. 31%)

Sustainable Utilization of SKJ, YFT, and BET Resources in the Sulu-Sulawesi Sub-regional Area (SSS)” with funding support from the Japanese Trust fund (JTF) II.

Assessment and Sustainable Utilization of SKJ, YFT, and BET Resources in the SSS

This article describes the Activity using results of stock assessments from the Second SSS practical workshop (WS) in 2019 with some additional information, which include five topics, namely: “Capacity Building”, “Stock Structure”, “Catch and CPUE”, “Stock Assessment and Stock Status”, and “Recommendations on Catch Limits.”

Capacity Building

As one of the important objectives of this Activity, capacity building on stock and risk assessments for technical staff from the Association of Southeast Asian Nations (ASEAN) Member States (AMSs) was promoted through two (2) practical

workshops (WS) organized by SEAFDEC/TD. The First WS was conducted in Davao, Philippines in 2015 (SEAFDEC, 2017c), and the Second WS was at the premises of SEAFDEC/TD in Samut Prakan, Thailand in 2019 (SEAFDEC, 2019b) (Picture 1).



Picture 1. Second practical workshop on stock and risk assessment of SKJ, YFT, and BET in the Sulu-Sulawesi Seas Project (May, 2019) (SEAFDEC/TD)

Based on the catch and catch per unit of effort (CPUE) data, “A Stock Production Model Incorporating Covariates (ASPIC)” by Prager (2004) was applied for the stock assessments. In addition, four (4) menu-driven sets of software specially developed for SEAFDEC, were used to easily conduct the necessary processes without the use of any computer programming languages. These four sets of software are: “CPUE standardization”, “ASPIC (batch job)”, “Kobe I (Kobe plot)”, and “Kobe II (risk assessments). They have been gradually developed since 2013 and improved to reflect the requests from the SSS WS participants and also those from the SEAFDEC-Sweden Neritic Tuna Project WS in 2016-2020 also using these software (Nishida, 2020). In SEAFDEC, four software have been successfully and efficiently utilized during the capacity buildings on relevant stock and risk assessment (SEAFDEC, 2020; Kaewnuratchadasorn *et al.*, 2020).

Stock Structure

Although the SSS in the Southeast Asian waters is a considerably small part of the Western and Central Pacific Fisheries Commission (WCPFC) Convention Area (**Figure 4 above**), it embraces an area of about 900,000 km² of waters and the marine environment of this area is bestowed with rich

resources of SKJ, YFT and BET that migrate around, and is shared by three (3) bordering marine fish producing countries, namely: Indonesia, Philippines, and Malaysia (**Figure 4 below**). Thus, the SSS had been considered the most appropriate site in the Southeast Asian waters for this Activity, which was aimed at learning the stock statuses of these three important oceanic tuna species. Since it was necessary that the stock assessments should be conducted within the same stock to provide plausible and meaningful management suggestions, the stock structure was examined prior to conducting the stock assessments. In the entire Pacific Ocean, the stock structures of these three species were assumed to be of two stocks, *i.e.* the Western-Central (WC) Pacific stock and the Eastern stock, which are managed by the WCPFC and the Inter-American Tropical Tuna Commission (IATTC), respectively (**Figure 4 above**). Considering that the stocks of SKJ, YFT and BET in the SSS belonging to the WC Pacific stock, it would not be meaningful to conduct any stock assessments solely for the SSS.

If stock assessments were to be conducted only for the SSS, theoretically the stock status should be identical to those of the WC Pacific stock, because the key parameters such as biomass ratio (B/B_{msy}) and F ratio (F/F_{msy}) are supposed to be identical in both areas where the same stock inhabits, *i.e.* the Kobe plots (the stock status trajectory) in the SSS and WCPFC should be identical. However, if two Kobe plots were heterogeneous, this would imply that the local situation (stock statuses) in the SSS may be affected by unique localized anomalies such as fishing pressures, movements between the SSS and WCPFC, environmental conditions, number of FADs deployed, and others. Therefore, the stock statuses of these three oceanic tuna species in the SSS would have been likely reflected by the integration of these factors. Under such circumstances, stock assessments carried out to learn the local situation just **as crude references**, considering that the results might not be meaningful as it is not known as to what extent such anomalies had affected the local stock statuses of these three oceanic tuna species.

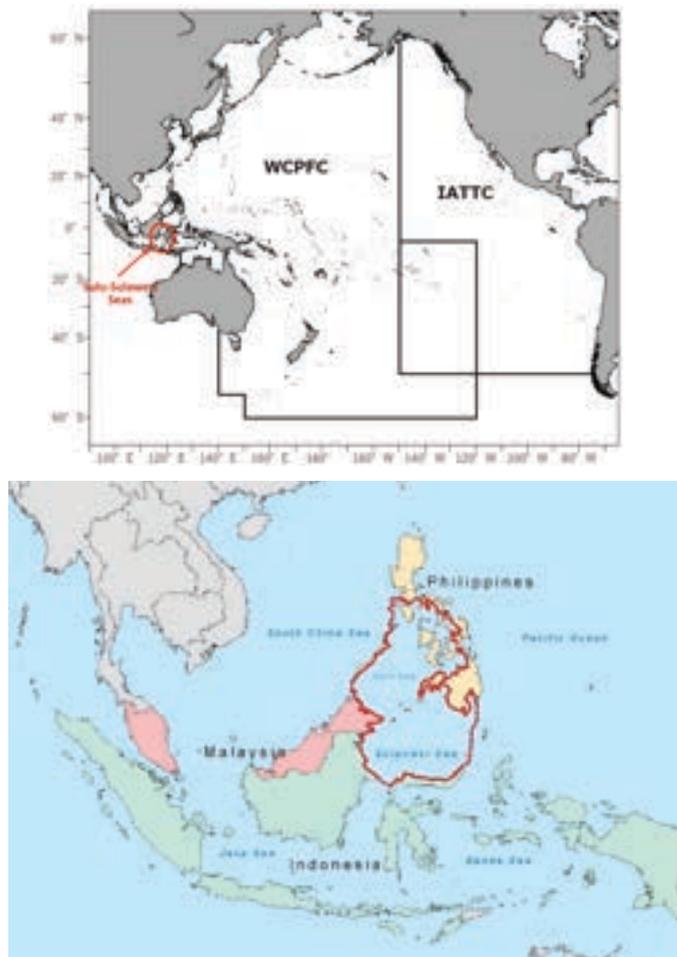
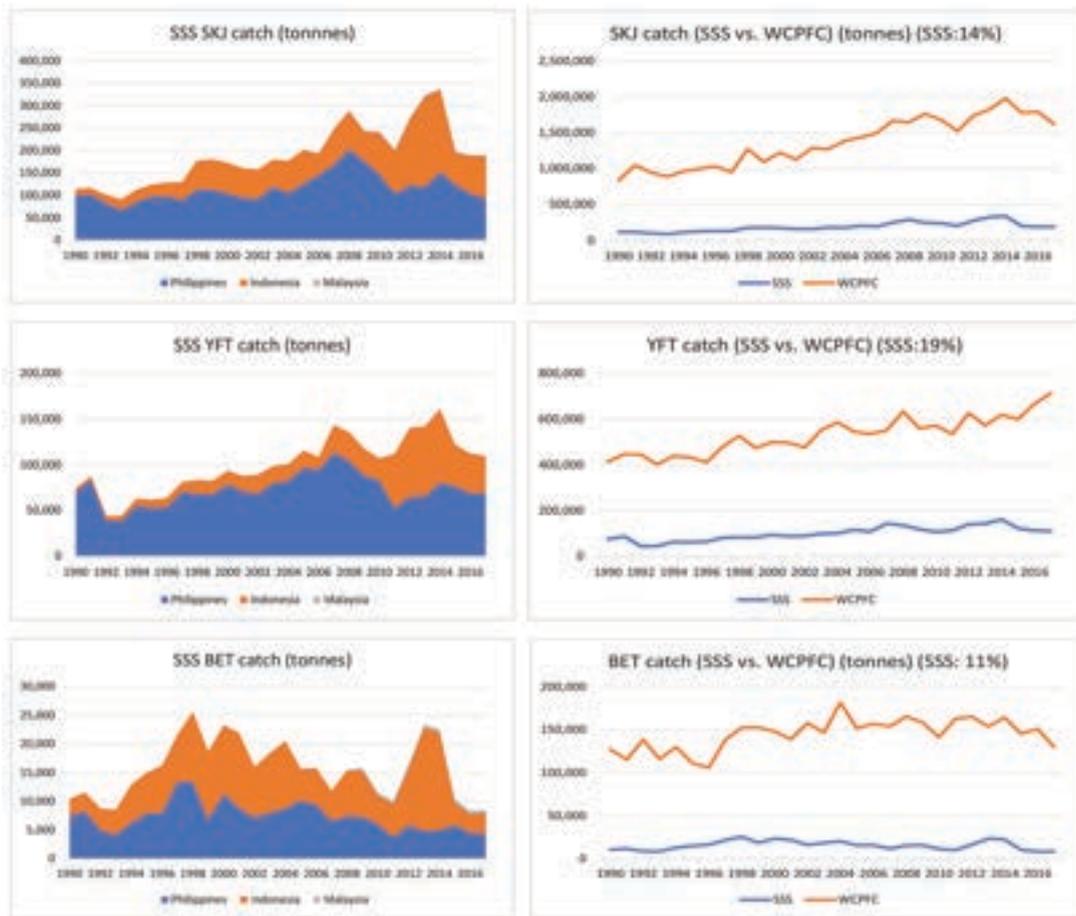


Figure 4. (above) WCPFC and IATTC Convention Areas and the location of the Sulu-Sulawesi Seas (SSS); (below) Sulu-Sulawesi Sea (formerly known as Sulu-Celebes Sea), SEAFDEC Sub-regional area bordered by the Philippines, Indonesia, and Malaysia, a very small part of the WCPFC Conventional Area

Catch and CPUE

Catch and CPUE were the two basic inputs to run ASPIC. However, since the official catch statistics are not available solely for the SSS, the total catch was computed by combining the estimated catch by country, provided by WS participants from three (3) countries (Indonesia, Philippines, and Malaysia), based on the best available scientific catch data from these countries. **Box 1 (left)** shows the SSS catch by species from three countries, and **Box 1 (right)**, comparison of the catch between the SSS and WCPFC in 1990-2017 (WCPFC, 2020). The average catch compositions of the SSS over WCPFC were 14 % (SKJ), 19 % (YFT), and 11 % (BET). Another input, the nominal CPUE (handline, purse seine and ring nets) were provided from the Philippines, which was standardized by WS participants to practice the CPUE standardization techniques and used for the stock assessments (ASPIC) which was also practiced by the participants.

