

PART III

Outlook of Fisheries and Aquaculture for the Southeast Asian Region

1. GROWING DEMAND FOR FISH AND FISHERY PRODUCTS

In the Southeast Asian region, fisheries form an integral part of people's livelihood, providing significant contribution to food security, nutritional requirements, sustained incomes, and improved socio-economics of people. Considering that several Southeast Asian countries are major fish exporting nations, the contribution of Southeast Asian fisheries to food security is not only limited for people within the region but also all over the world. With anticipated increase in the world's human population from 7.3 billion in 2014 to 8.1 billion by 2030 and 9.6 billion by 2050 (**Table 65**), the world food-producing sector including fisheries would therefore be faced with stronger challenge to secure the availability of food and nutrition for the growing demand from such increasing population.

In order to ensure the sustainable development of fisheries in the Southeast Asian region for the benefit of future generations, the FAO Code of Conduct for Responsible Fisheries serves as broad fisheries development framework, while the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region (adopted in 2001) and the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the

ASEAN Region Towards 2020 (adopted in 2011) would also continue to provide guidance on priority actions for enhancing the contribution of fisheries to food security of peoples in the region. Furthermore, the Strategic Plan of Action on ASEAN Cooperation in Fisheries (2016-2020), which was developed taking into consideration the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 and recently endorsed by the ASEAN-SEAFDEC Member Countries during the Thirty-eighth Meeting of the ASEAN Ministers on Agriculture and Forestry, also serves as guide for actions to be implemented by the AMSs towards sustainability of the fisheries sector in the near future.

2. ISSUES AND CHALLENGES TOWARDS SUSTAINABLE UTILIZATION OF FISHERY RESOURCES

Under the Convention on Biological Diversity (CBD), the Strategic Plan for Biodiversity 2011-2020 developed during the Tenth Meeting of the Conference of the Parties on 18-29 October 2010 in Aichi Prefecture, Japan, includes the Aichi Biodiversity Target Number 6, which states that *“By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so*

Table 65. Projected population, fish production, per capita production, and GDP of the Southeast Asian countries

Countries	Population (million)			Fish production (2014) (thousand metric ton)	Average. per capita fish consumption (2013) (kg/person/yr) ³	GDP (2014) ⁵
	2014 ¹	2030 ²	2050 ²			
Brunei Darussalam	0.4	0.5	0.6	3.9	47.0	36,607
Cambodia	15.2	18.9	22.5	745.0	41.4	1,081
Indonesia	252.2	295.5	322.2	20,601.0	31.8	3,534
Lao PDR	6.8	8.5	10.2	151.0	19.8	1,693
Malaysia	30.2	36.1	40.7	1,988.0	54.0	10,803
Myanmar	51.5	60.2	63.6	5,040.0	60.7	1,221
Philippines	99.9	123.6	148.3	4,681.0	30.2	2,865
Singapore	^{5,5}	6.4	6.7	6.7	46.9	56,319
Thailand	68.6	68.3	62.4	2,667.0	26.1	5,445
Viet Nam	90.7	105.2	112.8	6,333.0	34.8	2,053
Southeast Asia	621.0	723.2	790.0	42,217.0	35.1⁴	3,867
World	7,300³	8,084	9,587	195,700.0	19.7	77,609⁴

Source:

¹ ASEAN Statistical Year Book 2015

² World Population Prospects: The 2015 Revision, Key Findings and Advance Tables

³ FAO Yearbook 2014

⁴ Calculated based on per capita fish consumption in 2013 and population in 2014

⁵ International Monetary Fund Database Website

that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.”

The importance of fisheries and “life below the water” was also reflected among world leaders in developing the targets to “end poverty, protect the planet, and ensure prosperity for all.” To provide a platform for common efforts among governments, civil society and the private sector to meet these ambitions, the Sustainable Development Goals (SDGs) were adopted by the United Nations Sustainable Development Summit 2015 on 25-27 September 2015. The SDGs are made up of 17 goals together with sub-sets of 169 targets. In terms of fisheries and aquatic environmental protection, the SDG Goal Number 14 should be specifically highlighted as it indicates an ambition to: “*conserve and sustainably use the oceans, seas and marine resources.*” The SDG goals have specific targets to be achieved over the next 15 years (by 2030).

The Aichi Biodiversity Target Number 6 and the Sustainable Development Goal Number 14 should therefore be taken into consideration in undertaking activities towards sustainable development of fisheries in the Southeast Asian region.

