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SEAFDEC organized the First Consultation on Fishery and Statistics and Information in Southeast Asia



Participants of the Fishery Statistics Consultation

On 21–22 September 2021, SEAFDEC organized the “First Regional Technical Consultation on Fishery Statistics and Information in Southeast Asia” through an online platform. The Consultation was attended by the representatives from the ASEAN Member States (AMSS), representative from the Food and Agriculture Organization of the

United Nations (FAO), and officers of SEAFDEC Secretariat and Departments. This Consultation is the first of a series of Consultations intended to harmonize the “Regional Framework for Fishery Statistics of Southeast Asia” with the recently adopted global standards, definitions, and classifications of fishery statistics.

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EDITORIAL

During the third quarter of 2021, SEAFDEC continued to organize events that are beneficial to the Member Countries. The important regional events include the “First Regional Technical Consultation on Fishery Statistics and Information in Southeast Asia” that was intended to harmonize the Regional Framework for Fishery Statistics of Southeast Asia as well as the “Teleworkshop on Development and Improvement of Regional Fishing Vessels Record (RFVR) for Combating IUU Fishing in the Southeast Asian Region” which reviewed the RFVR Database management and operation.

SEAFDEC also continued to conduct several trainings and workshops to enhance the capacity of SEAFDEC staff, SEAFDEC Member Countries staff, and fisheries students. The topics of the training/workshops include gender integration in small-scale fisheries, fisheries management as tools for EAFM,

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Teleworkshop on Development and Improvement of RFVR



SEAFDEC/TD organized the “Teleworkshop on Development and Improvement of Regional Fishing Vessels Record (RFVR) for Combating IUU Fishing in Southeast Asia” from 28 to 30 September 2021 via the Zoom platform. There were 20 participants including the RFVR national focal points and fisheries officers from the AMSS who attended

the Teleworkshop. The Teleworkshop was aimed at: 1) reviewing, exchanging, and updating the information on vessel registration and fishing license through the implementation of activities to combat illegal, unreported and unregulated (IUU) fishing among the AMSS; and 2) improving the RFVR Database

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EDITORIAL

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fish population dynamics and fisheries management, and marine fish hatchery.

The other important events include the launching of the project “Promoting the Blue Economy and Strengthening Fisheries through the Ecosystem Approach to Fisheries (GoTFish)” by SEAFDEC in collaboration with FAO/RAP with the goal of reducing stress in the Gulf of Thailand through improved practices and fisheries management, and better understanding of the role of incentives and the ecological corridors. The “Fifth Fisheries *Refugia* Project Steering Committee Meeting” was organized to discuss the progress of works and came up with a policy directive to support project activities. In addition, the “4th Regional Scientific and Technical Committee Meeting” was conducted to discuss the issues and challenges and strategic plan for the fisheries *refugia* project towards 2022.

Toward strengthening cooperation with the international/regional agencies/organizations such as FAO to address the priority fisheries issues, SEAFDEC participated in the FAO Global Conference on Aquaculture Millennium, e-Technical Working Group on the Global Stocks and Fisheries, and CWP Task Group on Catch Concept and Fishing Effort.

Furthermore, SEAFDEC congratulated *Mr. Dan Baliao* for his third term to serve as Chief of SEAFDEC/AQD for another two years. Also, MFRDMD bid farewell to *Dr. Ahmad Ali* who served as Chief of SEAFDEC/MFRDMD since 19 August 2020 and retired from the government service in July 2021.

Lastly, SEAFDEC expressed condolences to the family of *Mr. Panu Tevarutmaneeikul* who served as the Secretary-General of SEAFDEC from 1999 to 2003, and who passed on in November 2021. ❖

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SEAFDEC organized the First Consultation on Fishery and Statistics and Information in Southeast Asia

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After the countries' presentations, the Consultation discussed and agreed on the revised general parts of the Regional Framework and Explanatory Notes of the Fishery Statistical Bulletin of Southeast Asia produced annually by SEAFDEC. The Consultation also provided comments on the proposed inclusion of statistics on fish processing

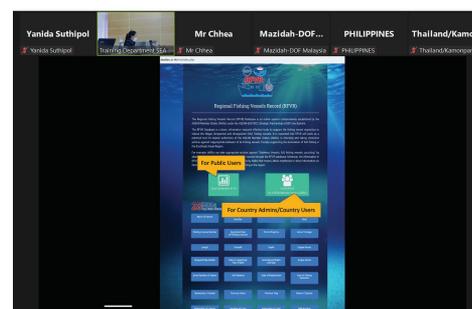
and fish trade (export and import) for regional compilation by SEAFDEC in the future. Several other concerns for revising the Regional Framework, e.g. categorization of national and foreign workers, inclusion on per capita fish consumption, were also raised and these could be discussed during the future Consultations. ❖

Teleworkshop on Development and Improvement of RFVR

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management and operations through the introduction and demonstration of the use of template/format of CSV/Excel file to upload the key data elements (KDEs) to the RFVR Database.

The RFVR Database is a tool to support fishing vessel inspection to reduce IUU fishing vessels in the region through enhancing transparency, traceability, and in supporting the implementation of port State measures. Currently, the RFVR



Database including the KDEs is available for the fishing vessels 24 meters in length and over. ❖

AQD and PENRO Guimaras release sea turtles to the wild

Kathy, Remy, and Sandy – the three injured sea turtles rehabilitated in net cages at SEAFDEC/AQD's Igang Marine Station in Guimaras, Philippines – had fully recovered. They were released back to the wild on 4 August 2021 with the help of the Guimaras Provincial Environment and Natural Resource Office (PENRO Guimaras). In 2016, AQD and PENRO Guimaras signed an

agreement to protect and conserve sea turtles in Guimaras Island. ❖

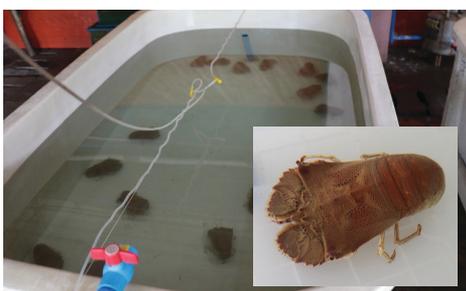


AQD to breed slipper lobster

SEAFDEC/AQD, with support from the Government of Japan Trust Fund, is looking to develop culture technologies for the slipper lobster (*Thenus orientalis*)

to begin a new industry and open more livelihood opportunities.

The slipper lobster derives its name from its flattened carapace. It is one of the few endemic and edible lobsters in the Philippines and more affordable than the commonly traded spiny lobster. ❖



First batch of slipper lobster breeders stocked at the hatchery in AQD's Tigbauan Main Station, Iloilo, Philippines

Agreement inked to jumpstart aquaculture development in Mindanao

More oysters and crabs may soon be spawning and growing in the southern Philippines once a recently inked partnership between SEAFDEC/AQD and the Mindanao Development Authority (MinDA) gains traction.