Box 1. (left) The trend of SKJ, YFT, and BET catch in the SSS of the Philippines, Malaysia and Indonesia (1990-2016) and (right) Comparison of catch by species between the SSS and WCPFC



Stock Assessment and Stock Status

Kobe plots for SKJ (1990-2017), YFT (1990-2015) and BET (1990-2017) based on results of stock assessments were overlaid with those available in WCPFC (WCPFC, 2020), which made use of the stock assessment model, “A length-based, age and spatially-structured model for fisheries stock assessment (MULTIFAN-CL or MFCL).” **Box 2** shows the comparison of the two Kobe plots (the SSS vs. WCPFC) for SKJ, YFT, and BET (left to right).

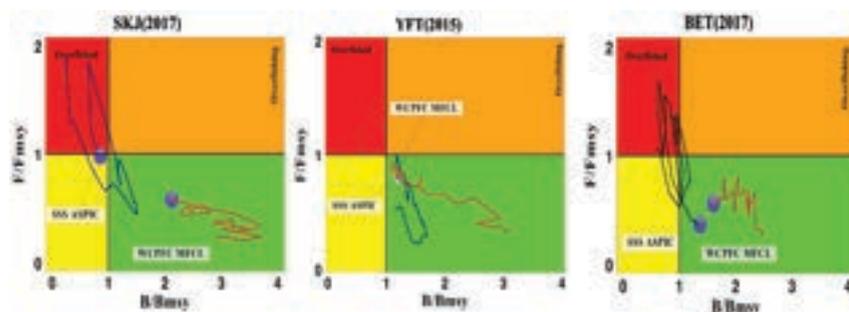
These plots should be looked with caution because the stock assessment models used are different, *i.e.* ASPIC for the SSS

and MFCL for WCPFC. In addition, the results in the SSS could have been affected by the integrated anomalies caused by the aforementioned factors.

Even with such caution, it is likely suggested that: (a) the past stock statuses of the three oceanic tuna species in the WC Pacific Ocean were safe since all trajectories are within the green zones; (b) as for the SSS, the past stock statuses of YFT was safe, while those of SKJ and BET were not safe since majority of the stock status trajectories are in the red or yellow zones; (c) it is likely that the biomass ratio (B/Bmsy) of SKJ and BET in the SSS was locally affected detrimentally by

Box 2. Comparisons of the Kobe plots between SSS and WCPFC for SKJ, YFT, and BET

Note: (1) Year (e.g. 2017 or 17) represents the most recent stock status year (the last year of the stock assessments)
 (2) B: Total biomass (ASPIC) and Spawning Stock Biomass (MFCL)



higher fishing pressure and/or any of the other aforementioned anomalies; and (d) although the Kobe plot patterns between the SSS and WCPFC were different for all species, the most recent stock statuses for YFT (2015) and BET (2017) were similar, *i.e.* in the green zone in both the SSS and WCPFC, while the stock status of SKJ in the SSS was unsafe since it was in the yellow zone, although this was not too serious as it was closer to both $B/B_{msy}=1$ and $F/F_{msy}=1$.

Conclusion and Recommendations

It should be well noted that the results of the stock assessments should be considered with caution for reasons that were explained above. However, it is highly likely that the stock statuses of the tuna species in the SSS were much worse than in the whole WC Pacific Ocean for SKJ and BET, *i.e.* there were likely strong local depletions by higher F and/or by other factors explained previously. In the SSS, the most recent stock statuses of YFT (2015) and BET (2017) were in the safe (green) zones, although the stock status of SKJ was in unsafe (yellow) zone. From the standpoint of the precautionary approaches, it is recommended that the total catch limits in the SSS should not be increased from the (localized) MSY levels by species as shown in **Table 2**.

Table 2. Recommended catch limits and the current catch levels (2013-2017) of three oceanic tuna species in the SSS

	SKJ (t)	YFT (t)	BET (t)
Recommended catch limits	240,000	133,000	18,000
Current catch levels, 5-year average catch (2013-2017)	248,000	130,000	15,000

Note: Current catch levels, 5-year average (2013-2017), were based on the data used during the Second practical workshop on stock and risk assessment of SKJ, YFT, and BET in the Sulu-Sulawesi Seas (May, 2019)

Because SEAFDEC is not the organization mandated to make recommendations on catch limits, unlike RFMOs and the ASEAN, these recommendations could not be considered legally binding. Nevertheless, since Indonesia and the Philippines have been harvesting more than 98 % of the total catch of each species of SKJ, YFT and BET, these countries should constructively bear these recommendations in mind for the sustainability of their respective oceanic tuna resources and fisheries.

Final Remarks

This article describes mainly the stock statuses of SKJ, YFT and BET resources in the SSS. The other important tuna resources, the neritic tunas in the Southeast Asian waters, have been separately handled by the SEAFDEC-Sweden Project, and the results of the stock assessments of the narrow-barred Spanish and Indo-Pacific king mackerel were published (Kaewnurachadasorn *et al.*, 2020). Meanwhile, those for longtail tuna and kawakawa would be published in the near future.

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Efficient Inland Fisheries Data Collection Made Easy: the DACOFA Way

Dina Muthmainnah, Sevi Sawestri, Ni Komang Suryati, Arya Nugraha, Virgilia T. Sulit, Aroef H. Rais, Sevrina Asri and Albertus V.J. Pratama

The role of inland capture fisheries in ensuring adequate nutrient supplies and food security could not be surmised, especially that information on the actual contribution of inland fisheries to the socio-economic development of many countries is unfortunately not readily available. Inland fisheries activities are notably small-scale, making it difficult to compile the relevant data, much more their continuous production trend which is necessary for stock assessment. At times when such data is available, the information tends to be scattered, ending up with data that are not useful and scientifically, could not be utilized. As a result, evaluating the importance and value of inland fisheries remains one of the biggest challenges for its development, since the data available is not sufficient enough for any analysis. The SEAFDEC Inland Fishery Resources Development and Management Department (SEAFDEC/IFRDMD) therefore, takes on an important responsibility not only of collecting existing data on inland fisheries production but also in addressing the gaps in information collection and the research needs related to fish stocks in inland waters. Although, an increasing number of databases support the development of indicators for data collection about the inland fisheries sub-sector, choosing the appropriate management option that is applicable for the Southeast Asian region should be taken into consideration. Therefore, alternative approaches on data collection are necessary to improve the situation. As means of promoting an effective system of data collection on inland fisheries, SEAFDEC/IFRDMD introduced the web-based mobile application which is envisioned to be capable of efficiently collecting the data on inland capture fisheries in the Southeast Asian region. This application is known as DACOFA, which is short for "Data Collection for Fishery Activities."

For many countries around the world, inland fisheries are important for poverty alleviation, food security, gender empowerment, cultural services, ecosystem functions, and biodiversity (Funge-Smith & Benneth, 2019), and also for the well-being of their peoples, rural community livelihoods, and national economies (UNEP, 2010; Cooke *et al.*, 2016). More often than not, the importance of inland fisheries is either not quantified or is undervalued, and as a result, inland fisheries are largely overlooked in policy discussions. Globally, the sustainable development agenda have in fact, focused mainly on the marine environment (FAO, 2018). In the Southeast Asian countries, the role of inland fisheries is not only for enhancing the peoples' livelihoods but also increasingly in providing recreational services, biodiversity conservation, and eco-tourism, as what is the trend nowadays. Therefore,

in order to demonstrate the importance of the inland fisheries sub-sector, it is necessary that monitoring of the production and management is improved in order to demonstrate the increasing contribution of the sub-sector to food security which has recently become a major global concern (Suuronen & Bartley, 2014).

The future of inland fisheries development is linked with the successful management of the wide inland resources such as rivers, swamps, lakes, and other wetlands (UNEP, 2010), making it crucial to ensure that management of the inland fisheries is placed on a larger environmental and socio-economic scale. Considering that data and information are the basis for proper management, these should be properly monitored and collected. It is common in tropical watersheds that fish landings could go completely unreported and the amount of catch is oftentimes estimated from unreliable information sources, clearly contributing to the severely incorrect production data from inland capture fisheries. In many cases, the amount of catch reported is only an underestimation because the fisheries production from many small tributaries and water bodies is generally overlooked (Vehanen *et al.*, 2020).

Data Collection on Inland Fisheries: issues and concerns

Aside from being small-scale, activities in inland fisheries are highly seasonal with their highest peak taking place during flood receding periods or at the end of the rainy season. These features should be considered when collecting the data and analyzing the production statistics on inland capture fisheries. As a matter of fact, these factors must have been overlooked resulting in the inadequacy or incompleteness or untimely statistics data and production trend from inland capture fisheries. Furthermore, the inland fisheries sub-sector has been given better attention only very recently compared to the practice in the past when more importance was put on the marine fisheries sub-sector.

Catch statistics and related information on fisheries are some of the fundamental data that could provide a better picture of the present situation of the fisheries as well as that of the condition of the fishery resources. Such data are useful for the decision-makers in establishing the most appropriate fisheries management policies and measures towards achieving the sustainability of the fisheries.

For many Southeast Asian countries, the importance of catch statistics from inland capture fisheries is not well understood and less evaluated, which could be because such data are fragmented and discontinuous, contributing to the alarming bleak condition of the overall status of the region's small-scale fisheries. In fact, the majority of inland fishing activities are not licensed, operated at a semi-commercial or subsistence level, and are widely dispersed along the numerous inland water bodies (FAO, 2010). Moreover, the numbers of fishers are large as these include the occasional fishers, and vary significantly during the different seasons, resulting in inconsistencies of information in terms of the catch size and composition, and types of gears used, among others. Furthermore, as the catch usually comprise multi-species of fish that go immediately to various market channels, information on the catch is not properly recorded (Muthmainnah *et al.*, 2019) as there are no centralized landing ports or major markets where data could be easily collected. Oftentimes, the catches are purchased on the spot or bartered locally by buyers or in most cases these are brought directly by fishers to the local markets. Also, large portions of the catch are brought home by fishers for household consumption and for traditional post-harvest processing into fermented and salted fish for direct consumption.

Development of DACOFA

Recognizing the urgent need to gather valuable data and information on inland fisheries from each ASEAN Member State (AMS) to understand the real situation of the region's inland fisheries, and to identify the key issues that hinder the sustainable development of the region's inland fisheries, SEAFDEC/IFRDMD has been considering all possible approaches for the efficient and effective system of collecting data from inland capture fisheries. This resulted in the development of an application-based system on Android mobile phones that had been established mainly for collecting data on inland capture fisheries in the Southeast Asian region. SEAFDEC/IFRDMD considered the use of mobile phones with Android operating system for convenience and ease in running the application, and for the affordability of these types of mobile phones.

The development of the data collection application, which is known as the system of Data Collection for Fishery Activities or DACOFA, started in 2019 and was timely launched on 27 January 2020 during the inauguration of the SEAFDEC/IFRDMD Building by the Minister of Ministry of Marine Affairs and Fisheries (MMAF) of the Republic of Indonesia, *Dr. Edhy Prabowo*. One of the main advantages of this data collection application is the possibility of gathering data while the enumerators are on-the-go or in locations where Internet connection is unreliable. Offline forms would allow the fishers to store a backup of their data on their mobile devices and upload the data once an Internet connection is available, and automatically, the data will be recorded on the IFRDMD Database.