2.1 Marine Capture Fisheries

Based on the trend in fisheries production, where several major species being harvested are fully- or over-exploited, and with deteriorating aquatic habitats caused by habitat destruction and marine pollution, it is likely that production from capture fisheries of the Southeast Asian region will not increase much further in the near future. In this connection and considering the anticipated increasing demand for fish despite limited fishery resources, promotion of responsible practices on sustainable utilization of resources should be continued in the Southeast Asian region. Appropriate management approaches that are appropriate for small-scale fisheries that had been introduced through the past decades, particularly the co-management concept, should be promoted further for adoption by the countries as appropriate, taking into consideration the availability of their respective supportive legal frameworks. During the past few years, the concept of Ecosystem Approach to Fisheries Management or EAFM has been promoted for equitable management that balances ecological well-being and societal benefits to ensure long-term sustainable use of the fishery resources. Thus, the EAFM concept could be one of the methods beneficial for the region, considering the nature of the region’s fisheries which is

multispecies and involves a wide range of stakeholders across the sector.

Conservation and rehabilitation of important aquatic habitats, particularly the fragile habitats that are critical to life stages of aquatic species such as coral reefs, sea grass beds, and mangrove forests, restoration of deteriorated inland habitats and rebuilding stocks of aquatic species are some of the approaches that had been put into practice by several countries in the region with a view of enhancing the fisheries production. Nevertheless, to ensure effective implementation of such approaches, regional guidelines on best practices are necessary with clear objectives, based on results of feasibility studies, and with involvement of relevant stakeholders in the planning and management as well as in monitoring and evaluation. Furthermore, the concept on fisheries *refugia* that had been introduced in the region could be promoted further to complement the existing conservation and management measures by integrating the fisheries objectives of protecting the critical life cycles of aquatic species, *e.g.* spawning, nursing, broodstock aggregation, as well as maintaining the migratory routes of species targeted for management, with consideration also on the establishment of fisheries *refugia* for management of transboundary species that move across the EEZs of more than one country.

2.2.2 Combating IUU Fishing

Illegal, Unreported and Unregulated (IUU) fishing which has been identified as one of the causes of the declining fishery resources, can take place in all aspects of capture fisheries and in all bodies of water. Initiatives to conserve and manage fish stocks have been undermined by IUU fishing, the result of which could lead to total collapse of capture fisheries, seriously hampering all attempts to rebuild the stocks that may have already been overfished. International society during the past decade had enforced stringent requirements for combating IUU fishing and enhancing traceability of fish from capture fisheries, *e.g.* the European Council (EC) Regulation 1005/2008 Establishing a Community System to Prevent, Deter and Eliminate IUU Fishing (entered into force on 1 January 2010); the Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (entered into force on 5 June 2016); US Presidential Taskforce on Combating Illegal, Unreported and Unregulated (IUU) Fishing and Seafood Fraud.

Recognizing the threats from declining fishery resources and taking heed of the international requirements for combating IUU fishing, several countries in the region had issued regulations to limit their fishing activities. These include:

- o Controlling overfishing activities by:
 - Improving vessel registration and licensing systems
 - Applying Vessels Monitoring System (VMS)
 - Prohibiting foreign vessels from operating in national waters (*e.g.* Indonesia, Malaysia)
 - Strengthening MCS and preventing poaching
- o Regulating fish landings at ports by:
 - Enhancing inspections at landing sites or ports through the implementation of the Port State Measures Agreement
 - Prohibiting the landing of catch from vessels (*e.g.* Indonesia, Malaysia) in other country's ports
- o Controlling fish and fishery products along the supply chain through the implementation of traceability system, *e.g.* catch to be accompanied with required documents along the supply chain

The ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain which was adopted by the Senior Officials Meeting of the ASEAN Ministers on Agriculture and Forestry (AMAF) in 2015, could serve as a regional framework for the development of corresponding measures to combat IUU fishing by the respective countries in the region, as well as for the establishment of regional cooperation and collaboration in combating IUU fishing. In any case, it is anticipated that more stringent requirements for ensuring the sustainable utilization of resources and combating IUU fishing could be encountered by the Southeast Asian countries in the near future.

Besides the requirements for combating IUU fishing, the fisheries sector of the region is also being challenged by the need to implement existing standards and instruments developed by various organizations such as the International Labour Organization (ILO) and the International Maritime Organization (IMO), particularly the ILO Promotional Framework for Occupational Safety and Health Convention 2006 (No. 187), and the ILO Work in Fishing Convention 2007 (No. 188). In responding to such requirements, the AMSs supported the development of the “ASEAN Guidelines on Implementation of Labor Standards for the Fisheries Sector” to secure the rights and decent working conditions of people engaged in the fisheries sector including migrant workers in the spirit of the ASEAN Community integration. Furthermore, modification of existing vessels or adoption of “new designs of fishing vessels” could be options for enhancing compliance with relevant provisions in the abovementioned Conventions, and reducing requirements for workers onboard fishing vessels in the future.

