



SEAFDEC

NEWSLETTER

VOLUME 44 NUMBER 4 October–December 2021

BANGKOK, THAILAND, ISSN 0857 - 233X

INSIDE THIS ISSUE

- Workshop on Seerfish in Malaysian Waters using ASPIC in Collaboration with DOF Malaysia 5
- IFRDMD organizes Workshop on Community Based-Management for Sustainable Inland Fisheries Conservation 6
- AQD lab now ISO accredited 10
- Workshop on Conservation of Sharks and Rays through Parasites' Perspective 11
- Special Report: Hydroacoustic Monitoring of Anguillid Eels: a preliminary study 16
- Building human capacity on fish stock assessment in Southeast Asia towards sustainable use of fishery resources 18
- New Chief of SEAFDEC/IFRDMD 24

EDITORIAL

During the last quarter of 2021, SEAFDEC organized annual events that were significant for the region such as the 44th Program Committee Meeting (44PCM) which discussed and reviewed the programs, projects, and activities implemented by SEAFDEC in 2021 and those proposed for 2022 and the 24th Meeting of Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (24FCG/ASSP) which addressed the policy considerations on issues of importance to the fisheries sector of the region.

Regional technical events were also organized including the SEAFDEC Webinar “Regional Responses to U.S. Marine Mammal Protection Act” which discussed and shared information on issues, actions, and needs related to the U.S. MMPA, and the “Regional Workshop on Effective Practice for Supporting the Livelihood and Well-being of Small-scale Fishers in Southeast Asia” that shared the lessons learned from the success cases that applied practices to support and improve the livelihoods including the adaptations to the

(Continued on Page 2)

The Forty-fourth Meeting of the SEAFDEC Program Committee was convened



Participants of the 44PCM

The “Forty-fourth Meeting of the SEAFDEC Program Committee” (44PCM) was held on 15–17 November 2021 through a virtual platform. The 44PCM was attended by the SEAFDEC Program Committee Members for Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam together with their respective delegations, and the representatives from

USAID/RDMA and WorldFish. The SEAFDEC Secretary-General, Deputy Secretary-General, and Department Chiefs together with officers from the SEAFDEC Secretariat and Departments also attended the Meeting.

During the Meeting, the participants took note of the progress and achievements of sixteen (16) ongoing

(Continued on Page 2)

SEAFDEC convenes the 24FCG/ASSP



The “Twenty-fourth Meeting of the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership” or the 24FCG/ASSP was organized through the online platform on 24–25 November 2021. The Meeting

was attended by the representatives from the ASEAN-SEAFDEC Member Countries, representatives from the ASEAN Secretariat as well as the SEAFDEC Secretary-General, Deputy

(Continued on Page 3)

EDITORIAL

(Continued from Page 1)

COVID-19 situation of small-scale fishers. Moreover, another important regional events was the “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” which was organized to enhance the capacity of the SEAFDEC Member Countries to determine the reference points of fish stocks for proper management and sustainable utilization of fishery resources.

The respective SEAFDEC Departments continued the conduct of several training courses and workshops. TD conducted the “Regional Training Course on Implementation of Port State Measures for Inspection,” “Regional Training on Ocean Environment and Marine Resources,” “Online Training on Implementing Adaptive Fisheries Management and the Use of FishPath Decision Support Tool,” and “Regional Training on Geographic Information System (GIS) and Remote Sensing (RS) for Aquaculture.” AQD organized training courses on aquaculture technology, fish feed and nutrition, mangrove crab hatchery, catfish hatchery and grow-out operations, tilapia culture technology, and sandfish seed production. MFRDMD conducted the workshops on seerfish, sharks, and rays through parasites’ perspective and analysis of sharks and rays species to determine MSY; while IFRDMD organized the workshop on community based-management for sustainable inland fisheries conservation.