Overview of the Implications of DACOFA

At the onset, SEAFDEC/IFRDMD recognized that achieving the sustainable utilization of the inland fishery resources should be addressed first before considering the several concrete management measures. Therefore, it has become necessary to understand the various aspects of inland capture fisheries in the region, which also requires massive capacity building of the stakeholders in inland waters. In addition, it had also become necessary to identify the critical issues regarding the fish stocks in order to achieve the sustainable use of the freshwater fishery resources. Thus, mapping of the historical research activities and its findings had been carried out through desk studies, and the information compiled would serve as baseline data that could be used to fill the gap between achieving a science-based water resource healthy index that could be used in improving any conceptual fisheries management plan.

Therefore, data collection which entails the gathering of relevant and accurate data using the simplest way possible had been considered of utmost importance. In fact, collection of field data is the root or the primary step of the entire field management process. In addition, DACOFA which has been developed as a method of collecting data with software application or web-based application could receive real-time information and data, which could be accessed by the SEAFDEC/IFRDMD staff from their respective offices. By using this mobile application compared to paper-based forms, the number of data to be collected could be greatly increased, giving option for the data collectors to best suit the purposes. Nonetheless, before using this application, the users should be trained on the best practices for the data collection on how to successfully capture such information from remote



Figure 1. Training of data collectors conducted by staff from IFRDMD Data Center

areas. In this regard, the staff from the Data Center as well as researchers from SEAFDEC/IFRDMD had been conducting such training courses (**Figure 1**).



Figure 2. Trainees assisted by IFRDMD staff, making use of their android mobile phones installed with DACOFA application, for inputting fisheries activities data from Patratani Village, South Sumatra, Indonesia

Since July 2020, SEAFDEC/IFRDMD has pilot-tested the use DACOFA in collecting data on inland capture fisheries from Patratani Village, South Sumatra, Indonesia. The DACOFA Application had been installed on the smartphone devices of the enumerators (**Figure 2**). Subsequently, the application could already be accessed from the Google Play Store.

The DACOFA Application Menu

After the application is installed on smartphones, the enumerators or data collectors can choose the language options at top right of **Figure 3a**: there are two language options, *i.e.* Bahasa (IND) and English (ENG). Then input the USER NAME and PASSWORD that has been given by the administrator, and then click the “SIGN IN” option. After clicking “SIGN IN”, there are four option components: VIEW DATA, INSERT DATA, PRIVACY POLICY, and the back-red icon” (**Figure 3b**).

The information of each option comprises the following:

1. VIEW DATA: This function will show all the data that have been saved or inputted into the system
2. INSERT DATA: This function will show the form for collecting the data
3. PRIVACY POLICY: This function will show the explanation about this application

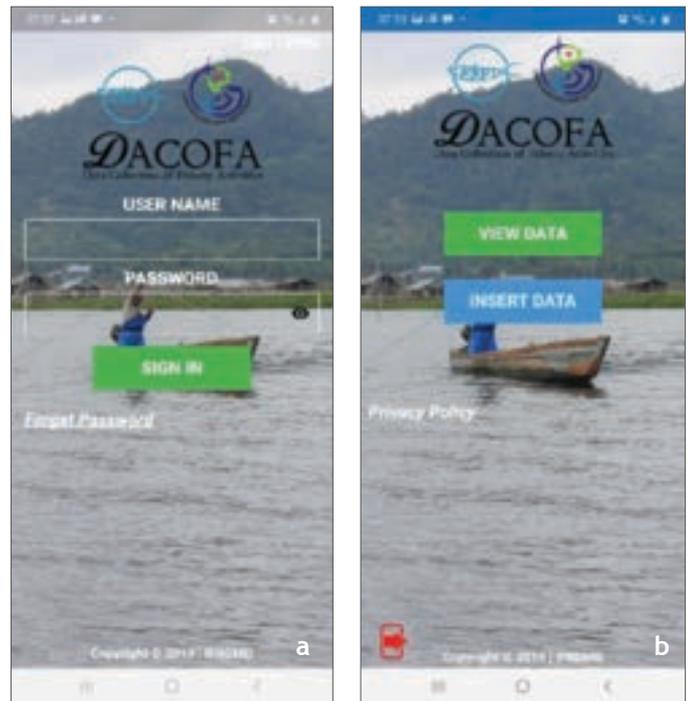


Figure 3. The DACOFA application menu: a. Language options; b. Main page

4. Back-red icon: This function will show the notification to exit from this application

To input data by the enumerator, in this case, called the USER, the procedure below should be followed:

1. Push the “INSERT DATA” option. Then, the screen will show the form which contains: date, fishing gear, others, mesh size, units of fishing gear, country, province, district, location and operation type (**Figure 4**)



Figure 4. Inputting data on the DACOFA application menu

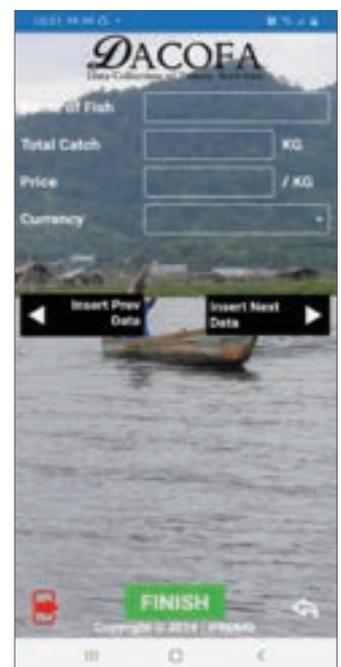


Figure 5. Information on price of fish on DACOFA

2. Fill up the data form completely
3. “OTHER” options: if there is no explanation or information, please input the punctuation hyphen “-”.
4. Choose “OK” button after inputting of data is completed, and the screen will go to next page which contains the information on name of fish, total catch, price of the fish, kind of currency, and the button for looking for the previous data or the next data
5. Fill up the data form completely; and if there is no information on the fish price, please input the number zero “0” (Figure 5).
6. Choose the “INSERT NEXT DATA” button if the user wishes to input another information
7. Choose the “FINISH” button after completing the inputting of data
8. Lastly, user will be shown to the main page after choosing the “FINISH” option

After inputting the data, comes the validation of the data. The procedure for validating the data in the DACOFA application is as follows:

1. Choose the “VIEW DATA” on the main page
2. The inputted fishery data will appear based on date of entry (Figure 6).
3. Three options are available: “EDIT”, “DELETE”, and “VALIDATE”. If there are no revisions or data cancelations, please click “VALIDATE” (Figure 7), and finally, the data will be saved in the SEAFDEC/IFRDMD Database.

Challenges in the Application of DACOFA

During the trial and pilot testing of DACOFA, some challenges had been encountered while collecting data using the smartphones. Considering that the operation of DACOFA application makes use of a smartphone and is dependent on an Internet link, the stability of Internet links and facilities in the desired area should be established.

Nowadays, the use of smartphones for communication is prevalent even in developing countries. The growth in smartphone usage even in some of the poorest and most remote communities has allowed for the application of new innovations. However, the personal ability of stakeholders to input the data also determines the success of any data collection. Generally, fishers engaged in inland fisheries come from the marginal communities and mostly received inadequate education. As mentioned by Pauly (1990), fishers are often presented or perceived as the “poorest of the poor,” and their poverty is viewed as a consequence of their being over-dependent on fisheries and consequently overexploiting their own resources. In this regard, SEAFDEC/IFRDMD has been supporting and training the stakeholders on the implementation of an up-to-date technology to enable the fishers to improve their skills in data collection, and be able

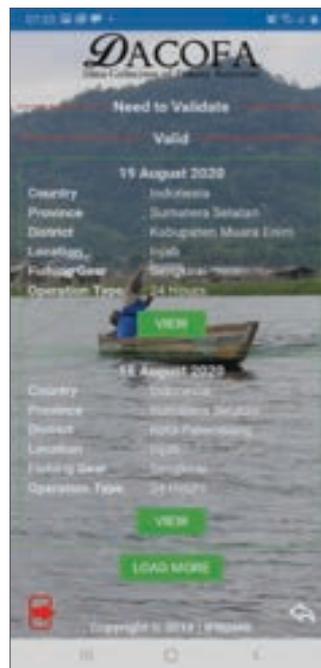


Figure 6. Data displayed on DACOFA menu

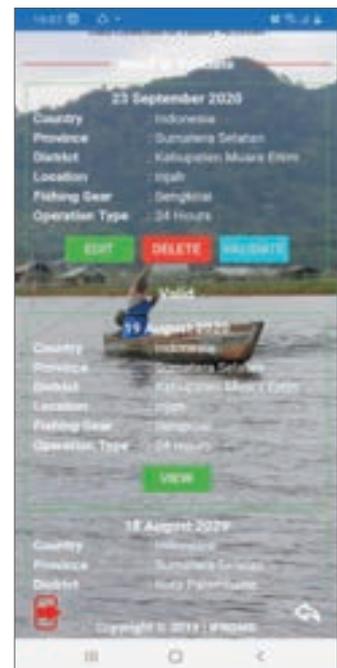


Figure 7. The data shown on screen before being saved in the IFRDMD Database

to report the desired information properly since the current paper-based reporting systems are also not practical and sustainable.

Way Forward

Data in research is always bound, and that it should be reusable, searchable, and accessible. Therefore, such data should be collected and stored securely. Mobile data collection has been recognized as the best choice for efficiently reaching any research objectives. Furthermore, these mobile data collection applications’ efficiently opens a chance for adaptive work-time, especially in the new-normal period after the pandemic crisis. The enumerators could enter the data with care and continue performing faster data analysis. This application is also suitable for monitoring the overexploited fish commodities, especially those not properly recorded. This way, the unsustainable utilization of such fish commodities could be addressed.

Acknowledgement

This study was part of the JTF-funded project implemented by SEAFDEC/IFRDMD during 2015-2019. The authors acknowledge the assistance of Ms. Diana Luspa for proof-reading this article. We are very grateful for the support of the Chief and Deputy Chief of IFRDMD in testing this application with the IFRDMD research activities. The authors, Dina Muthmainnah and Sevi Sawestri as the main contributors to this article, are very grateful to all those concerned.