In compliance with the emerging requirements for sustainable utilization of fishery resources and combating IUU fishing, the Southeast Asian countries adopted a “Joint Declaration on Combating IUU Fishing and Enhancing the Competitiveness of ASEAN Fish and Fisheries Products” in 2016 to promote the pertinent activities as shown in **Box 21**.

Box 21. Joint Declaration on Combating IUU Fishing and Enhancing the Competitiveness of ASEAN Fish and Fisheries Products

- Strengthening Monitoring, Control and Surveillance (MCS) programs under national laws and regulations for combating IUU fishing
- Intensifying capacity building and awareness-raising programs, including information, education, and communication campaigns
- Enhancing traceability of fish and fishery products from capture fisheries through the implementation of the “ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain” and the “ASEAN Catch Documentation Scheme for Marine Capture Fisheries”
- Enhancing traceability of aquaculture products, through the implementation of all ASEAN Good Aquaculture Practices (GAPs) with certification scheme based on regulations of respective countries
- Managing fishing capacity with a view to balancing the fishing efforts with the declining status of the fishery resources in the Southeast Asian region, and establishing conservation measures based on scientific evidence
- Promoting the implementation of port State measures
- Enhancing regional cooperation in managing transboundary fishery resources
- Regulating the quality and safety of ASEAN fish and fishery products all throughout the supply chain
- Addressing issues on labor (safe, legal, and equitable practices) in the fisheries sector
- Enhancing close collaboration between the AMSs and relevant RFMOs in combating IUU fishing
- Undertaking collective efforts in developing preventive and supportive measures to strengthen rehabilitation of resources and recovery of fish stocks to mitigate the impacts of IUU fishing

For the implementation of these required actions, respective Southeast Asian countries should ensure the availability of supportive legal and institutional frameworks as well as human and financial resources. Furthermore, building the awareness of key stakeholders along the fishery supply chain should also be enhanced to facilitate the implementation of such actions, *e.g.* required traceability system.

The ASEAN Catch Documentation Scheme (ACDS) is one of the management tools meant to improve and strengthen fisheries management in the region, in order to support intra-regional and international trade of fish and fishery products. The development of the ACDS took into consideration the requirements of RFMOs, the EU, and the U.S. Presidential Task Force as well as the systems that are already in place in the respective AMSs

in order that the ASEAN fish and fishery products would be acceptable by major importing markets. Although the ACDS is still in its finalization process for pilot-testing in selected AMSs, its implementation by the AMSs as envisioned, is not only intended to enhance intra-regional trade but also to improve national traceability of fish and fishery products in the future.

With regards to the Port State Measures Agreement (PSMA) which has been ratified by 25 States (including three Southeast Asian countries, namely: Indonesia, Myanmar, and Thailand) and entered into force on 5 June 2016, several Southeast Asian countries have already established their respective national systems and designated ports as well as the required legal frameworks to support the implementation of the PSMA. However, awareness-raising is still necessary to provide deeper understanding on the implications of the entry into force of the PSMA, including institutional responsibilities relevant to the respective laws and regulations of the countries. Furthermore, capacity building activities should also be promoted to ensure effective implementation of the PSMA. Through such processes, the capability of the countries in enforcing control over foreign-flagged vessels would be enhanced, as well as in obtaining information on source of origins of fish and fishery products, and preventing the importation of fish and fishery products from IUU fishing activities in the future.

In 2016, the ASEAN Regional Plan of Action for the Management of Fishing Capacity (RPOA-Capacity) was endorsed by the Thirty-eighth Meeting of the ASEAN Ministers on Agriculture and Forestry (38th AMAF). Implementation of the RPOA-Capacity, including development of respective National Plans of Action for Management of Fishing Capacity by respective AMSs is encouraged to strike a balance between fishing efforts and the available fishery resources. While close collaboration at regional, sub-regional or bilateral levels is necessary for ensuring effective fisheries management of transboundary fishery resources, the AMAF at its Thirty-eighth Meeting had encouraged the AMSs to consider developing the “Common ASEAN Fisheries Policy” to strengthen their collective efforts in attaining sustainable and responsible fisheries, and food security towards the unification of ASEAN Community. This is one of the biggest challenges for the Southeast Asian fisheries, which needs to be explored in the near future.