Aiming to establish hatcheries to produce seeds and accelerate aquaculture development in Mindanao, the second largest island in the Philippines, AQD Chief, *Mr. Dan Baliao*, signed the three-year agreement with MinDA on 6 September 2021 at Tigbauan, Iloilo, Philippines. The Memorandum of Agreement formalized the collaboration through techno-transfer programs, including verification and training in broodstock, hatchery, nursery, and grow-out operations of commercially



viable finfishes, crustaceans, mollusks, and seaweeds.

Despite COVID-19 restrictions, *Mr. Baliao* said the research center will immediately meet its commodity leaders and find means to conduct trainings

in Mindanao. The Head of the AQD Research Division, *Dr. Leobert de la Peña*, expressed support to the project and said that AQD is willing to share its expertise and technical capabilities to make the collaboration successful.



AQD researcher wins 3rd place in photo contest

The associate researcher of SEAFDEC/AQD, *Ms. Irene Legaspi*, won third place in the photo contest “Research despite COVID” during the 44th Larval Fish Conference held virtually on 24–25 June 2021. *Ms. Legaspi*’s winning capture, which bested 19 other entries, was her photo with a giant white marlin that she and her team took while looking for kawakawa samples.



Fisheries Society. The sessions this year included topics such as climate change, commercial and ornamental aquaculture, form, function and development, larval assemblages, and recruitment processes.



Moreover, three other AQD researchers, namely: *Ms. Annie Franco*, *Ms. Mary Anne Mandario*, and *Mr. Peter Palma*, also attended the conference, an annual event sponsored by the Early Life History Section of the American

AQD and Philippine National Museum dissect ocean sunfish

SEAFDEC/AQD’s FishWorld assisted the Philippine National Museum in dissecting an ocean sunfish (*Mola mola*) on 6 July 2021 in Oton, Iloilo, Philippines. The sunfish was found washed ashore but did not exhibit signs of external injury. The skeleton will be preserved and displayed by the museum.



AQD and BFAR discuss WWF project on seaweeds



AQD staff and official during the event

SEAFDEC/AQD met with the Philippine Bureau of Fisheries and Aquatic Resources (BFAR) to discuss the ongoing project with World Wildlife Fund (WWF) “Blue Horizon: Ocean Relief through Seaweed Aquaculture” on 22 July 2021. The Project aims to strengthen and develop seaweed value chains that can drive environmental sustainability, poverty alleviation, livelihood resiliency, and shared prosperity to people living in coastal areas of the Philippines. A similar study under the Project is also being conducted in Viet Nam.



DEPARTMENTAL ACTIVITIES

Online internships, the new norm

Despite the pandemic, SEAFDEC/AQD catered to requests from academic institutions to accommodate their students for on-the-job training and internships. To make this possible, AQD provided the virtual arrangement for the first time for this on-the-job training. Experts from AQD delivered lectures to fisheries students of the Northern Negros State College of Science and Technology (NONESCOST) to support the college's virtual on-the-job training program. Sixteen topics on culture technologies, fish health management, and nutrition for shrimps, mangrove crab, and marine fish were covered between 23 and 29 June 2021.

In addition, 10 BS Biology students from the Pamantasan ng Lungsod ng Maynila (University of the City of Manila) had their virtual on-the-job training at AQD. Likewise, the students attended virtual lectures on



A screenshot of AQD experts conducting lectures on aquaculture to student trainees from the Pamantasan ng Lungsod ng Maynila

aquaculture topics such as broodstock management of marine fish, biology and ecology of shrimp, biology and identification of mangrove crab, biology and reproduction of giant freshwater prawn, and micropropagation of seaweeds, and diseases and health management of aquaculture species. AQD experts conducted the lectures via Zoom between 7 and 26 July 2021. The students were also tasked to prepare infographics based on what they learned from the lectures.

Moreover, the University of the Philippines Los Baños (UPLB) invited AQD to share its knowledge and experiences in aquaculture technologies with agricultural and biosystems engineering students through the virtual internship program. On 2 to 3 August 2021, AQD's Engr. John Aldrin Tugo and Technical Assistant Mr. Michael Tesorero delivered the lecture on hatchery construction and design, and cage culture of high-value marine fish, respectively.

Lastly, AQD also catered to four BS Development Communication student trainees from West Visayas State University who began their on-the-job training on 23 August 2021. They were set to complete 200 hours of practicum by October 2021 at AQD's Development Communication Section where they attended lectures and continue to assist in science communication projects.



Feed mill by aquafarmers, for aquafarmers

A fish farmers' cooperative is set to establish their own feed mill in Capiz, Philippines after the agreement with SEAFDEC/AQD was formalized for AQD to assist in planning and setting up of the facility. The feed mill will produce low-cost feeds using AQD's formulations to help local fish farmers reduce their cost of production. Feed cost continues to be the most significant expense in aquaculture, comprising over half of the total production cost. AQD Chief, Mr. Dan Baliao, signed the Memorandum of Agreement (MOA) with the Panay Aqua Farmers Consumers Cooperative (PAFCC) on 24 September 2021 at AQD's Tigbauan Main Station. Mr. Baliao said that the researchers, engineers, and economists of AQD have been working on the feasibility study of the feed mill which would be completed very soon.



AQD scientist joins int'l conference on fisheries and aquaculture



SEAFDEC/AQD Scientist, Dr. Maria Rowena Egua, participated in the "8th International Conference on Fisheries and Aquaculture" conducted online on 19–20 August 2021, where she presented the results of her ongoing study on tilapia-prawn co-culture "Assessment of Tilapia–Freshwater Prawn Co-culture Schemes for Increased Farm Production." The study focuses on the technical viability of multispecies freshwater aquaculture production in

tanks and lake-based cages. She also served as chair of two of the conference sessions.

The two-day conference included keynote and plenary presentations on fisheries and aquaculture topics such as nutrition, shrimp diseases, and status of aquaculture in selected countries. There was also a workshop for early career researchers on how to publish papers for scientific publication.



TD participates in International Workshop on Eradication of IUU Fishing



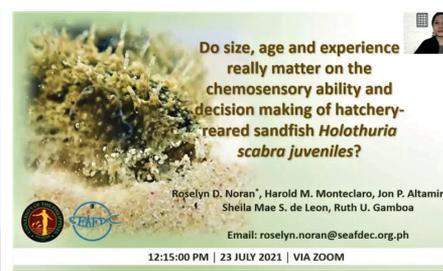
on Eradication of Illegal, Unreported and Unregulated Fishing for Regional Plan of Action to Promote Responsible Fishing Practices Including Combating IUU Fishing in the Region” which was organized by the RPOA-IUU Secretariat and the Ministry of Marine Affairs and Fisheries of Indonesia from 9 to 11 August 2021.