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Moving Towards the Renewed Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region

Malinee Smithrithee, Sawitree Chamsai, Nualanong Tongdee, Worawit Wanchana, and Pattaratjit Kaewnuratchadasorn

The ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security in the New Millennium: “Fish for the People,” convened in November 2001 and aimed at analyzing the fisheries problems and identifying the directions and actions towards the sustainability of the ASEAN fisheries for food security in the new millennium, adopted the first “**ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security in the New Millennium.**” This instrument had been used as a framework for the development of national policies and actions for the promotion of sustainable fisheries in the Southeast Asian region. Ten years later in June 2011, the sequel “**ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 “Fish for the People 2020: Adaptation to a Changing Environment”**” was organized to assess the importance of fisheries to pave the way for enhancing the contribution of fisheries to food security in the Southeast Asian region, assess the importance of fisheries to the socio-economic enhancement of the people in the region, and address the emerging issues that impede the sustainable development of fisheries in the region. The “**ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020**” or RES&POA-2020 was adopted during the Ministerial and Senior Officials Meeting of the ASEAN-SEAFDEC Conference. The RES&POA-2020 has since then served as policy framework and priority actions for the Southeast Asian countries to support their efforts towards attaining the sustainability of fisheries development

and enhancing the contribution of fisheries to food security and improved livelihoods of peoples in the region. On the fifth year of implementation of the RES&POA-2020 in 2016, the progress of such efforts was reviewed and the priority areas were identified to make sure that the development of the region’s fisheries sector remains sustainable and its contribution to food security in the Southeast Asian region had been enhanced. As the year 2020 ushered in emerging developments in fisheries, the SEAFDEC Council of Directors recommended that the RES&POA-2020 should be reviewed to ensure that it remains up-to-date and relevant to the current situation of the fisheries sector in the Southeast Asian region. In this regard, meetings of the ASEAN-SEAFDEC Member Countries were convened by the SEAFDEC Secretariat to discuss the “**Way Forward of the Resolution and Plan of Action for the ASEAN Region Towards 2020**” by reviewing the progress of the ASEAN Member States in the implementation of the RES&POA-2020, especially focusing on the outputs and outcomes attained at national level, as well as those of SEAFDEC and other regional and sub-regional partners. During such meetings, other fisheries-related priority and emerging issues were also discussed and identified, and linked with other fisheries policy development processes. The results had served as inputs for revising the RES&POA-2020 and for coming up with the “**ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030**” or RES&POA-2030.

As policy frameworks for SEAFDEC and the ASEAN Member States (AMSs), the 2001 ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security in the New Millennium (**Figure 1**) and the subsequent RES&POA-2020 (**Figure 2**) had been instrumental in the development and promotion of various actions undertaken by the AMSs leading to significant achievements that were attained during the periods from 2001-2010 to 2011-2020 (**Box 1**), specifically with respect to the ASEAN-SEAFDEC policy documents that have been developed during 2001-2020.

ASEAN-SEAFDEC Policy Documents established during 2001-2020

Several policy documents had been developed at the height of the implementation of the 2001 ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region from 2001 until 2010 (**Figure 3**). These include: Series of Regional Code of Conduct for Responsible Fisheries; the Regional Guidelines on Collecting Fishery Statistics for Inland and Coastal

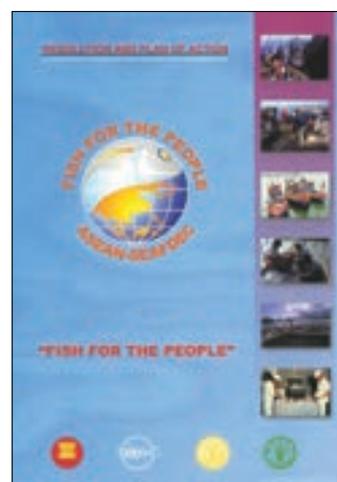


Figure 1. 2001 ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security in the New Millennium (SEAFDEC, 2001)

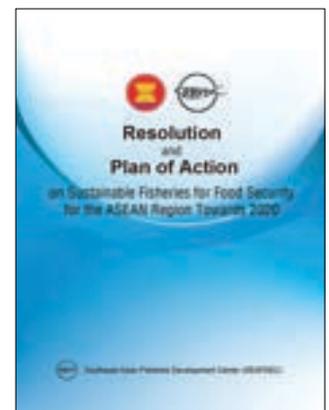


Figure 2. ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 (RES&POA-2020) (SEAFDEC, 2011)

Box 1. Achievements of ASEAN and SEAFDEC from the adoption of the Resolutions and Plans of Action in 2001-2020

2001 ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region (2001 Resolution and Plan of Action): 2001-2010

In adopting the 2001 Resolution and Plan of Action, the AMSs made efforts in addressing the unsustainable fisheries practices that had negatively impacted on the fish supply for food security and socio-economic well-being of peoples in the Southeast Asian region. With focus on fisheries management, aquaculture, and utilization of fish and fishery products, the 2001 Resolution and Plan of Action had paved the way for the regionalization of the global Code of Conduct for Responsible Fisheries, promotion of rights-based fisheries, standardization of definitions and classifications for regional fishery statistics, enhancement of human resource capabilities, promotion of responsible fishing technologies and practices, exploration of underutilized fishery resources, reduction of discards and post-harvest losses, promotion of aquaculture for rural development, production of quality seeds for aquaculture, and maximized utilization of fish catch, among others. In addition, adoption of the 2001 Resolution and Plan of Action also led to strengthened collaboration among SEAFDEC and the AMSs, especially in harmonizing product standards and sanitary measures, implementing the ASEAN trade policy on fish and fishery products, and assessing the impacts of government subsidies on fisheries.

Moreover, the 2001 Resolution and Plan of Action had also been used as the framework for the development and implementation of the Special Five-Year Program on the Contribution of Sustainable Fisheries for Food Security for the ASEAN Region, as well as in the revision of the fisheries regulations of the respective AMSs. Furthermore, SEAFDEC also supported the AMSs in their efforts to conduct marine resources surveys using the SEAFDEC research and training vessels, the M.V. SEAFDEC and M.V. SEAFDEC 2.

With the promotion of the 2001 Resolution and Plan of Action, the visibility of SEAFDEC had been enhanced, specifically through the *"Fish for the People,"* a Special Publication produced by the Southeast Asian Fisheries Development Center (SEAFDEC) to promote sustainable fisheries for food security in the ASEAN region. The title of the Special Publication follows the theme of the series of ASEAN-SEAFDEC Conferences aimed at achieving sustainable fisheries and food security in the ASEAN region. Meanwhile, the collaboration between SEAFDEC and the ASEAN had been strengthened through the formalization of the ASEAN-SEAFDEC Strategic Partnership.

ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 (RES&POA-2020): 2011-2020

The RES&POA-2020 which served as policy framework for the sustainable development of fisheries and enhancement of the contribution of fisheries to food security and well-being of peoples in the region, also provided the channel for the development of policy guides in response to the challenges of the changing environment and some emerging issues, e.g. climate change, competitiveness of fish and fishery products from the AMSs, impacts of fishing operations and gears on ecosystems, improvement of working conditions of people engaged in fisheries activities, sustainability of inland fisheries especially the inter-connectivity of habitats, IUU fishing. In accordance with the RES&POA-2020, the implementation of effective management of fisheries through an ecosystem approach to fisheries management had been intensified.

After the five-year implementation of the RES&POA-2020, a review was carried out in 2016 to assess the effectiveness and efficiency of the RES&POA-2020 in addressing a range of issues and concerns encountered by the countries while carrying out the various programs and activities that were aimed at achieving sustainability in their respective fisheries. Seven countries, namely: Brunei Darussalam, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam participated in the review. Based on the several programs and activities that had been implemented in line with the RES&POA-2020, "management" of marine and inland fisheries and aquaculture were identified as the priority areas. The results of the review also indicated that several countries enhanced their efforts in promoting the involvement of key stakeholders in the process of either developing, formulating, or implementing specific fishery management plans. The concept of an ecosystem approach to fisheries management (EAFM) was identified as one of the key aspects that had been adopted for the development of policies and frameworks. Results of fishery resource surveys have been used as source of information for management planning, while fish restocking program is still a conventional way of enhancing the fishery resources. The countries also enhanced their efforts in monitoring and regulating the development of aquaculture within the context of environment-friendly concept.

Moreover, many capacity building activities have been carried out involving the local communities as well as fisheries-related organizations to prepare them to adopt alternative livelihoods and adapt to climate changes in support of achieving sustainable development. Efforts have also been made by the countries in improving their traditional fishery products to be more competitive in the world market while complying with international standards. In summary, the RES&POA-2020 has been effective in addressing a range of issues and concerns that the countries had aimed to tackle.

Fisheries; Regional Guidelines for the Promotion of One Village, One Fisheries Product (FOVOP) in the ASEAN Region. Meanwhile, during the adoption of RES&POA-2020, more policy documents had been developed and promoted in the Southeast Asian region with the strong support of not only of the AMSs but also of other regional and international organizations as well as donor agencies (**Figure 4**).

The policy documents developed during 2001-2020 had been grouped into six categories corresponding to the categories under the Plan of Action, namely: A-Planning and Information; B-Fisheries Management (Marine Fisheries, Inland Fisheries), C-Aquaculture, D-Optimal Utilization of Fish and Fishery Products, E-Fish Trade, F-Regional and International Policy Formulation, as shown in **Box 2**.

Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 (RES&POA-2030)

After its ten-year implementation, the RES&POA-2020 was reviewed by the AMSs with support from SEAFDEC, to accommodate the emerging issues and challenges in the region's fisheries sector (SEAFDEC 2016). Results of such review had been used by the AMSs and SEAFDEC in coming up with the ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 (RES&POA-2030) as shown in **Figure 5** (SEAFDEC, 2020). While the RES&POA-2030

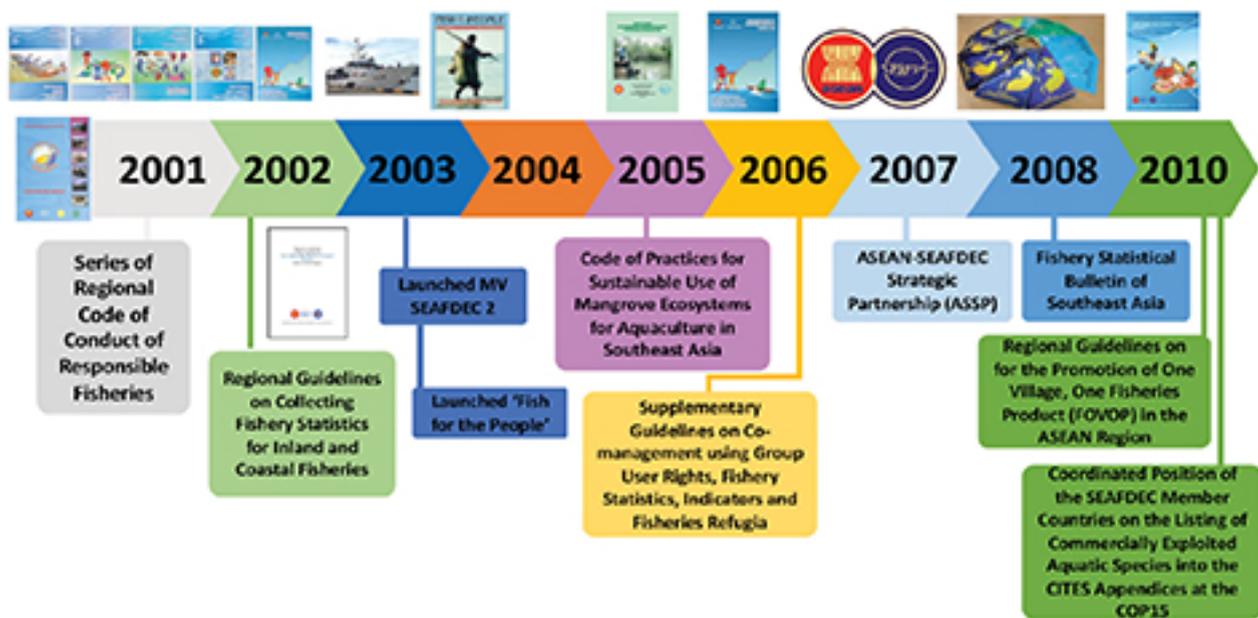


Figure 3. ASEAN-SEAFDEC Policy Documents established during 2001-2010



Figure 4. ASEAN-SEAFDEC Policy Documents established during 2011-2020

reiterates the regional cooperation to combat IUU fishing and enhance competitiveness of the ASEAN fish and fishery products, it also includes major additional aspects that deal with emerging issues.