While it is well recognized that effective management is a key towards sustainable utilization of the fishery resources, improved data and information on status and trends of fishery resources is one of the prerequisites for science-based management, as well as in the implementation

of the RPOA-Capacity or NPOA-Capacity taking into consideration the available fishery resources. Based on the progress of the compilation of available fisheries statistics from the Southeast Asian countries, it appears that several countries still have limited capacity to come up with timely and reliable fishery statistics with details necessary for determining the actual status and trends of the fishery resources. The region is therefore faced with strong need not only to improve collection and compilation of data and information on fishery resources, *e.g.* data on production that could be used for stock assessment and development of appropriate indicators appropriate for fisheries in the region (*e.g.* CPUE), but also to be able to implement management measures based on such data and information.

2.2 Inland Capture Fisheries

The inland capture fisheries sub-sector is important not only for its contribution to food security, particularly for rural areas, but also for providing steady contribution of around 7-8% of the region’s total fisheries production. Nevertheless, the sub-sector has been confronted with the deterioration of inland aquatic habitats caused by alterations of floodplains for urbanization and conversion to agriculture areas, constructions of cross-river obstacles, *e.g.* dams for hydropower and irrigation purposes, roads, and pollution among others. Considering that inland water resources are being utilized by multiple resource users, competition for such utilization by several sub-sectors would be more severe in the future. Respective countries in the region should therefore enhance cross-sectoral coordination in order to maximize the benefits that could be obtained from inland water resources, and at the same time, ensure that relevant aquatic habitats would continue to provide its contribution to increased fisheries production for people’s sustained livelihoods and to the aquatic resources’ nourished biodiversity.

This sub-sector has also been confronted with concerns on availability of data and information, considering that the sub-sector comprises large portion of small-scales fisheries, most of which are part-time or subsistence fishers, with its catch and production that are diverse and multispecies, and a large portion of which is used for household consumption without being appropriately recorded. As a result, inland fisheries production is underestimated and underrepresented in most of national statistics or other records, which leads to the inadequate attention given to the inland fisheries sector. It is therefore necessary to improve data collection in order that the importance of inland capture fisheries is beefed up, and the information compiled provides sufficient justification for balancing and trading-off between resource conservation and development projects.

Although it could be viewed that management of inland fishery resources is mostly a national issue under the respective countries, regional management framework is necessary in some cases, particularly in transboundary inland bodies of water, *e.g.* Mekong River Basin (transboundary for Thailand, Cambodia, and Viet Nam).

2.3 Aquaculture

Based on statistical reports, the trend of aquaculture production has been drastically increasing over the past 10 years with the improvements in aquaculture technologies. Production from the aquaculture sub-sector is seen to be a key contributor to meeting the increasing demand for fish and fishery products in the future. While efforts have been exerted by many Southeast Asian countries to intensify aquaculture operations and increase production with a view to meeting food security requirements, such operations have also been seen to compete with the utilization of captured fish as ingredient for aquaculture feeds and for human consumption. Technologies for the substitution of fish-based ingredients in aquaculture feeds have been explored by relevant national and regional agencies, and works have continued with particular focus on the use of locally available ingredients in feed formulations. Sharing of information on this aspect is necessary, in order that utilization of the fishery resources in the Southeast Asian region could be optimized for sustaining the food security and livelihoods of its people.

While some aquaculture operations over the past decades had been developed towards intensification requiring high production inputs, *e.g.* seedstocks, feeds, chemicals, and therapeutants, that results in increased aquaculture yield, among others, the aquaculture industry had been confronted with continuing concerns on transboundary diseases that hinder its sustainable development. While the countries in the region have been seriously working to establish effective approaches to prevent and/or control further incidence of aquatic animal diseases, emerging diseases have continued to occur during the past few years, *e.g.* the AHPND or EMS that resulted in drastic reduction of aquaculture production from major exporting countries of the Southeast Asian region. Considering the transboundary nature of these diseases that could easily spread from one place to another or even across the country or region, establishment and strengthening of surveillance measures through regional collaborative mechanism are crucial to alert the countries of any disease occurrence and enable them to adopt and adapt appropriate preventive and management measures in a timely manner.

Responsible aquaculture practices should also be promoted by countries in the region, along with the available regional guidelines, *e.g.* the ASEAN Good

Aquaculture Practice (GAqP), ASEAN Shrimp GAP, the ASEAN Guidelines for the Use of Chemicals in Aquaculture and Measures to Eliminate the Use of Harmful Chemicals. Furthermore, as adopted by the Thirty-eighth AMAF in 2016, the Regional Guidelines on Traceability System for Aquaculture Products in the ASEAN Region could be used by the Southeast Asian countries in verifying the safety and quality of their products, and ensuring that such products are farmed in compliance with national or international management requirements, and meeting with the national security and public safety objectives.