Furthermore, SEAFDEC/AQD also launched two new publications, *i.e.* a manual on Aquaculture Techniques for Freshwater Species, and a collection of Scientific Articles on Sustainable Aquaculture, Resource enhancement, and Aquatic Animal Health.

Finally, SEAFDEC welcomed the new Chief of IFRDMD, *Mr. Zulkarnaen Fahmi* starting 28 December 2021 to succeed *Dr. Arif Wibiwo*. ☒

SEAFDEC Newsletter is available at www.seafdec.org.

You can unsubscribe or send your comment on our Newsletter to secretariat@seafdec.org.

The Forty-fourth Meeting of the SEAFDEC Program Committee was convened

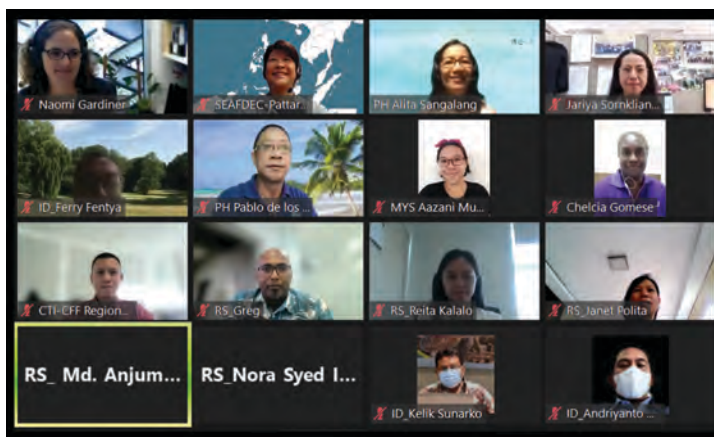
(Continued from Page 1)



projects and approved four (4) new projects under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism. Subsequently, the 44PCM also noted the progress and achievements of the ten (10) Departmental Programs, and six (6) Other Programs. Finally,

the 44PCM was informed that the recommendations and comments raised on the activities of the projects conducted in 2021 and those proposed for 2022 would be incorporated in the projects for improvement prior to their submission to the SEAFDEC Council and higher authorities of the ASEAN for approval. ☒

SEAFDEC joins the CTI-CFF Women Leaders Call Forum



The Senior Policy Officer of SEAFDEC Secretariat, *Ms. Pattaratjit Kaewnuratchadasorn*, and SEAFDEC/TD Gender Focal Person, *Ms. Jariya Sornkliang*, participated in the “Women Leaders Call Forum” which was hosted by the Coral Triangle Initiative for Coral Reefs, Fisheries and Food Security (CTI-CFF) Secretariat on 8 October 2021.

The Forum was aimed at updating the progress of gender-related activities in 2021, proposing the workplan in 2022 as well as reporting the progress of the

development of the Gender Equality and Social Inclusion Policy (GESI). In this occasion, SEAFDEC presented the SEAFDEC Gender Strategy as well as the actions undertaken by SEAFDEC and its Departments such as awareness-raising on gender aspects and mainstreaming gender into the organization and programs and projects ensuring that women, men, and youth at all levels access equitable benefits in the sustainable development and management of fisheries and aquaculture in the Southeast Asian region. ☒

SEAFDEC convenes the 24FCG/ASSP

(Continued from Page 1)



Secretary-General, and senior officials of the SEAFDEC Secretariat and Departments.

The highlights of the 24FCG/ASSP include follow-up actions carried out by SEAFDEC and ASEAN Member States (AMSs) with respect to the directives given at the 53rd Meeting of the SEAFDEC Council, meetings of ASEAN bodies related to fisheries, and other meetings of SEAFDEC. The 24FCG/ASSP was informed on the endorsement of the two regional documents, namely:

Report on Stock and risk assessments of kawakawa (*Euthynnus affinis*) and longtail tuna (*Thunnus tonggol*) resources in the Southeast Asian waters using ASPIC and Regional Action Plan for Management of Transboundary Species: Indo-Pacific Mackerel in the Gulf of Thailand Sub-Region, by the 43rd Meeting of AMAF in October 2021. Moreover, the 24FCG/ASSP took note of the programs and activities implemented in 2021 and the proposed activities for 2022 under the FCG/ASSP mechanism, as endorsed by the 44PCM including