Figure 5. Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 (RES&POA-2030)

For example, the aspect on the need to strengthen national statistics mechanisms especially disaggregated data collection at species level, establish reference points for stock assessment, and come up with estimated biomass or capacity level to determine the maximum sustainable yield, allowable biological catch, or allowable effort for marine and inland fisheries, reduce the impacts of aquatic pollution, marine debris and microplastics, develop financial incentives, especially for small-scale stakeholders and cooperatives, e.g. micro-credit, improve the capability of fishing crew and adopt appropriate technologies to optimize number of crew onboard, encourage the implementation of the Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines), with due consideration given to gender equality.

Box 2. ASEAN-SEAFDEC policy documents and regional guidelines developed from 2001-2020, corresponding to the Plan of Action

Plan of Action	Policy Documents and Regional Guidelines
A. Planning and Information	<ul style="list-style-type: none"> Regional Guidelines on Collecting Fishery Statistics for Inland and Coastal Fisheries (2002) SOPs on Sharks Data Collection in Southeast Asia (2003)
B. Fisheries Management	<ul style="list-style-type: none"> Regional Guidelines for Responsible Fisheries Management in Southeast Asia (2003) Supplementary Guidelines on Co-management using Group User Rights, Fishery Statistics, Indicators and Fisheries Refugia (2006) Regional Plan of Action on ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain (2013) Regional Plan of Action on Sustainable Utilization of Neritic Tunas in the ASEAN Region (2013) Regional Action Plan for Managing Foraging Habitats of Sea Turtles (2014) Essential Ecosystem Approach to Fisheries Management Training Materials (2014) Regional Policy Recommendations on Conservation and Management of Eel Resources and Promotion of Sustainable Aquaculture (2015) Policy Brief: Applying Human Rights-Based and Gender Equality Approaches to Small-Scale Fisheries in Southeast Asia (2018) Regional Action Plan for Management of Transboundary Species: Indo-Pacific Mackerel in the Gulf of Thailand Sub-Region (2020)
<i>B1. Marine Fisheries</i>	<ul style="list-style-type: none"> Regional Guidelines for Responsible Fishing Operations in Southeast Asia (1999) Regional Fishing Vessels Records (RFVR) for 24 meters in length and over (2013) Joint ASEAN-SEAFDEC Declaration on Regional Cooperation for Combating IUU Fishing and Enhancing the Competitiveness of ASEAN Fish and Fishery Products (2016) ASEAN Regional Plan of Action for the Management of Fishing Capacity (2016) Strategic Plans of Action for Fishery Resources Enhancement in the Southeast Asian Countries (2016) ASEAN Catch Documentation Scheme (ACDS) for Marine Capture Fisheries (2018)
<i>B2. Inland Fisheries</i>	<ul style="list-style-type: none"> Regional Guidelines for Responsible Fishing Operations in Southeast Asia (1999) Strategic Plans of Action for Fishery Resources Enhancement in the Southeast Asian Countries (2016)
C. Aquaculture	<ul style="list-style-type: none"> Regional Guidelines for Responsible Aquaculture in Southeast Asia (1999) Code of Practices for Sustainable Use of Mangrove Ecosystems for Aquaculture in Southeast Asia (2005) Regional Guidelines on Traceability System for Aquaculture Products in the ASEAN Region (2016) Regional Policy Recommendations on Early Mortality Syndrome (Acute Hepatopancreatic Necrosis Disease) and Other Transboundary Aquatic Animal Health Diseases (2016) Regional Database of Alternative Feed Ingredients in Aquaculture (2018) Regional Technical Guidelines on Early Warning System for Aquatic Animal Health Emergencies (2019)
D. Optimal Utilization of Fish and Fishery Products	<ul style="list-style-type: none"> Regional Guidelines for Responsible Post-harvest Practices and Trade (2007) Good Manufacturing Practice (GMP) for Small and Medium-sized Fish and Fish Products Pre-processing Establishments in ASEAN (2008) Regional Guidelines on for the Promotion of One Village, One Fisheries Product (FOVOP) in the ASEAN Region (2010) ASEAN Guidelines for the Use of Chemicals in Aquaculture and Measures to Eliminate the Use of Harmful Chemicals (2013) Regional Guidelines on Cold Chain Management of Fish and Fishery Products in ASEAN Region (2019)
E. Fish Trade	<ul style="list-style-type: none"> Regional Guidelines for Responsible Post-harvest Practices and Trade (2007)
F. Regional and International Policy Formulation	<ul style="list-style-type: none"> (Common/Coordinated) Positions of the ASEAN-SEAFDEC Member Countries on the Listing of Commercially Exploited Aquatic Species into the CITES Appendices at the COP15-18

The RES&POA-2030 (**Box 3**) was endorsed by the Fifty-second Meeting of the SEAFDEC Council in May 2020 and was adopted by the ASEAN Senior Officials and Ministers during the Special Senior Officials' Meeting of the 41st Meeting of the ASEAN Ministers on Agriculture and Forestry (SSOM 41st-AMAF) on 5 August 2020 and the 42nd Meeting of the ASEAN Ministers on Agriculture and Forestry on 21 October 2020, as well as the Senior Official and Minister responsible for fisheries in Japan (*ad referendum*). The adopted RES&POA-2030 (SEAFDEC, 2020) would then be used as a

regional framework for the sustainable development of fisheries and enhancing the contribution of fisheries to food security and livelihood of peoples in the Southeast Asian region in the next decade. The three Resolutions and Plans of Action on Sustainable Fisheries in the ASEAN Region and the programs to support their implementation have been established, but the strong commitment, support, and close cooperation among the AMSs, coupled with collaborative technical support from regional and international organizations, are necessary to achieve “fish for the people” for the generations to come.

Resolution on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030

We, the Ministers of the ASEAN-SEAFDEC Member Countries on the occasion of the Forty-second Meeting of the ASEAN Ministers on Agriculture and Forestry (42nd AMAF) held virtually on 21 October 2020 in Cambodia, with the Minister of Japan responsible for fisheries through *ad referendum*, taking into consideration the “Resolution on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020” adopted by the Ministers responsible for fisheries of the ASEAN-SEAFDEC Member Countries during the *ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 “Fish for the People 2020: Adaptation to a Changing Environment* in 2011, and accommodating the emerging issues that could occur in the near future;

Reaffirming our commitment to the United Nations 2030 Agenda for Sustainable Development adopted in 2015, particularly those that contribute to achieving sustainable development and management of fisheries;

Bearing in mind the possible impacts climate change has on fishery resources, and noting ongoing efforts to address and better understand climate change under the United Nations Framework Convention on Climate Change (UNFCCC) adopted in 1994, the Paris Agreement, and the Intergovernmental Panel on Climate Change (IPCC);

Being guided by the 2007 ASEAN Charter, which aims to ensure sustainable development for the benefit of present and future generations and to place the well-being, livelihood, and welfare of the peoples at the center of ASEAN community building process;

Recognizing the ASEAN Community Vision 2025, and the Vision and Strategic Plan for ASEAN Cooperation in Food, Agriculture and Forestry (2016-2025) which are meant to achieve “A competitive, inclusive, resilient and sustainable Food, Agriculture, and Forestry (FAF) sector integrated with the global economy, based on a single market and production base contributing to food and nutrition security and prosperity in the ASEAN Community”;

Being aware of the ASEAN-Japan Cooperation through the ASEAN Plus Three Mechanism that aims to support the realisation of ASEAN Community Vision 2025;

Also **bearing in mind** the continuous efforts of the ASEAN Member States (AMSs) in ensuring the sustainable development of fisheries and aquaculture is in line with relevant international guidelines and agreements, e.g. the FAO Code of Conduct for Responsible Fisheries; and the Regional Guidelines on Responsible Fisheries in Southeast Asia, the Regional Plan of Action to Promote Responsible Fishing Practices including Combating IUU Fishing in the Region (RPOA-IUU) framework, and the ASEAN RPOA for the Management of Fishing Capacity;

Acknowledging the efforts of the AMSs in implementing the Resolution on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 adopted on 17 June 2011; and the Joint ASEAN-SEAFDEC Declaration on Regional Cooperation for Combating Illegal, Unreported and Unregulated Fishing and Enhancing the Competitiveness of ASEAN Fish and Fishery Products, adopted on 3 August 2016;

Recognizing the ASEAN-SEAFDEC Strategic Partnership that provides the cooperative platform between ASEAN and SEAFDEC in achieving the long-term common goals towards the development and management of sustainable fisheries through various regional initiatives;

DO HEREBY RESOLVE, without prejudice to the sovereign rights, obligations, and responsibilities of our countries under relevant international laws and arrangements, to:

1. Endeavour to sustain the supply of fish and fishery products from the ASEAN region to improve food security, facilitate poverty alleviation, and improve the livelihoods of ASEAN people dependent on the harvesting, farming and marketing of fish and fishery products, by enhancing the necessary national fisheries policies, legal and institutional frameworks that encourage and support responsible fisheries and aquaculture operations, including small-scale operations as well as providing supplementary livelihood options;
2. Further develop strategic partnerships and cooperation to maximize the synergies and complementarities among the various stakeholders, e.g. government, private sector, civil society, and relevant development partners and donor agencies, in addressing regional and global challenges that may impact sustainable development of fisheries and aquaculture throughout the supply chain;
3. Promote capacity building of relevant organizations and stakeholders through mobilization of resources and harmonization of initiatives that support fisheries communities and governments, with due consideration given to gender equality;
4. Strengthen fisheries governance, in line with international practices, by evaluating current constraints to ensure comparability and compatibility of the required practices and the operations of fisheries in the AMSs;
5. Further develop regional initiatives to promote a responsible fisheries management mechanism, taking into account the specific social, economic, cultural, ecological, and institutional contexts and diversity of the ASEAN and ASEAN fisheries in the spirit of the realization of the ASEAN Economic Community and the ASEAN Socio-Cultural Community;
6. Implement effective management of fisheries that integrates habitat with fishery resources management, and aims to improve the social and economic benefits of all stakeholders, especially by delegating selected management functions to the local level and promoting co-management as a partnership between government and relevant stakeholders;
7. Promote sound management of fishing capacity and use of responsible fishing technologies and practices, recognizing increasing emphasis on rights-based fisheries; and at the same time, secure the rights and well-being of inland and coastal fisheries communities as well as the ecological well-being;
8. Strengthen cooperation among AMSs and with international and regional organizations in combating IUU fishing and management of fishing capacity to balance available resources;
9. Support the efforts to promote low carbon development technologies by minimizing the contribution of the fisheries sector to greenhouse gas emissions, with emphasis on promoting the use of energy-efficient equipment and alternative energy sources;
10. Enhance resilience of fisheries communities in anticipating and adapting to changes in the environments of inland and coastal waters, including those caused by climate change, which could adversely affect communities in their operations of fisheries and aquaculture;
11. Increase awareness and support the reduction of impacts of aquatic pollution and marine debris, including abandoned, lost or otherwise discarded fishing gear (ALDFG), and microplastics/microbeads on fisheries and aquaculture;
12. Strengthen knowledge, including local knowledge, and science-based development and management of fisheries by enhancing the national capacity to collect, analyze, and share fisheries data and information;
13. Improve the working conditions of people engaged in fisheries activities, and strengthen measures for safety of fishing vessels taking into consideration the specificity of fisheries of the region;

Box 3. Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 (Cont'd)

14. Enhance awareness of the contributions that inland fisheries have on food security and livelihoods, and ensure that the well-being of fishery resources and stakeholders are taken into consideration when undertaking development projects that could impact on the sustainability of inland fisheries;
15. Promote inter-agency coordination of the multiple uses of inland aquatic resources to conserve inland aquatic habitats;
16. Strengthen aquaculture governance and implement good aquaculture practices to sustain production for food safety and security, sustainable livelihoods, and rural development;
17. Promote cooperation among AMSs and with international and regional organizations to support the implementation of good aquaculture practices through joint research, technology transfer, and human resource development;
18. Mitigate the potential impacts of aquaculture on the environment and biodiversity including the spread of pathogens of aquatic animals caused by over-intensification of aquaculture operations, inappropriate implementation of aquatic animal health management, and uncontrolled introduction and movement of aquatic species;
19. Promote joint ASEAN approaches and positions in international trade in fish and fishery products produced in the region, by harmonizing the standards, criteria, and guidelines, and developing mutually-recognized agreements on sustainability and food safety management systems;
20. Support the competitiveness of the ASEAN fish trade through the development of procedures and programs that would certify, validate, or otherwise indicate the origin of fish and fishery products to improve product traceability, sustainable fishing practices, and food safety, in accordance with international and national requirements;
21. Optimize the utilization of catch/harvest by reducing post-harvest losses and wastes to increase fish supply and improve economic returns through promotion of appropriate technologies, facilities and best practices along the supply chain;
22. Improve and exchange technologies, and enhance facilities to ensure that fish quality assurance and safety management systems are in place and operational, taking into account the importance of traditional fishery products and food security requirements, and promote the development of fishery products as supplementary livelihoods for fisheries communities;
23. Support the Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 adopted by the Senior Officials of the ASEAN-SEAFDEC Member Countries on 5 August 2020; and to
24. Pledge our commitment to fully support this Resolution, and task the ASEAN Senior Officials to implement necessary actions and report the progress in the advancement of sustainable fisheries that contribute to a prosperous, stable, and peaceful ASEAN Community;

AND DO HEREBY DECIDE,

That the Resolution on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 be implemented as soon as possible and use the *Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030* adopted by the Senior Officials of the ASEAN-SEAFDEC Member Countries on the occasion of the Special Senior Official Meeting of the 41st ASEAN Ministerial Meeting on Agriculture and Forestry (SSOM-41st AMAF) held virtually on 5 August 2020 in Brunei Darussalam, and the Senior Official of Japan responsible for fisheries through *ad referendum*, as priority actions for formulating and implementing programs, projects, and activities by the AMSs and through the appropriate ASEAN-SEAFDEC mechanisms.

Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030

The Senior Officials of the ASEAN-SEAFDEC Member Countries on the occasion of the Special Senior Officials Meeting of the 41st ASEAN Ministerial Meeting on Agriculture and Forestry (SSOM-41stAMAF) held virtually on 5 August 2020 in Brunei Darussalam, with the Senior Official of Japan responsible for fisheries through *ad referendum*, taking into consideration the priority actions stipulated in the Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 adopted by the Senior Officials responsible for fisheries of ASEAN-SEAFDEC Member Countries during the *ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2030 "Fish for the People 2020: Adaptation to a Changing Environment"* in 2011, as well as the emerging issues; and

Guided by the Resolution on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030, and the need to enhance collaboration among government agencies that have the responsibility for fisheries and fisheries-related issues in order to harmonize policies, plans and activities that support sustainable fisheries, food safety and security at the national and regional levels;

Recognizing the progress made by the ASEAN Member States (AMSs) in the implementation of the Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030;

Recalling the initiatives of the AMSs to adopt the policy frameworks and instruments developed through the ASEAN-SEAFDEC Strategic Partnership (ASSP);

HEREBY DECIDE

That the Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 should serve as priority actions for AMSs in developing and implementing programs, projects, and activities in support of the implementation of the Resolution on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030.

A. PLANNING AND INFORMATION

1. Integrate the planning of marine capture fisheries, inland capture fisheries, and aquaculture sub-sectors to promote sustainable development of the fisheries sector, including harvesting and post-harvest in both capture fisheries and aquaculture;
2. Strengthen the capacity to plan for sustainable fisheries in the context of changing socio-economic and ecological environments through the mobilization of the most up-to-date data and information, and the provision of appropriate policy summaries for decision makers;
3. Strengthen national statistical mechanisms for fisheries and aquaculture including data collection disaggregated at species level, and exchange of statistical data; and include collection/compilation of non-routine data and information, e.g. from fish consumption surveys, species composition, biological information, as well as local and indigenous knowledge, with the aim of improving the valuation of fisheries including monitoring of their performance;
4. Establish reference points, and come up with estimated biomass or capacity level to determine the maximum sustainable yield, allowable biological catch, or allowable effort for marine and inland fisheries;

Box 3. Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 (Cont'd)

5. Strengthen the collection of data and information, where relevant, on species under international concern, e.g. sharks and rays, sea turtles, catadromous eels, aquatic mammals, etc., and harmonize/standardize data collection methods among countries in the region;
6. Enhance regional fishery information systems and mechanisms to facilitate sharing, exchange and compilation of statistics and information required at the sub-regional and regional level, and apply where appropriate, regionally standardized definitions and classifications for statistical data to facilitate regional compilation, analysis, and data exchange;
7. Coordinate, decentralize and enhance the sharing of relevant statistics and fisheries-related data and information between the national fisheries and other authorities including those responsible for food security, environment, trade, aquaculture, water resources, agriculture/forestry, wetlands, migration/employment, and rural development;
8. Promote the use of simple and practical indicators that had been developed, for planning, monitoring, and evaluation of fisheries in support of achieving sustainability;
9. Share and exchange information on research findings, good practices, and experiences among countries, including national and regional institutions;

B. FISHERIES MANAGEMENT

10. Regularly review, update and strengthen national fisheries policies, legal and institutional frameworks through consultation and engagement of government agencies, the private sector, fishers, civil society, and other relevant stakeholders;
11. Accelerate the development of fisheries management plans as basis for fisheries conservation and management;
12. Implement measures to prevent unauthorized fishing and eliminate illegal fishing practices, e.g. strengthening enforcement of laws and regulations, establishing monitoring control and surveillance (MCS) mechanisms and network, developing and promoting responsible fishing practices, encouraging supplementary livelihood options;
13. Enhance implementation of comprehensive policies for fisheries management through (i) licensing systems (boats, gear, and people); (ii) rights-based fisheries; (iii) supportive legal and institutional frameworks; (iv) strengthened institutional cooperation; and (v) streamlined co-management;
14. Strengthen the adoption of fisheries management approaches, e.g. co-management and ecosystem approaches to fisheries management, at all levels with all relevant stakeholders involved in the process of planning and policy formulation for management of natural resources, conservation, rehabilitation of habitats and protective geographical features, and improvement of human well-being;
15. Strengthen the capacity of fisheries communities and the capability of fisheries-related organizations (e.g. by empowering such organizations as appropriate) to implement necessary actions towards increased resilience, improved livelihoods, adoption of supplementary livelihoods, and poverty alleviation, in support of achieving sustainable development with gender integration in the process;
16. Enhance the participation of local communities, fisheries-related organizations, and other stakeholders in fisheries management and in fisheries and stock assessments by providing data, local ecological information, and traditional knowledge on the status of fisheries and stocks;
17. Raise awareness of the need to develop financial incentives, especially for small-scale stakeholders and cooperatives, e.g. micro-credit, with national and regional institutional assistance for the responsible development of fisheries enterprises and developmental activities that optimize economic returns;
18. Enhance the efficient use of energy by adapting appropriate technologies for fishing gear and fishing vessel design, and fishing operations; and promote the use of alternative energy sources;
19. Improve the capability of fishing crew and workers in fishing industry, and conduct educational and skills development program for new crew members and workers entering the industry; while also adopt appropriate technologies to optimize number of crew onboard fishing vessels;
20. Promote the implementation of good and appropriate employment practices in accordance with domestic laws and regulations or relevant international instruments;
21. Enhance the capacity of relevant authorities and communities to collaboratively resolve conflicts on resources utilization;
22. Explore the potential of under-utilized fishery resources through comprehensive fishery resources surveys, and promote their exploitation in a precautionary manner based on analysis of the best available scientific information;
23. Encourage the implementation of the Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines) and promote the collection of sex-disaggregated statistics on fishers and fish workers in the fish value chain;
24. Promote fair distribution of benefits gained from both intra-regional and international trade of fish and fishery products among small-scale actors along the whole value chain;
25. Monitor and assess the perceived impacts of climate change to fisheries and aquaculture; and adjust existing programs to take into consideration the effects of climate change and natural disasters, focusing on the programs for (i) developing appropriate adaptation and mitigation plans; (ii) integrating fisheries and habitats management; (iii) enhancing community resilience through livelihood diversification; (iv) strengthening local organizations; and (v) promoting safety at sea and other priority areas;
26. Assess and manage the impacts of aquatic pollution and marine debris, including abandoned, lost, or otherwise discarded fishing gear (ALDFG) and microplastics/microbeads, on fisheries and aquaculture;
27. Foster cooperation with other countries for the conduct of stock assessment on straddling, transboundary, highly migratory, and shared fishery resources, as appropriate, to serve as inputs for formulating science-based fishery management plan; and strengthen sub-regional and bilateral cooperation including inter-agency cooperation for management of such resources;