The Workshop was aimed at increasing mutual understanding through strengthened cooperation among the RPOA-IUU participating countries and

Pacific countries in the prevention and eradication of IUU fishing. During the Workshop, he made the presentation on “Regional Capacity Building to Combat IUU Fishing in Southeast Asia” which focused on the SEAFDEC initiatives and capacity building activities on combating IUU fishing for the ASEAN Member States. *Mr. Kongpathai* is the Project Manager of the TD project “Strengthening Regional Cooperation and Enhancing National Capacities to Eliminate IUU Fishing in Southeast Asia.”



Confab seeks to address global marine challenges



The Philippine Association of Marine Science organized the “16th National Symposium in Marine Science” to discuss possible solutions to global marine challenges by applying the results of marine science research in policymaking and governance. The online event was hosted by Caraga State

University in Butuan City, Philippines on 22–24 July 2021.

SEAFDEC/AQD researchers participated in the event, where they presented the results of their research activities. Scientist *Dr. Jon Altamirano*, Senior Technical Assistant *Ms. Roselyn*

Baylon, and Technical Assistant *Ms. Quenie Montinola* discussed the improved seed production and hatchery techniques for sea cucumbers, biology and behavior of hatchery-reared sandfish juveniles, and importance of citizen science during the COVID-19 pandemic, respectively.



AQD reviews activities and achievements for 2021

The two-day review and planning meeting was conducted last 27 to 28 September 2021 to assess the progress of SEAFDEC/AQD’s current research programs and activities. The annual evaluation meeting allows AQD to align its activities and priorities with the needs of the Southeast Asian region, including the Philippines as its host country. Program and Project Leaders reported on 40 ongoing research, verification, and extension programs. Meanwhile, Section Heads also presented the progress of training, information dissemination, and administrative activities. The hybrid meeting conducted simultaneously through Zoom and at the AQD Tigbauan



Main Station, also discussed plans and future activities.

External evaluators from government agencies and the private sector were invited to give their impressions and recommendations. *Dr. Maria Theresa Mutia* from the National Fisheries

Research and Development Institute, *Dr. Emelyn Flores* from the Department of Science and Technology Region 6, *Mr. Wilfredo Delos Santos* of Bureau of Fisheries and Aquatic Resources Region 6, and *Mr. Rene Bocaya* of Finfish Hatcheries, Inc. attended the Meeting virtually.



Collecting data on anguillid eels during the COVID-19 situation

Between July and August 2021, lockdown measures were implemented in Indonesia to reduce the spread of COVID-19 hampering the SEAFDEC/IFRDMD team to carry out the on-site activities on data collection on anguillid eels. In order to obtain the monthly data,



IFRDMD team collecting data on elvers and yellow eels caught by the trap in Poso River

the enumerators collected data from the study site and sent to IFRDMD including the number of fish caught and length-weight data. When the COVID-19 situation has improved, the IFRDMD team had the chance to visit Poso River in Central Sulawesi on 13–18 September 2021 to conduct an eel survey. For many years, the Poso River is known to

be an eel fishing ground in Indonesia. The IFRDMD team collected data on elvers and yellow eels caught by the trap installed in the Poso River and recorded the water quality from downstream to upstream. Also, the team interviewed the owner of the company in the area who is engaged in glass eel rearing and trading. ❖



Tanks for rearing glass eel into yellow eel

IFRDMD convenes the 2021 JTF Semi-annual Meeting



IFRDMD official and staff during the JTF Semi-annual Meeting

SEAFDEC/IFRDMD convened the 2021 JTF Semi-annual Meeting on 3 September 2021 in Palembang, Indonesia *via* Zoom. The objectives of the Meeting were to review the outputs of activities of the Japanese Trust Fund (JTF) VI Phase 2 projects conducted in 2021 and discuss the proposed activities for 2022. The Meeting was attended by 30 IFRDMD researchers and administrative staff.

During the Meeting, the achievements of the activities conducted in 2021 of the two projects “Management scheme of

inland fisheries in the Southeast Asian region” and “Sustainable utilization of Anguillid eels in the Southeast Asia region,” were presented by the project coordinators and reviewed by the participants. While, some activities in 2021 were postponed due to the COVID-19 situation, the researchers were encouraged to devise strategies to reach the goals of the projects. After the project leaders presented the proposed activities under the projects in 2022, the participants provided recommendations to improve the plans of the activities. ❖

Kick off Forum for the GoTFish Project Preparation Grant Phase

SEAFDEC and the FAO Regional Office for Asia and the Pacific (FAO/RAP) jointly organized the “GoTFish Inception Workshop” to initiate the Project Preparation Grant (PPG) phase of the Global Environment Facility (GEF) supported project “Promoting the Blue Economy and Strengthening Fisheries Governance of the Gulf of Thailand through the Ecosystem Approach to Fisheries” (GoTFish) on 8 September 2021. The Workshop was attended by the National Focal Points of the GoTFish PPG phase and SEAFDEC National Coordinators as well as representatives from FAO, SEAFDEC, IUCN, the academe, NGOs, and relevant partners.

This Inception Workshop was intended to introduce the project to stakeholders, and present the project preparation objectives and implementation process that will be undertaken in coordination with the project participating countries, namely: Cambodia, Malaysia, Thailand, and

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SEAFDEC/TD joins Aquatic Science Special Event



Phusirimongkol, participated in the Aquatic Science Special Event which was organized online by the Department of Aquatic Science, Faculty of Science, Burapha University, Chonburi Campus, Thailand on 20 August 2021. The special event was meant to increase the knowledge of university students and prepare them for on-the-job training. In this occasion, *Mr. Krit* served as one of the resource persons to share information on the role and activities of TD in the region as well as information on student internship at TD. ✂

SEAFDEC/TD Head of Project *Mr. Isara Chanrachkij*, and Training Planning and Management Division, and Extension Officer, *Mr. Krit*

Kick off Forum for the GoTFish Project Preparation Grant Phase

(Continued from Page 6)

Viet Nam, and relevant partners. It is expected that the consultations and participatory process of stakeholders would contribute to the development of a detailed project document for submission to the GEF Secretariat in June 2022. The overall goal of the GoTFish Project is to reduce stress in the Gulf of Thailand through improved practices and fisheries management, with a strong focus on transboundary governance and management, a better understanding of the role of incentives (on both market and changes on fishers' behavior) and the ecological corridors which are important for both aquatic biodiversity and fisheries.