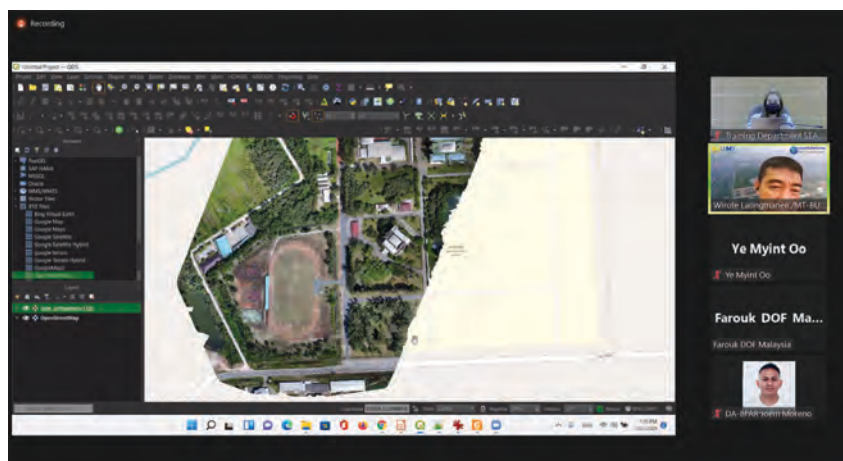
three Pipeline Projects which will be placed under the FCG/ASSP Mechanism in 2022 once the funding sources are confirmed. The 24FCG/ASSP also noted the implementation and provided guidance for further implementation of several documents adopted by ASEAN through the FCG/ASSP Mechanism, as well as other issues that are of importance to the fisheries sector of the ASEAN-SEAFDEC Member Countries. These include the Regional Management Initiatives for Combating IUU Fishing, Regional Plan of Action for Sustainable Utilization of Neritic Tunas in the ASEAN Region, Regional Plan of Action for the Management of Fishing Capacity, CITES-related Issues, Fisheries Subsidies, and U.S. Marine Mammal Protection Act.

The results and recommendations of the 24FCG/ASSP would be submitted to the SEAFDEC Council for approval and to the ASEAN Sectoral Working Group on Fisheries (ASWGFi) for endorsement to the higher authorities of the ASEAN. ✦

Regional Training on Geographic Information System and Remote Sensing for Aquaculture

SEAFDEC/TD organized the “Regional Training Course on Geographic Information System (GIS) and Remote Sensing (RS) for Aquaculture” from 30 November to 3 December 2021 via the online platform. The goal of the Training was to enhance the capacity of relevant human resources on the utilization of geographic information system (GIS) and remote sensing (RS).

The Training was attended by 37 participants including junior fisheries officers and researchers from the ASEAN Member States (AMSs) who have the basic knowledge of and/or working on GIS and RS in fisheries and environment, resource person from Burapha University, Chanthaburi Campus in Thailand, and technical and support staff from the SEAFDEC Secretariat and Training Department. The coverage of the Training Course



Participants during the Regional Training Course on Geographic Information System (GIS) and Remote Sensing (RS)

includes the introduction to GIS and RS and overview of the application of GIS in aquaculture, which was imparted by the resource person, *Dr. Wirote Laongmanee*. After the Training, the participants requested SEAFDEC/TD to organize a physical training so that they

can learn and practice more on the use of GIS and RS software together with resource person and other participants to strengthen the network of GIS and RS researchers in the region. ✦

DEPARTMENTAL ACTIVITIES

SEAFDEC 22nd ISP Meeting convened

SEAFDEC organized the “Twenty-second Meeting of SEAFDEC Information Staff Program” or 22ISP on 29 November and 1 December 2021 through the online platform. The 22ISP was attended by the SEAFDEC Deputy Secretary-General, senior officials, and information-related officers from the SEAFDEC Secretariat, TD, AQD, MFRDMD, and IFRDMD.