Marine Fisheries

28. Strengthen the implementation of measures and activities to combat IUU fishing by ensuring compliance with national laws and regulations, and with the provisions of relevant international instruments; encourage the development and implementation of national plans of action to combat IUU fishing; promote inter-agency coordination for effective implementation of laws and regulations; and enhance awareness and understanding of applicable international and regional instruments and agreements through information dissemination campaigns;

Box 3. Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 (Cont'd)

29. Establish and strengthen regional, sub-regional, and bi-lateral coordination on fisheries management and efforts to combat IUU fishing; and where appropriate promote the establishment of Monitoring, Control and Surveillance (MCS) network through inter-agency coordination and information sharing;
30. Mobilize regional/sub-regional collaboration frameworks and tools for combating IUU fishing, e.g. Regional Plan of Action to Promote Responsible Fishing Practices including Combating Illegal, Unreported and Unregulated Fishing (RPOA-IUU); ASEAN Regional Plan of Action for the Management of Fishing Capacity (RPOA-Capacity); Regional Fishing Vessels Record (RFVR); ASEAN Catch Documentation Scheme (ACDS), and the use of technologies to support monitoring and surveillance of fishing activities, e.g. Vessel Monitoring System (VMS), traceability systems;
31. Support consultative dialogues at regional/sub-regional level among fisheries legal officers to share and exchange information on updated legal and regulatory frameworks in addressing issues in fisheries management;
32. Improve the capacity of relevant national authorities to effectively implement the requirements of port State measures and flag State responsibilities;
33. Intensify research on the impacts of various fishing gear types and methods on the ecosystem and populations of aquatic animals, and develop and promote environment-friendly fishing practices, e.g. low impact and fuel efficient (LIFE) fishing gears/methods;
34. Mitigate bycatch and discard concerns including excessive catch of juvenile fish by promoting the adoption and implementation of relevant regional and international guidelines, e.g. FAO International Guidelines on Bycatch Management and Reduction of Discards;
35. Promote resource enhancement approaches with appropriate monitoring and evaluation programs, e.g. deployment of appropriate resource enhancement structures, restocking of commercially-important aquatic species, and restoration of degraded habitats, taking into consideration possible socio-ecological impacts;
36. Apply the concept of fisheries refugia in line with the Regional Guidelines on the Use of Fisheries *Refugia* for Capture Fisheries Management in Southeast Asia to complement the existing conservation and management measures, including the integration of fisheries with habitats management;
37. Promote the adoption of different management approaches to sustainably manage major critical coastal habitats, e.g. mangroves, coral reefs and seagrasses; and develop and disseminate information and guidance on the use of appropriate tools and interventions;
38. Enhance safety at sea, decent working conditions and implementation of onboard fishing vessels sanitation, including the development of new design for fishing vessels, in compliance with relevant international standards;
39. Assess the possible impacts of subsidies on fisheries, particularly on the special requirements and the needs of small-scale fisheries in the region;

Inland Fisheries

40. Establish and implement comprehensive policies and supporting legal and institutional frameworks, and adopt ecosystem approaches to inland fisheries management that devolve co-management responsibilities to the local authorities and stakeholders, strengthen the rights of communities, and promote rights-based fisheries;
41. Enhance awareness of the importance of inland fisheries for local food security, and the importance of rehabilitating and restoring habitats for migratory inland aquatic animals, restocking indigenous aquatic species to enhance productivity (with monitoring and evaluation of restocking programs) and encouraging culture-based inland fisheries, where appropriate;
42. Monitor the impacts, and mitigate the negative impacts of invasive/alien species on the inland ecosystem and biodiversity;
43. Strengthen inter-agency coordination (national/sub-regional) on multiple-use water resources of the wetlands/flood-plains to sustain inland fisheries, mitigate conflicts among users and also encourage better coordination to address transboundary inland fisheries management issues;
44. Promote Research and Development (R&D) to understand the migration patterns, spawning grounds and seasons, and nursery grounds of important inland aquatic animals; and ensure the sustainability of inland fisheries by maintaining health of the ecosystem, particularly the inter-connectivity of habitats and the specific management needs during the dry season;
45. Monitor and assess the impacts of the construction/operations of man-made structures that could alter the water ways and affect migration and spawning of aquatic animals, particularly those at risk of overexploitation, and develop mitigating measures and appropriate conservation and management measures for such impacts through consultative processes that may involve collaboration with regional organizations;
46. Encourage coordinated planning and management on the use of inland water bodies including rivers, floodplains, wetlands, etc. through (i) resource enhancement programs; (ii) inland fisheries management programs; (iii) environmental impact assessment of structures on the aquatic resources; and (iv) restocking of indigenous and/or commercially-important aquatic animals species taking into consideration concerns on genetic diversity; and build/improve the capacity of human resources and institutions in the implementation of such programs;
47. Formulate guidelines to promote the use of practical and simple indicators for inland/floodplain fisheries within the national inland fisheries management framework, to facilitate (i) timely local level fisheries management decisions with due respect to the large number of people/farmers that take part in fishing; (ii) dialogues to ensure that the inter-connectivity of fish migration path is kept as a tool for management/conservation measures; and (iii) adaptation to the effects of climate change within water bodies;

C. AQUACULTURE

48. Strengthen national programs and policies on aquaculture address social, economic, and environmental aspects of sustainable aquaculture to improve food security, livelihoods, and employment, and alleviate poverty by (i) providing the mechanisms and enabling policies for good aquaculture practices, efficient markets and fair trade; (ii) strengthening the capacity of small-holder fish farmers; and (iii) promoting inter-agency collaborations;
49. Develop and implement ASEAN guidelines for environment-friendly and responsible aquaculture and good aquaculture practices that cover: (i) integration of quality and safety management systems for products with significant trade potentials; (ii) use of chemicals in aquaculture in relation to food safety; (iii) development of product traceability systems from farm to market; and (iv) implementation of quarantine and inspection/sampling procedures and Sanitary and Phytosanitary (SPS) measures for aquaculture products to ensure food safety;
50. Integrate aquaculture into rural development activities within the context of multiple-use of land and water resources through inter-agency coordination in policy formulation, project planning and implementation, stakeholder consultation, extension services and technology transfer; and participate in and provide support to regional initiatives that assess the role of aquaculture in poverty alleviation for better policy formulation;

Box 3. Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 (Cont'd)

51. Explore the use of advanced technologies for marine (inshore and offshore) and inland aquaculture, including the development of full-cycle breeding and aquaculture technologies for selected high-value species;
52. Implement measures or strategies at national and local levels to: (i) monitor and regulate aquaculture operations; (ii) prevent over intensification of aquaculture; and (iii) ensure that activities are carried out in a sustainable manner and that aquatic animal welfare is taken into consideration as appropriate; (iv) effectively enforcing regulations to avoid conflict in the use of common resources; and (v) adopt the concept of environmental carrying capacity including the implementation of good aquaculture practices;
53. Provide government support for R&D on: (i) improving existing genetic resources; (ii) assessing the impact of climate change on aquaculture; and (iii) improving the feeding and aquatic animal health management;
54. Promote the production and distribution of specific pathogen-free (SPF) and specific pathogen-resistant (SPR) broodstock and seeds through: (i) establishment of certified government or private hatcheries as sources of quality seed; (ii) dissemination of new breeding technologies and techniques for the effective distribution and maintenance of genetically-improved strains; and (iii) implementation of sound policies that promote better hatchery management practices, including the responsible collection and use of wild broodstock and seed;
55. Improve aquatic biosecurity by providing support to: (i) research on the development of domesticated, genetically improved, specific pathogen-free (SPF), and specific pathogen-resistant (SPR) aquaculture species; and (ii) small-scale hatchery operators and farmers to access healthy broodstock and improve their ability to adopt, at the farm level, the established techniques for aquatic animal health management;
56. Formulate and implement complementary and supportive policies that will: (i) build the capacity of fish farmers and hatchery operators in adopting broodstock and hatchery technologies and innovations; (ii) enhance fish farmers and hatchery operators' access to SPF/SPR broodstock and seeds produced through farmer-friendly broodstock management methods; (iii) foster strong cooperation between the public and private sectors engaged in development and dissemination of quality broodstock and seed stock; (iv) strengthen the capacity of fish farmers' groups, e.g. by empowering fish farmers' groups; and (v) promote development of a skilled workforce for the aquaculture industry;
57. Encourage good and appropriate employment practices in accordance with domestic laws and regulations or relevant international instruments;
58. Raise awareness of the need to develop financial incentives and micro-credit, with national and regional institutional assistance, for the responsible development of aquaculture enterprises and developmental activities that optimize economic returns;
59. Reduce the risk of negative environmental impacts, loss of biodiversity, and disease transmission by regulating the introduction and movement of aquatic organisms in accordance with relevant regional and international guidelines, e.g. the Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals;
60. Continue national efforts to prevent and control serious disease outbreaks by providing government support to: (i) R&D following standard procedures (e.g. OIE standards) in handling emerging diseases and surveillance of transmission of diseases; and (ii) regional initiatives on harmonization of regional disease control standards, disease reporting, and implementation of contingency plans to handle emerging diseases;
61. Further enhance capabilities in the diagnosis and control of aquatic animal diseases through: (i) continued support in development of technology and techniques for disease identification; (ii) promotion of the widespread use of users friendly, field-friendly, rapid and standardized diagnostic tests; and (iii) establishment of regional and inter-regional referral systems, including the designation of reference laboratories and timely access to fish health experts within the region;
62. Strengthen the implementation of regional warning systems on aquatic animal health and diseases to inform other AMSs of relevant epidemiological events and to raise awareness of emerging pathogens that may pose risks. Build emergency preparedness capacity through rapid and timely responses to reduce potential catastrophic consequences of emerging diseases as highlighted by ASEAN Network of Aquatic Animal Health Centres (ANAAHC);
63. Promote the prudent use of legal antibiotics in aquaculture, and monitor the impacts of Antimicrobial Resistance (AMR) on aquatic animals;
64. Improve the efficient use of aquafeeds by regulating the quality of manufactured feed and feed ingredients, and support continued/applied research for developing suitable alternative protein sources that will reduce the cost and dependence on fish meal and other fish-based products, and subsequently promote regional sharing of information on feed ingredients; encourage the culture of species requiring no or low fish meal content in their feed and application of effective feeding management practices, taking into account the need for cultural and social acceptance of feed ingredients;
65. Undertake risk assessment of the culture of exotic aquatic species, and establish measures to prevent the escape of high risk species and their possible impacts on the natural ecosystem and biodiversity;
66. Improve human resource capabilities for responsible aquaculture through: (i) closer public and private sector collaboration in R&D, paying particular attention to the need for advanced skills in biotechnology and assessment of the efficacy and economics of the use of probiotics and immunostimulants including vaccines; and (ii) effective implementation of aquaculture education and extension services;
67. Formulate and implement national policies and strategies that will enable the aquaculture sector to adopt measures to mitigate the potential impacts of climate change and environmental stressors by providing support to R&D on climate change, and other environmental-related issues to increase resilience, strengthening the overall capacity of various stakeholder groups and fostering cooperation within the aquaculture sector and with other sectors, and developing standard procedures for disaster risks reduction in aquaculture;
68. Apply precautionary approach to safeguard the environment from the over-intensification and expansion of inland, coastal and offshore aquaculture;
69. Conduct risk assessment and R&D related to the use of Genetically Modified Organism (GMO) products in aquaculture (e.g. broodstock and aquafeeds) including food safety issues;