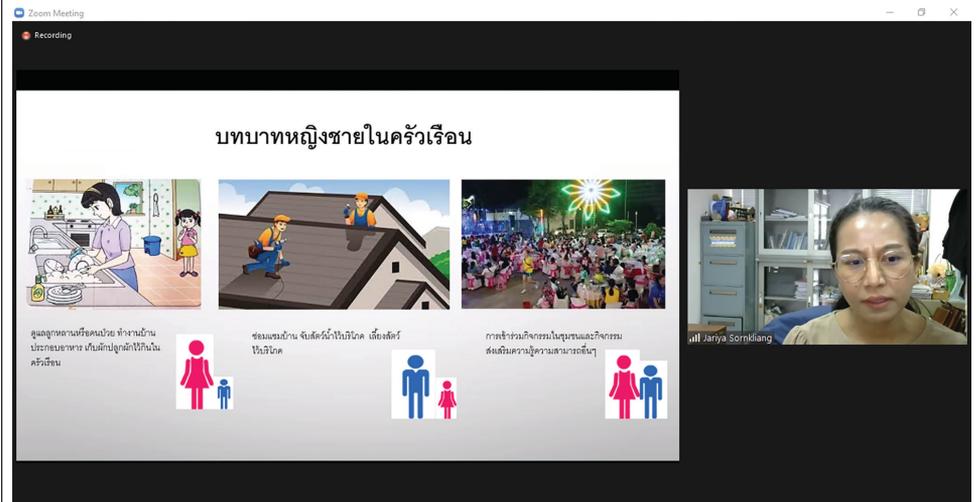
In her Opening Remarks, SEAFDEC Secretary-General, *Ms. Malinee Smithrithee*, highlighted the importance of the Gulf of Thailand sub-region for its role in increasing fish production for food, livelihoods, and economies for countries around the Gulf of Thailand and the need to continue the collaborative efforts of all stakeholders to focus on sustainable fisheries management, transboundary governance and management, and the ecological corridors which are important for aquatic biodiversity and fisheries. ✂

Workshop on Data Validation on Gender Integration in Inland Fisheries in Buriram Province, Thailand

SEAFDEC/TD in collaboration with the Department of Fisheries (DOF) of Thailand conducted the “Workshop on Data Validation on Gender Integration in Inland Fisheries in Buriram Province, Thailand” from 20 to 22 September 2021. The aim of the Workshop was to report and recheck the results of the data analysis of Aquatic Animal Food Bank of Subsomboon Group in Buriram Province including strengthening the knowledge of stakeholders in the community on the gender concepts. However, due to the COVID-19 pandemic, the Workshop was conducted virtually from SEAFDEC and DOF Central Office in conjunction with

the face-to-face stakeholder workshop in Subsomboon Community, Buriram Province. There were 73 participants in the Workshop including local community members, DOF officers, and SEAFDEC staff.

During the Workshop, the participants gained understanding of the gender concepts that would be integrated in program planning and implementation. Finally, the Workshop came up with the action plan for the development of the Aquatic Animal Food Bank of Subsomboon Group. ✂



SEAFDEC staff during the data validation workshop

SPECIAL REPORT

Aquaculture seeds and feeds at the core of AQD's collaboration with the Government of the Philippines

SEAFDEC/AQD

For almost 50 years, SEAFDEC/AQD has been generating scientific information behind aquaculture technologies applied in Southeast Asia and other parts of the world. Since 2017, AQD and its host country, Philippines, have upgraded their collaborative programs to accelerate the implementation of projects that address the needs of the local aquaculture industry. A reliable supply of quality seeds and a source of cost-efficient nutrition are at the core of the partnership, these being the most pressing issues faced by fish farmers. In just four years, AQD had made significant headways in providing technical support to the government agencies of Philippines.

Fry sufficiency program

While AQD in the Philippines is the birthplace of milkfish breeding and hatchery technologies, the country is currently in a deficit for fry to supply its large milkfish industry, which is second in the world next to Indonesia. Local hatcheries produce an estimated 1.2 billion fry annually, while upwards of 1.4 billion are imported from abroad. To address this shortage, state-owned multispecies hatcheries are set to be constructed in strategic locations around the country. In 2018, AQD was tasked by the government, through the Bureau of Fisheries and Aquatic Resources (BFAR), to conduct site suitability surveys and design facilities that will each produce about 25 million milkfish fry annually. BFAR provided the support of USD 188,700, with which AQD surveyed 16 towns in eight provinces for possible sites. AQD has so far endorsed the completed feasibility of eight proposed hatchery sites and provided detailed engineering designs for each. Under a separate agreement, AQD is also helping BFAR evaluate proposed hatchery development sites in Western Visayas. These include new locations for proposed hatcheries and existing hatchery sites that are either non-operating or underutilized. So far, the Department has completed feasibility studies for proposed sites in three towns, and two hatcheries are already undergoing rehabilitation.

At AQD's Tigbauan Main Station, new broodstock and multispecies hatchery facilities were also constructed between 2019 and 2021 to help boost fry production. They showcase AQD's design for the hatcheries supported by the government to be built around the country. Besides, training areas were provided in the new facilities to accommodate government personnel and private technicians. Four new broodstock tanks were constructed to hold at least 400 additional milkfish breeders which can produce 256 million larvae annually. These larvae may be supplied to satellite hatcheries that have no broodstock facilities. A new marine fish hatchery was also constructed and can be used to produce a target of 20 million

milkfish fry annually. The same facility can also be used for pompano, mangrove crab, or shrimp. Meanwhile, a freshwater hatchery was also constructed to produce seeds of the giant freshwater prawn, catfish, and tilapia.

Parallel with infrastructure development, AQD also piloted the training of personnel to operate the proposed government hatchery facilities. Two rounds of intensive training in 2018 and 2021 were done for a total of 23 fisheries graduates who were given hands-on experience in AQD facilities. For three months, the trainees helped operate the marine fish hatchery, milkfish hatchery, shrimp hatchery, mangrove crab hatchery, and freshwater hatchery of AQD. They were also given experience in pond and sea cage culture. As early as 2018, a group of trainees already successfully upstarted a BFAR hatchery in the province of Camarines Sur, while some continue to work in AQD while waiting for the completion of the government hatcheries.

Aside from enhancing infrastructure and human resources, AQD also stocked up on milkfish breeders to boost its own capacity to serve as the central hatchery to supply eggs and larvae to satellite hatcheries. Between 2018 and 2021, the Department acquired about 500 breeders, each weighing



One of SEAFDEC/AQD's designs of multispecies hatcheries to be built and operated by the Government of the Philippines

between 3 kg and 5 kg, in addition to its existing stock of about 200 breeders. Most of these were stocked in the new broodstock facilities. To maximize the breeding potential of the milkfish broodstock, AQD implemented a thermal manipulation technology at its broodstock facilities to raise the water temperature from 26 °C to 30 °C. This is to demonstrate a solution to the non-spawning of milkfish during colder months in the country, particularly from November to February. During the test run from November 2019 to February 2020, months when no production is usually observed, almost 24 million good eggs and 12 million normal larvae were produced.

Development of low-cost feeds

With feeds being the largest expense in aquaculture production, AQD has long been developing cost-efficient feed formulations using alternative ingredients such as agro-industrial wastes and byproducts. Using byproducts of poultry and ethanol production as well as protein-enhanced copra meal, AQD formulated a diet that costs only about USD 0.55/kg to produce in its pilot-scale feed mill compared to commercial feed that costs about USD 0.69/kg.