2.4 Cross-cutting Issues

2.4.1 Fish Utilization and Trade

In order to enhance the contribution of capture fisheries to food security, there is a need for improved utilization of the catch, *e.g.* management of low-value fish or by-catch, and improved post-harvest handling to minimize losses and maximize utilization and economic returns. These efforts would help in increasing the portion of fisheries production meant for human consumption in the future.

Issues on safety and quality of fish and fishery products are also equally crucial that need to be addressed appropriately. While several emerging standards and requirements that ensure the safety and quality of fish and fishery products are in place, particularly those intended for export, the region should also consider developing the ASEAN standards in line with relevant regional and international instruments such as the Rules of Procedure of the Codex Alimentarius Commission and the Agreement on the Application of Sanitary and Phytosanitary Measures or SPS Agreement. The respective countries should also continue to establish their respective national systems and build up their capacity in conducting analysis for chemical and drug residues as well as biotoxin substances in fish and fishery products to ensure that these fish products whether meant for export or domestic consumption, meet the quality and safety requirements.

2.4.2 International Fisheries-related Issues

The region's fisheries sector has been bearing the brunt from the listing of several commercially-exploited aquatic species into the CITES Appendices, *e.g.* basking shark, great white shark, whale shark, humphead wrasse, European eel, oceanic whitetip shark, porbeagle shark, manta rays, and three species of hammerhead sharks. During the CoP17-CITES in 2016, additional species have been approved for listing, *e.g.* silky shark, thresher shark, devil rays, and clarion angelfish. In the future,

other aquatic species could be proposed for listing in the CITES Appendices, *e.g.* Asian eels, sea cucumbers, and corals. It is therefore necessary to improve data collection on various commercially-exploited species in the region, to provide justifications for discussion at relevant international fora, *e.g.* CoP-CITES as and when necessary. Although mechanisms had been established to develop a common and coordinated position among the AMSs on the listings of commercially-exploited aquatic species, such mechanisms should be strengthened, particularly by seeking high-level endorsement of the said positions to be reflected by the respective countries during the CoP-CITES, as well as other relevant international and regional fora in the future.

2.4.3 *Small-scale Fisheries*

The Southeast Asian fisheries either in coastal or inland areas, which comprise very large numbers of small-scale fishers, provide significant contribution to food security and livelihood of people. Thus, adoption of the “Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication” or the “VGSSF Guidelines” could be very relevant to the region. The VGSSF was conceived based on the vision of eradicating hunger and promoting sustainable development as outlined in new FAO strategic framework. Such vision could be achieved through the promotion of human rights-based approach by empowering small-scale fishing communities including the men and women populations, to participate in decision-making processes and to assume responsibilities for sustainable use of the fishery resources. Nevertheless, application of the SSF Guidelines at the regional level needs to be designed to cater to the needs of small-scale fisheries in the Southeast Asian region.

2.4.4 *Climate Change*

Climate change is another important global issue that has created impacts on the fisheries sector either capture fisheries or aquaculture. For marine capture fisheries, the sub-sector is affected by rising sea temperature, sea-level rise as well as ocean acidification, with anticipated changes in recruitment, physiology, population dynamics, and ecology of various aquatic species and their ecosystems. Furthermore, more drastic weather conditions have also occurred, *e.g.* more intense storms that result in severe calamities to fishing communities along the coastal areas. Moreover, drastic changes in seasonal patterns have also been observed in inland areas during the past few years, *e.g.* longer or shorter rainy season and drought period, resulting in alterations in inland water bodies that affect inland capture fisheries. Measures to enhance the awareness of people that could be impacted by climate change and variability as well as mitigation approaches are therefore necessary and should be developed.

In the case of aquaculture, the major impacts could be from the changes in water regimes (caused by climate variability) resulting in shortage or excessive water runoff impacting inland aquaculture, as well as fluctuation of water salinity for brackishwater aquaculture. As it could also be presumed that cultured species are easily impacted by changes in water temperature, thus, research studies aimed to explore appropriate species that could adapt with anticipated changing temperatures should be carried out. Furthermore, efforts on low carbon development in the Southeast Asian region should also be explored and promoted, by minimizing the contribution of the fisheries sector (capture and culture) to greenhouse gas emission, with emphasis in proportioning energy efficiency and utilizing alternative energy sources wherever possible and appropriate.