D. OPTIMAL UTILIZATION OF FISH AND FISHERY PRODUCTS

70. Strengthen support for the development and application of technologies and best practices that optimize the utilization of catches/farmed products, reduce post-harvest losses and wastes, value-add byproducts and valorize fish waste/trimmings in commercial and small-scale fisheries, aquaculture, and processing operations, through improved processing, facilities and infrastructure development, onboard and onshore handling, and storage, distribution and marketing of fish and fishery products;
71. Promote the production of and preserve the diversity of traditional fish products by assisting producers to secure stable supplies of quality raw materials and meet food safety requirements; and improve product identity, nutritive value and marketing. In the process, promote the identity of and other initiatives on local fishery products;

Box 3. Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 (Cont'd)

72. Strengthen fish quality and safety management systems that support the competitive position of ASEAN fish and fishery products in the world markets, including possible adoption of cold chain management standards and moving towards ISO22000 and ISO/IEC 17025 accreditation of national fish inspection laboratories; enhance capacity and acknowledge the recognized national laboratories, risk analysis and equivalence agreement, e.g. the Mutual Recognition Agreement (MRA); and promote the implementation of the quality and safety management systems among small and medium enterprises in the AMSs;
73. Encourage relevant control agencies at all levels to apply appropriate legislation and coordinated activities regarding the handling, processing, distribution, storage, marketing, quality, and safety of fish and fishery products;
74. Promote and conduct training programs and develop training materials to upgrade the technical skills and competencies of personnel in the public and private sectors on fisheries post-harvest technologies, and food quality and safety management systems;
75. Raise awareness of the need to develop financial incentives and micro-credit, with national and regional institutional assistance for the responsible development of fisheries and aquaculture enterprises, and developmental activities that optimize economic returns;
76. Encourage good and appropriate employment practices in accordance with domestic laws and regulations or relevant international instruments;
77. Adopt standards and guidelines for handling fish and fishery products, and implement hygienic fish handling onboard fishing vessels and provide training on fish and fishery products handling as part of the requirements for issuance of permits at all levels for fish vessel crews;

E. FISH TRADE

78. Strengthen cooperation among AMSs to implement international standards with regards to trade in fish and fishery products within the ASEAN;
79. Implement regional/ASEAN standards (e.g. ASEAN Good Aquaculture Practices (ASEAN GAqP), ASEAN Shrimp Good Aquaculture Practices (ASEAN Shrimp GAP), and ASEAN Policy Guidelines on Standards and Conformance) applicable for fishery and aquaculture products that are in line with international requirements and applicable to the region; and promote such standards to be acceptable by importing markets;
80. Encourage the implementation of appropriate international standards and strengthen programs relevant to Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT) measures, R&D, as well as capacity building and awareness raising on fish trade-related issues;
81. Encourage, as appropriate, the development of national laws, rules and regulations on trading of species in accordance with relevant rules of international law;
82. Strengthen cooperation and mechanisms among AMSs to work towards common positions that could be reflected in international fish trade related fora, e.g. World Trade Organization (WTO), Food and Agriculture Organization of the United Nations (FAO)/COFI Sub-committee on Fish Trade, Office International des Epizooties (OIE), *Codex Alimentarius* Commission (CAC), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);
83. Engage the private sector (e.g. ASEAN Seafood Federation) in addressing trade-related issues, and in collaborative efforts to promote and sustain regional and international trade;
84. Assist small-scale producers to comply with standards on safety and quality of fish and fishery products by providing support programs including capacity building;
85. Assist small-scale producers from both capture fisheries and aquaculture in securing and maintaining access to markets at the national, regional and international levels, and in the process, develop marketing systems that are not capital intensive but are accessible for local producers;
86. Apply traceability systems with mechanisms as needed to certify or validate the information for the whole supply chain by harmonizing AMSs' inspection systems in line with international standards and strengthening port inspections process to improve traceability;
87. Encourage and provide guidance to develop/improve branding or eco-labeling of fish and fishery products that demonstrate the eco-friendly and socially acceptable nature of ASEAN products, including organic standards and coordination of Halal requirements;

F. REGIONAL AND INTERNATIONAL POLICY FORMULATION

88. Increase participation and involvement of AMSs in international fora and technical committees, e.g. CITES, CAC, FAO, OIE, Regional Fisheries Bodies (RFBs), and WTO; and promote ASEAN interest, recognizing that fisheries policies of relevance to the ASEAN are increasingly discussed and agreed upon at the global level.

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CALENDAR OF EVENTS

Date	Venue	Event	Organizer(s)
2020			
1 October	Virtual Meeting	2 nd Inter-Departmental Consultation on Preparation for SEASOFIA2022	SEAFDEC Secretariat
6 October	Virtual Meeting	2 nd Ad-Hoc Meeting of the Project Steering Committee of the Fisheries <i>Refugia</i> Project	Fisheries <i>Refugia</i> project
6-9 October	Virtual Meeting	Inception Workshop for the Project on Enhancing Food Safety and Competitiveness of Seafood Products	SEAFDEC/MFRD
7 October	Virtual Meeting	Inter-Departmental Workshop on Study on Impacts from Corona Virus-2019 Pandemic on Fisheries Sector of the SEAFDEC Member Countries	SEAFDEC Secretariat
14 & 16 October	Virtual Meeting	19 th Environmental Management Expert Group Meeting	MRC
20 October	Virtual Meeting	4 th Forum of Entities Associated with ASEAN	ASEAN
21 October	Virtual Meeting	42 nd Meeting of the ASEAN Ministers on Agriculture and Forestry (AMAF)	ASEAN
26-29 October	Webinar	Regional Aquaculture Reviews and State of World Aquaculture 2020	FAO
29 October	Virtual Meeting	3 rd Asia-Pacific Day for the Ocean	UN/ESCAP
2-6 November	Virtual Meeting	24 th Session of the Indian Ocean Tuna Commission (IOTC)	IOTC
9-11 November	Virtual Meeting	4 th Compliance Committee Meeting of the Southern Indian Ocean Fisheries Agreement (SIOFA)	SIOFA
9 Nov 2020 - 20 Feb 2021	Online course	Distance Learning Course: Basic Principles of Health Management in Aquaculture	SEAFDEC/AQD
10 November	Webinar	JIRCAS 50 th Year Anniversary International Symposium 2020: The role of international collaboration in agricultural research to address challenges in the post-COVID-19 global food system	JIRCAS
10-12 November	Virtual Seminar	43 rd Meeting of the Program Committee Meeting (PCM)	SEAFDEC
16,25 November	Virtual Seminar	Lower Mekong Fish Passage Initiative Virtual Seminar	US-DOI
17-18 November	Virtual Seminar	23 rd Meeting of the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP)	SEAFDEC
30 Nov -1 Dec	Virtual Meeting	21 st Meeting of SEAFDEC Information Staff Program (ISP)	SEAFDEC Secretariat
2 December	Virtual Meeting	6 th Meeting of the Scientific Working Group (SWG) on Neritic Tuna Stock Assessment in the Southeast Asian Waters	SEAFDEC/MFRDMD
4 December	Virtual Meeting	2 nd Regional Inception Phase Meeting for the Project on Implementing the Strategic Action Programme for the South China Sea	UNEP/GEF
8 December	Virtual Meeting	Regional Technical Consultation on Regional Plan of Action for the Management of Fishing Capacity (RPOA Capacity)	SEAFDEC/MFRDMD
9 December	Virtual Meeting	Inception Meeting for the Project on Sustainable Fish in Asia Project (SuFIA)	RTI
9 December	Virtual Meeting	2020 Government of Japan Trust Fund Projects Annual Progress Meeting	SEAFDEC/IFRDMD
18 December	Secretariat	In-house Training on Micro-finance, Credit and Insurance	SEAFDEC/TD
21 December	Virtual Meeting	Teleconference for the Project on Strengthening the Effective Management of Inland Fisheries and Aquaculture in AMS with GIS and RS Technology	SEAFDEC Secretariat
21-22 December	Virtual Meeting	1 st Meeting of ASEAN Network for Combating IUU Fishing (AN-IUU) National Focal Points	ASEAN
2021			
1-5 February	Rome, Italy	34 th Session of FAO Committee on Fisheries	FAO
24 February	Teleworkshop	Regional Workshop on the Study on Impacts of COVID-2019 Pandemic on the Fisheries Sector of the ASEAN-SEAFDEC Member Countries	Secretariat

Southeast Asian Fisheries Development Center (SEAFDEC)

What is SEAFDEC?

SEAFDEC is an autonomous intergovernmental body established as a regional treaty organization in 1967 to promote sustainable fisheries development in Southeast Asia. SEAFDEC currently comprises 11 Member Countries: Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam.

Vision

Sustainable management and development of fisheries and aquaculture to contribute to food security, poverty alleviation and livelihood of people in the Southeast Asian region

Mission

To promote and facilitate concerted actions among the Member Countries to ensure the sustainability of fisheries and aquaculture in Southeast Asia through:

- i. Research and development in fisheries, aquaculture, post-harvest, processing, and marketing of fish and fisheries products, socio-economy and ecosystem to provide reliable scientific data and information.
- ii. Formulation and provision of policy guidelines based on the available scientific data and information, local knowledge, regional consultations and prevailing international measures.
- iii. Technology transfer and capacity building to enhance the capacity of Member Countries in the application of technologies, and implementation of fisheries policies and management tools for the sustainable utilization of fishery resources and aquaculture.
- iv. Monitoring and evaluation of the implementation of the regional fisheries policies and management frameworks adopted under the ASEAN-SEAFDEC collaborative mechanism, and the emerging international fisheries-related issues including their impacts on fisheries, food security and socio-economics of the region.



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The third prize winner, *Mohd Nor Aman bin Mohamed Zain*, from the national drawing contest in Malaysia

National Drawing Contests were organized in all ASEAN-SEAFDEC Member Countries as part of the preparatory process for the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 "Fish for the People 2020: Adaptation to a Changing Environment" held by ASEAN and SEAFDEC in June 2011 in Bangkok, Thailand, in order to create awareness on the importance of fisheries for food security and well-being of people in the region.