While favorable results in experimental trials have been documented, the efficacy and efficiency of feeds can only be confidently verified through large-scale feed testing. To

achieve this, AQD partnered with the National Fisheries Research and Development Institute (NFRDI) and BFAR to accelerate the push for cost-efficient feeds. Under the USD 145,800 agreement formalized in 2018, AQD, NFRDI, and BFAR have been jointly testing low-cost feed formulations at their respective facilities in the provinces of Iloilo, Guimaras, La Union, Eastern Samar, Batangas, and Nueva Ecija. The broad scope of the field tests covers milkfish and tilapia culture in cages and ponds in freshwater, brackishwater, and, saltwater (except for tilapia). So far, results have been promising with tilapia and milkfish fed with the AQD-formulated feeds performing at par, if not better, than those fed commercial diets in terms of total weight gain, average body weight, total feed consumed, and feed conversion ratio.

With endorsement from BFAR, a fish farmers' cooperative has inked an agreement with AQD for the Department to assist them in building a feed mill in the province of Capiz. The facility will produce feeds using the low-cost formulations of AQD and help provide for the needs of local fish farmers. AQD assisted the farmers in preparing a feasibility study for the proposed feed mill and will continue to assist them until operations are realized. ❖



AQD's new broodstock tank facilities at its Tigbauan Main Station



Stocking new milkfish broodstock at AQD's new facilities at its Tigbauan Main Station



Tilapia harvest during the field testing of cost-efficient feeds at AQD's Dumangas Brackishwater Station

REGIONAL PROGRAMS

Fisheries *Refugia* Project organizes 4th Regional Scientific and Technical Committee Meeting

The Project Coordinating Unit of the Fisheries *Refugia* Project organized the “Fourth Regional Scientific and Technical Committee Meeting (RSTC4)” on 22 July 2021 *via* the Zoom platform. The Meeting was one of the regional activities under the SEAFDEC/UNEP/GEF Project on Establishment and Operation of a Regional System of Fisheries *Refugia* in the South China Sea and the Gulf of Thailand. There were 45 participants during the Meeting including

the National and Scientific and Technical Focal Points from six participating countries, namely: Cambodia, Indonesia, Malaysia, Philippines, Thailand, and Viet Nam, regional experts from various institutions, and officers from SEAFDEC/TD. The highlights of the Meeting include the progress of project activities at the national and regional levels and discussion on the issues and challenges related to the Project implementation. The Meeting also



discussed the strategic plan towards 2022.

Fifth Fisheries *Refugia* Project Steering Committee Meeting

The “Fifth Meeting of the Project Steering Committee (PSC5) of the SEAFDEC/UNEP/GEF Project on Establishment and Operation of the Regional System of Fisheries *Refugia* in the South China Sea and Gulf of Thailand (Fisheries *Refugia* Project)” was organized virtually on 3 September 2021 *via* the Zoom platform by the Project Coordinating Unit (PCU). The Meeting discussed the progress of works, policy to support the Project activities, financial matters, and others. There were

57 participants including the Project Steering Committee Members from six participating countries, UNEP Project Task Manager, SEAFDEC Secretary-General, SEAFDEC Secretariat Policy and Program Coordinator, Project Director and PCU staff, as well as observers from national lead agencies and technical officers from SEAFDEC/TD.

SEAFDEC is the executing agency of the Fisheries *Refugia* Project in partnership with the government

agencies responsible for fisheries in the six participating countries, namely: Cambodia, Indonesia, Malaysia, Philippines, Thailand, and Viet Nam. The Project comprises four components: 1) establishment of operational management at 14 priority fisheries *refugia*, with community-based *refugia* management plans being key outputs; 2) strengthening the enabling environment for the formal designation and operational management of *refugia*; 3) strengthening information management and dissemination of best practices in integrating fisheries management and biodiversity conservation, and improving community acceptance of area-based approaches to fisheries and coastal environment management; and 4) strengthening cross-sectorial coordination for integrated fisheries and environmental management.



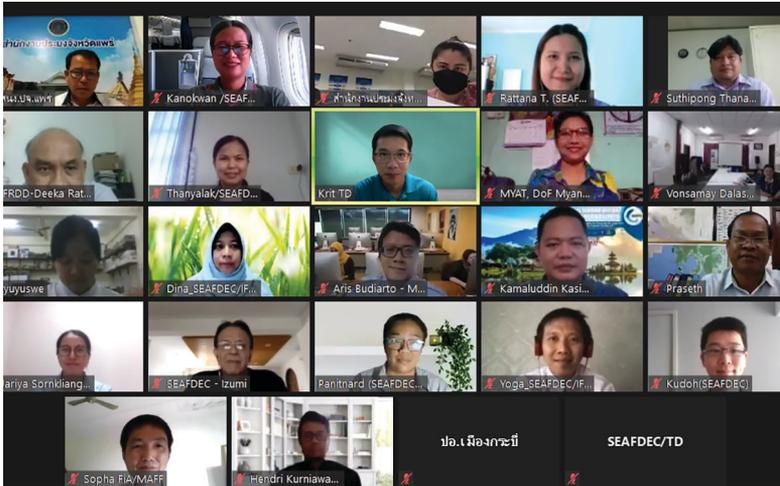
AQD offers 2nd session of Marfish online training

Due to the success of the first online offering of the Marine Fish Hatchery (Marfish) training course in June 2021, SEAFDEC/AQD conducted another session from 19 July to 3 August 2021. The second session was attended by 13 participants from SEAFDEC Member Countries, namely: Brunei Darussalam,

Cambodia, Malaysia, Myanmar, and Philippines. The Government of Japan Trust Fund sponsored 11 of the participants. The 16-day online training course used an interactive online learning platform that enabled the participants to access the pre-recorded lecture videos on broodstock management, larval rearing,

hatchery design and construction, natural food culture, nutrition, and health management, among others. The trainees also interacted with AQD resource persons and fellow participants through the platform’s discussion board and live meeting sessions.

Online Meeting on the Results of HRD-EAFM and the EAFM Implementation in the Learning Sites



SEAFDEC/TD organized the Management (HRD-EAFM) and the “Online Meeting on the Results of EAFM implementation in the Learning Human Resources Development on Sites” on 20 July 2021 via the Zoom Ecosystem Approach to Fisheries platform. The Meeting was attended by

26 participants, officers from TD, and representatives from the four learning sites in Cambodia, Lao PDR, Myanmar, and Thailand. The Meeting reviewed the implementation of EAFM and results of the monitoring and evaluation of HRD-EAFM in the learning sites. The EAFM training and implementation in the learning sites had been considered as the best practices for developing fisheries management plan to achieve sustainable enrichment of fishery resources and improve the livelihood of fishers. The Meeting recommended to continue promoting EAFM in Southeast Asia through EAFM training and implementation in the learning sites by engaging local fishers and relevant fisheries agencies and partners. ✎

Training Course on Fish Population Dynamics and Fisheries Management using R-statistical Program