During the Meeting, the progress and achievements of the implementation of Information Strategies for Enhancing SEAFDEC Visibility and Communication in 2021 were reviewed. Moreover, the Meeting also provided recommendations on the preparation and enhancement of SEAFDEC information tools/activities in 2022, including regular information materials, annual report, Special Publication “Fish for the



Participants of the 22nd ISP meeting

People,” SEAFDEC Newsletter, 2023 calendar, websites, and institutional repositories. Other information-related matters, including the progress of hosting institutional repositories, finalizing the SEAFDEC Style, and enhancement of dissemination of electronic copy of SEAFDEC publications, were also

discussed during the Meeting. The results from the 22ISP, particularly those that need policy support from SEAFDEC, would be submitted to the SEAFDEC Department Chiefs’ Meeting in 2021 for consideration and directives. ✪

TD supports activities by fish processing group in Sakon Nakhon Province, Thailand



Under the project “Small-scale Fisheries Management for Better Livelihood and Fisheries Resources,” SEAFDEC/TD in collaboration with the Department of Fisheries, Thailand, Sakon Nakhon Provincial Fisheries Office, and Nam Oon Dam Inland Fisheries Patrol Unit conducted a series of activities to support the fish processing group in Ban Dong Kham Pho community in Nam Oon Dam, Sakon Nakhon Province,

Thailand. On 23–25 November 2021, the assessment of production and marketing of the group’s major products (fermented fish, fermented fish meat wrapped with banana leaves, and dried fish) was carried out. It was found that the group lacked the certificate for product standards and equipment to produce marketable processed fish products. Also, the group needed to learn new techniques of fish processing and packaging.

To address the needs of the group, TD organized training on 23–24 December 2021 to enhance the skills of the 13 group members on production and marketing strategies. In addition, TD provided the group with a meat mixer and a vacuum sealer machine to improve their products to become more competitive in the market.

In the future, the group’s processed fish products will be promoted as One Tambon, One Product (OTOP) brand with support from the Sakon Nakhon Provincial Community Development Office. Tambon means Sub-District, and OTOP is a local entrepreneurship stimulus program of Thailand that supports the unique locally made and marketed products of each Tambon all over the country. ✪

IFRDMD holds the 2021 JTF Annual Meeting

SEAFDEC/IFRDMD organized the “2021 JTF Annual Meeting” on 14 December 2021 through the face-to-face meeting in Palembang, Indonesia together with an online platform to discuss the research activities conducted in 2021.

The Meeting was attended by 30 participants including the IFRDMD staff, observers, and evaluators. The evaluators were the lecturer from IPB University, *Dr. M. Mukhlis Kamal*, and SEAFDEC Secretariat Special Advisor, *Mr. Masanami Izumi*.

During the Meeting, the accomplishments of the two projects

entitled “Sustainable Utilization of Anguillid Eel in the Southeast Asia Region” and “Management Scheme of Inland Fisheries in the Southeast Asian Region” were presented. Both were

in the second year of implementation. The evaluators provided comments and suggestions on the proposed activities of the two Projects that will be conducted in the succeeding years. ☒



Participants of the 2021 JTF Annual Meeting

Workshop on Seerfish in Malaysian Waters using ASPIC in Collaboration with DOF Malaysia



The “Workshop on Seerfish in Malaysian Waters using ASPIC in Collaboration with DOF Malaysia” was organized by SEAFDEC/MFRDMD in collaboration with the Department of Fisheries (DOF) Malaysia from 19 to 23 December 2021 in Kuala Terengganu, Malaysia. There was a total of 23 participants in the Workshop including researchers from MFRDMD, resource persons from the DOF Malaysia, and members of the Scientific Working Group on Stock Assessment for Neritic Tunas in the Southeast Asian Waters (SWG-Neritic Tunas) from Malaysia.