Resource person of the Training Course, Prof. Tuantong Jutagate

SEAFDEC/TD organized the “Training Course on Fish Population Dynamics and Fisheries Management by Using R-statistical Program” from 19 to 23 July 2021 via the zoom platform with the aim of enhancing the capacity of human resources from the ASEAN Member States (AMSs), and strengthening the network of researchers on fish population dynamics and fisheries management in the Southeast Asian region on fish population dynamics and fisheries management using R-statistical program. The Training was participated by 50 fisheries officers and researchers from the AMSs. After the Training, the participants were expected to contribute to the enhancement of information sharing on the population dynamics of transboundary species in the region. ✎

Online Training Course on Fisheries Management Tools for EAFM

The “Regional Online Training Course on Fisheries Management Tools for Ecosystem Approach to Fisheries Management (EAFM)” was organized by SEAFDEC/TD from 23 to 27 August 2021 via the Zoom platform. The Training was attended by 36 participants including representatives from the SEAFDEC Member Countries, namely: Cambodia, Indonesia, Philippines, Myanmar, and Thailand, as well as TD staff. The Training was aimed at providing the participants with knowledge and skills that would enable them to identify the appropriate management tools that address EAFM issues common in the Southeast Asian region. The curriculum was focused on environmental, social, economic, and governance objectives based on the EAFM components. In the end, the participants were expected to be able to select the management tools that could be used for implementing the EAFM in their respective countries. ✎

Online Regional Workshop on Gender Integration in Small-scale Fisheries

With support from the Japanese Trust Fund, SEAFDEC/TD organized the “Online Regional Workshop on Gender Integration in Small-scale Fisheries in Southeast Asia” from 28 to 30 September 2021. The aim of the Workshop was to impart and exchange knowledge, skills, and experiences on gender integration in fisheries projects to ensure that project implementers apply gender-inclusive approaches in promoting human well-being in fisheries communities. The Workshop was attended by 55 representatives from the ASEAN Member States (AMSs), namely: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, and Thailand, as well as personnel from SEAFDEC Secretariat, TD, AQD, MFRDMD, and IFRDMD.

With resource persons from the USAID, the training sessions covered principles and approaches on integrating gender and social inclusion in the



whole project cycle to ensure that gender is mainstreamed and achieve gender equity and equality in fisheries development and project management. As an exercise to apply what they have learned from the sessions, the participants developed a sample country action plan to address existing gender issues in their respective areas, which include implementation and monitoring, evaluation, and learning (MEL) plan. The participants were encouraged to

integrate the action plan into their existing tasks in their organizations and extend their learnings from the Workshop among their peers. Furthermore, the participants recommended that gender integration should be promoted in small-scale fisheries at all levels through awareness-raising and capacity-building activities to improve gender sensitivity and responsiveness and achieve more gender and social inclusion initiatives in small-scale fisheries.



SEAFDEC participates in FIRMS e-session of TWG on the Global Record of Stocks and Fisheries



The Policy and Program Coordinator, *Dr. Worawit Wanchana*, Information and Program Coordinator, *Ms. Nualanong Tongdee*, and concerned officers from SEAFDEC Secretariat and Training Department attended the “e-Technical Working Group (e-TWG) on the Global Record of Stocks and Fisheries (GRSF)” on 30 September and 1 October 2021 hosted by the Food and Agriculture Organization of the United Nations (FAO). During the e-TWG session, the progress made by FAO in collaboration with partners in developing the GRSF was reported including the consolidation

of information system, pilot validation and testing of the Universally Unique Identifier (UUIDs), and development of GRSF database. It was noted that the information on the status of fisheries and resources for the GRSF could come from various sources, e.g. the current FAO/ Fisheries and Resources Monitoring System (FIRMS), inputs from countries to SDG 14.4.1 questionnaire, traceability systems that connected to stocks and fisheries records, among others. At the end, the TWG provided recommendations for consideration in further development of GRSF in the

perspective of the IT, fishery stock and resources, and traceability. Other ongoing work undertaken by FIRMS is the online consultation on terminology relevant to the Marine Resource and Fishery information domains, and the results of which including recommendations from the e-TWG session would be reported to the 12th Session of the FIRMS Steering Committee scheduled on 18–21 October 2021.

SEAFDEC had been a Partner to FIRMS and contributed to FIRMS database based on its project-based data collection. During the session, FAO noted the recent study undertaken by SEAFDEC entitled “Stock and Risk Assessment of Kawaka and Longtail Tuna Resources in the Southeast Asian Waters.” In this connection, SEAFDEC and FIRMS would consider if the results from this study could potentially be useful to FIRMS for better understanding of the resources in the waters of the Southeast Asian countries.



SEAFDEC participates in FAO Global Conference on Aquaculture Millennium +20

The Secretary-General of SEAFDEC, *Ms. Malinee Smithrithee*, delivered the statement at the “FAO Global Conference on Aquaculture Millennium +20,” which was held on 22–25 September 2021 in Shanghai, China. The Conference was hosted by the Food and Agriculture Organization of the United Nations

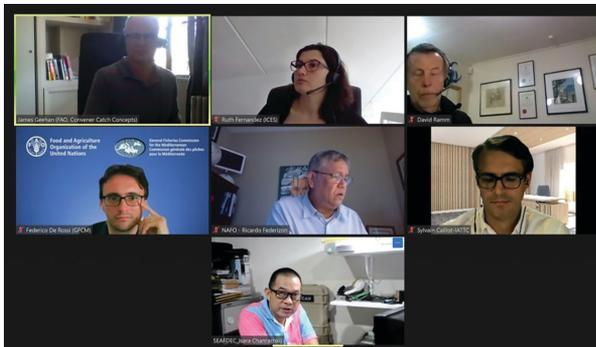
(FAO), the Ministry of Agriculture and Rural Affairs (MARA) of the People’s Republic of China and the Network of Aquaculture Centres in Asia-Pacific (NACA). The theme of the Conference focused on “Aquaculture for food and sustainable development”.

adopted the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 (RES&POA-2030). For over 50 decades, SEAFDEC has provided technical assistance to its Member Countries including production of good quality seed, reduction of fish-based ingredients for aquaculture feeds, management of fish health considering the linkage between aquaculture and environment, among others. The plan of action of the RES&POA-2030 is in line with the various aspects of the Shanghai Declaration on Aquaculture for Food and Sustainable Development...” ✦



In her statement, *Ms. Malinee Smithrithee* commended the results from the conference which is along the line with the existing policy frameworks with the ASEAN Member States, *i.e.* “...to ensure the sustainability of aquaculture considering its contribution to food supply for people all over the world, SEAFDEC Member Countries recently

SEAFDEC participates in the Meeting of CWP Task Group on Catch Concept and Fishing Effort

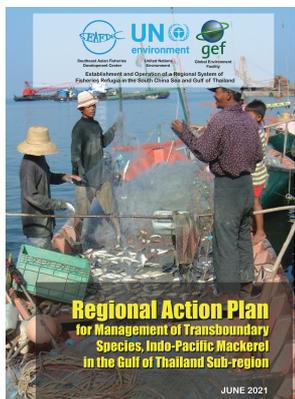


Hosted by the Food and Agriculture Organization of the United Nations (FAO), the Meeting of Coordinating Working Party (CWP) Task Group on Catch Concept and Fishing Effort was convened on 6 July 2021 through the online platform. Four representatives

from SEAFDEC, namely: *Ms. Saivason Klinsukhon* from the Secretariat as well as *Mr. Isara Chanrakhij*, *Dr. Nopporn Manajit*, and *Mr. Sukchai Arnupapboon* from the Training Department together with the representatives from eight partners of FAO attended the Meeting.

The Meeting discussed the Terms of References for the Task Group of Catch Concept and Fishing Effort; reviewed the proposal for revision of catch concept diagram; proposed the amendments on the definitions of catch concepts (*e.g.* retained catch, discarded catch, bycatch); reviewed the proposed changes on fishing effort definitions; and discussed the additional International Standard Statistical Classification of Fishing Gear (ISSCFG) categories. This revised ISSCFG would be brought for consideration by SEAFDEC and would be accommodated in the future revision of the Regional Framework for Fishery Statistics of Southeast Asia. ✦

Enhancing sustainable utilization and management of marine fishery resources in the Southeast Asian region (Continued from Page 15)



Regional Action Plan for Management of Transboundary Species: Indo-Pacific Mackerel in the Gulf of Thailand Sub-region

Another regional initiative focused on Indo-Pacific mackerel (*Rastrelliger brachysoma*) which is an economically important transboundary fishery resource in the Gulf of Thailand (GoT). SEAFDEC in collaboration with the AMSs developed the Regional Action Plan for Management of Transboundary Species: Indo-Pacific Mackerel in the Gulf of Thailand Sub-region through a series of technical consultations and activities such as data collection, DNA studies, among others. The document serves as guide for concerned countries in implementing actions to achieve sustainable Indo-

Pacific mackerel fisheries in the GoT sub-region by 2030 through science-based management. The provisions of the regional action plan were categorized within the context of ecosystem approach to fisheries management including governance, socioeconomic aspects, ecosystem, and climate change.

The abovementioned regional initiatives were adopted by the SEAFDEC Council during its 53rd Meeting in 2021 and recently noted by the Special SOM-42nd AMAF in August 2021. ✦

FUTURE ACTIVITIES

Date	Venue	Title	Organizer(s)
2021			
1-15 October	Online training	Training Course on Sandfish (<i>Holothuria scabra</i>) Seed Production, Nursery and Management	AQD
5-8 October	Online training	Online Training on Implementing Adaptive Fisheries Management and the Use of the Fish Path Decision Support Tool	TD
13-20 October	Online training	Training Course on Mangrove Crab (Mud Crab) Hatchery Operations	AQD
18 & 20 October	Online meeting	3 rd Inter-Departmental Consultation for Finalization of the Draft SEASOFIA 2022	Secretariat
26-29 October	Online training	Training Course on Catfish Hatchery and Grow-out Operations	AQD
26-29 October	Online training	Regional Training Course on Implementation of Port State Measure for Inspection	TD
27-28 October	Online workshop	Regional Workshop on Action Plans for Supporting the Livelihood and Well-being of Small-scale Fishers in the Member Countries	TD
15-17 November	Virtual meeting	44 th Meeting of the Program Committee Meeting (PCM)	Secretariat
22-25 November	Online meeting	29 th Session of the Asia and Pacific Commission on Agricultural Statistics (APCAS29)	FAO
22-26 November	Online training	Regional Training Course on the Relationship Between Ocean Environment Variability and Marine Resource Abundance and Oceanographic Sampling	TD
24-25 November	Virtual meeting	24 th Meeting of the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP)	Secretariat
29 Nov & 1 Dec	Virtual meeting	22 nd Meeting of SEAFDEC Information Staff Program (ISP)	Secretariat
30 November	Online meeting	1 st Meeting Workshop for the Ecosystem Approach to Fisheries Management (EAFM) in the Pilot Site of Tonle Sap Lake, Cambodia	TD
30 November	Online meeting	6 th Steering Committee Ad-hoc Meeting for the Fisheries <i>Refugia</i> Project	TD
30 Nov-3 Dec	Online training	Regional Training Course on Geographic Information System (GIS) for Aquaculture	TD
8-22 November	Online training	Training Course on Community-based Freshwater Aquaculture for Remote Rural Areas of Southeast Asia	AQD
23-26 November	Online training	Training Course on Feeds and Feeding Management	AQD
1-2 December	Kuala Terengganu, Malaysia	Workshop on Conservation of Sharks and Rays Through Parasites' Perspective	MFRDMD
2 December	Virtual Meeting	SEAFDEC Department Chiefs' Meeting	Secretariat
6-7 December	Kuala Terengganu, Malaysia	Workshop on Landing Data Analysis of Sharks and Rays by Species to Determine Value of Maximum Sustainable Yield (MSY)	MFRDMD
8 December	Central Kalimantan, Indonesia (and Online)	Workshop on Enhancing Sustainability of Peat-land Area Through Freshwater Aquaculture and Community Engagement Strategies	IFRDMD & Universitas Palangka Raya
9, 13-17 December	Secretariat (and online)	Consultative Planning and Training Workshop on Stock Assessment in Support the Implementation of the International Commitments for Sustainable Use of Fisheries Resources in Southeast Asia	Secretariat
10 December	Online meeting	2 nd Meeting Workshop for the Ecosystem Approach to Fisheries Management (EAFM) in the Pilot Site of Tonle Sap Lake, Cambodia	TD
13-17 December	Online training	Training Course on Mangrove Crab Hatchery Operations	AQD
14-16 December	Krabi Province, Thailand	National Workshop to Develop the Fisheries Management Plans for Krabi Province, Thailand	TD
19-23 December	Kuala Terengganu, Malaysia	Workshop on Seerfish in the Malaysian Waters by using ASPIC in collaboration with DOF Malaysia	MFRDMD
December (Tentative)	Online meeting	3 rd Meeting Workshop for the Ecosystem Approach to Fisheries Management (EAFM) in the Pilot Site of Tonle Sap Lake, Cambodia	TD

Enhancing sustainable utilization and management of marine fishery resources in the Southeast Asian region

SEAFDEC and the ASEAN Member States (AMSS) made efforts on the sustainable utilization and management of fishery resources to ensure long-term food security in Southeast Asian region. Two regional initiatives in line with the ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 (RES&POA-2030) and UN Sustainable Development Goals (SDGs) had been successfully implemented. The first regional initiative was the stock assessment of neritic tunas, namely: kawakawa (KAW) and longtail tuna (LOT) which were carried out by the AMSS with technical support from SEAFDEC Training Department (TD) and Marine Fisheries Resources Development and Management Department (MFRDMD). The stock assessment was done every 3–5 years since 2013 and the most recent assessment was conducted in 2018 using A Stock-Production model Incorporating Covariates (ASPIC), the tool commonly used by regional fisheries management organizations (RFMOs). KAW and LOT are considered as economically important transboundary fishery resources in the region. It was found that the stock status of the LOT in Southeast Asia is still in good condition. On the other hand, the stock status of KAW in the Indian Ocean side has significantly worsened from 2014 to 2018 and slightly worsened from 2013 to 2018 in the Pacific Ocean side. The results of the assessment therefore suggested that the concerned countries should consider reducing the current catch level of KAW.

Stock: Kawakawa (KAW) and longtail tuna (LOT)
Coverage area: Pacific Ocean and Indian Ocean
Working group: Scientific Working Group on Stock Assessment on Neritic Tunas in the Southeast Asian Region (SWG-Neritic Tunas)
Objective: To assess the stock of neritic tunas in Southeast Asia

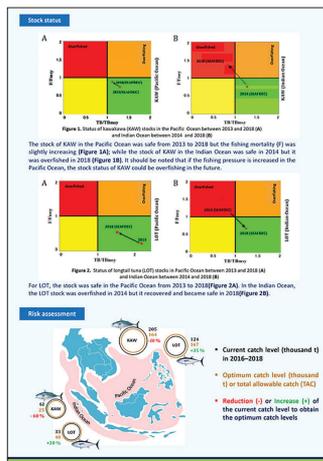
The neritic tunas, namely: kawakawa (KAW) and longtail tuna (LOT) are important fishery resources in the Southeast Asian region. For the sustainable utilization and management of these fishery resources, SEAFDEC in collaboration with its Member Countries established the SWG-Neritic Tunas in 2014. The first stock and risk assessments of KAW and LOT were conducted in 2016 through a series of workshops. The results of the first assessment had been endorsed through the ASEAN Mechanism in 2017.

In 2020, the second assessment of KAW and LOT was conducted using A Stock-Production Model Incorporating Covariates (ASPIC) to update the stock status until 2018. The data used in the second assessment was mainly obtained from the IOTC and FAO and compared to the data used during the previous practical workshops conducted in 2016. Subsequently, this activity was also adopted through the ASEAN Mechanism in 2021.

Recommendations
 Based on the results of the past and current assessments, it is recommended that
 ■ The concerned countries should consider reducing the current catch levels of KAW.
 ■ For the unhealthy stocks, the assessment should be conducted every two years.

Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030
 A. Planning and Innovation
 B. Fisheries Management
 C. Fish Trade
 D. Regional and International Policy
 E. Fish Trade

Please scan QR code for more information on Neritic tunas



Factsheet depicting the key results of the second regional study aimed at providing the updated stock status of kawakawa and longtail tuna resources in the region using ASPIC

(Continued on Page 13)



More information on Neritic tunas

Note for contributors

The SEAFDEC Newsletter publishes quarterly news on all aspects of fisheries in Southeast Asia. The Editors reserve the right to accept and/or abridge articles based on available space. Anyone wishing to submit an article to the SEAFDEC Newsletter is requested to send it to the Editor in Chief or Editors at the given addresses.

Information in this Newsletter may be quoted only if reference is made to SEAFDEC.

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Layout: Sunutta Pudtal

SEAFDEC/MFRDMD bids farewell to *Dr. Ahmad Ali*

After serving as Chief of SEAFDEC/MFRDMD since 19 August 2020 and research officer in the Department of Fisheries Malaysia (DOFM) since 8 October 1992, *Dr. Ahmad Ali* has retired from the government service in July 2021. *Dr. Ahmad* played significant roles especially in the field of endangered species (sharks and rays) and artificial reefs where he is an expert, towards enhancing the conservation and sustainable fisheries management in the Southeast Asian region. Among his major achievements include serving

as the Regional Vice-Chair of the IUCN Sharks Specialist Group for the Southeast Asian Region, describing the new shark species *Cephaloscyllium sarawakensis* in 2005, compiling new records of sharks and rays in the region, and innovating large-sized artificial reefs in Malaysia. He has also published various articles, journals, encyclopedias, and books at the regional and national levels. The farewell ceremony to honor *Dr. Ahmad* was held virtually in July 2021 which was attended by officers and staff of the DOFM headquarters,



Dr. Ahmad Ali

Fisheries Research Institutes, State Fisheries Offices throughout Malaysia, and MFRDMD. ❖

Baliao is SEAFDEC/AQD Chief for a third term



Mr. Dan Baliao

The current Chief of SEAFDEC/AQD, *Mr. Dan Baliao*, was reappointed to a third term and will serve for another two years until 6 September 2023. SEAFDEC Secretary-General, *Ms. Malinee Smithrithee*, confirmed the reappointment after the approval by the SEAFDEC Council which comes after his endorsement by the Philippine Department of Agriculture and nomination by Philippine President, *Mr. Rodrigo Duterte*, to the SEAFDEC Council.

Mr. Baliao was first appointed as Chief of AQD on 7 September 2017. Since then, he has prioritized development programs to uplift the sufficiency of aquaculture seeds in the Philippines, the host country of AQD, as well as in Southeast Asia. He has also pushed for AQD's development of cost-efficient aquafeeds, rallied for the intensive training of fisheries graduates to develop

a critical pool of aquaculture technicians, organized activities to accelerate technology transfer in aquaculture, and promoted the revival of the tiger shrimp industry in the Philippines and in the Southeast Asian region. Under his leadership, AQD also extended assistance to the Bureau of Fisheries and Aquatic Resources (BFAR) in conducting feasibility studies towards establishing over a dozen legislated multispecies hatcheries in various parts of the Philippines. He also advocated for the rehabilitation of abandoned and underutilized hatcheries.

Moreover, new broodstock and hatchery facilities were also recently completed at the AQD headquarters in Iloilo, Philippines to increase AQD's capacity to produce and supply both marine and freshwater seeds such as milkfish, tiger shrimp, giant freshwater prawn, and catfish. To support food security during the COVID-19 pandemic, AQD ramped up its own production and delivery of aquaculture seeds and extended technical assistance to local farmers. AQD also developed and conducted a series of online training courses in aquaculture for the National Fisheries Research and Development Institute to equip BFAR personnel. In light of the pandemic, numerous books and farmer-oriented manuals were authored by AQD experts so the public may freely download them from the Internet. ❖

SEAFDEC offers condolences on the demise of *Mr. Panu Tevarutmaneekul*



Mr. Panu Tevarutmaneekul

It is with deep sorrow that we announce the passing of *Mr. Panu Tevarutmaneekul* on 4 November 2021. *Mr. Panu* served as the Secretary-General of SEAFDEC from 1999 to 2003. *Mr. Panu* would be remembered and forever praised for his management of SEAFDEC that led to the great progress of the organization and advanced the development of the fisheries sector of Southeast Asia. We express our condolence to the family of *Mr. Panu* during this time of sorrow, and SEAFDEC staff wish to assure them that *Mr. Panu* will always be remembered in our thoughts and prayers. ❖