The aim of the Workshop was to train the participants on catch per unit effort (CPUE) standardization and stock analysis using ASPIC, Kobe plot (stock

status trajectory) decision-making tool for management, and other relevant programs. Furthermore, the stock and risk assessments for two selected seerfish species, *i.e. Scomberomorus commerson* and *S. guttatus*, in Malaysian waters were carried out during the Workshop. The landing data from the Indian Ocean Tuna Commission (IOTC) and FAO FishStat J were used for such analysis.

The results of the Workshop will be presented during the 7th Meeting of SWG for Stock Assessment on Neritic Tunas in the Southeast Asian Region scheduled in the third quarter of 2022. ☒



IFRDMD organizes Workshop on Community Based-Management for Sustainable Inland Fisheries Conservation



Participants during the workshop

SEAFDEC/IFRDMD organized the “Workshop on Community Based-Management for Sustainable Inland Fisheries Conservation” on 16 December 2021 to share the knowledge of management freshwater ecology, conservation strategies, community-integrated management of peatlands as well as the Special Area for Conservation and Fish *Refugia* (SPECTRA) concept. The hybrid Workshop was held face-to-face in Pekanbaru, Riau Province, Indonesia and *via* the online platform. The 67 participants include officers from

the Department of Fisheries of Indonesia in of Riau Provinces and Regencies, Regional Development Planning Agency of Riau, Department of Environment

and Forestry of Riau, Ministry of Marine Affairs and Fisheries (MMAF), Riau University, as well as SEAFDEC Training Department and IFRDMD.

At this event, the IFRDMD Chief and Dean of the Faculty of Fishery and Marine Science, Riau University signed an Agreement to collaborate in the enhancement of education program for environmental conservation and sustainable inland water resources management research as well as in the community fisheries development activities. ✦



Signing of the Agreement between the the IFRDMD Chief and Dean of the Faculty of Fishery and Marine Science, Riau University

Intensive aquaculture training for young technicians



(left to right) The graduates of the Training Course on Aquaculture Technologies for Manpower Development Mr. Jan Marico Postigo, Ms. Shielame Catayas, Liezel Lipat, and Angela Bacuyong together with SEAFDEC/AQD Deputy Chief Dr. Sayaka Ito (seated, left) and SEAFDEC/AQD Chief Dan Balião (seated, right) during the closing ceremony on 5 October 2021

SEAFDEC/AQD organized the training course “Manpower Development on Aquaculture Technologies” from 5 July to 5 October 2021 which accommodated three trainees from Mindanao and one from Luzon. The training course covered hatchery techniques for tiger

shrimp, mangrove crab, marine fish, and giant freshwater prawn; cage and pond grow-out culture of fish; and seaweed micropropagation. The course was instructed through lectures and hands-on experience in AQD facilities in Iloilo and Guimaras, Philippines.

The trainees were thoroughly screened from among the graduates of fisheries schools near the areas where the Philippine government will build new hatchery facilities. On 29 September–5 October 2021, the trainees finished the last stage of their training through individual oral reporting and oral examination on hatchery and grow-out procedures before a panel of evaluators including resource persons, area supervisors, and AQD Deputy Chief *Dr. Sayaka Ito*.

The intensive training course was part of a program to build a pool of highly skilled technicians to operate government hatchery facilities being prepared in the Philippines. ✦

Fish feed and nutrition training course, a hit among feed millers



on Fish Nutrition and Feed Development” from 23 to 26 November 2021 through an interactive learning platform. A total of 63 participants including feed millers, fish farmers, and government technical staff attended the Training Course.

Fish nutrition plays a crucial role in profitable aquaculture ventures as feeds account for over 50 percent of the production cost. Through the Training Course, the AQD experts shared the basic principles of fish nutrition and the techniques for formulating, preparing, and evaluating cost-efficient fish diets through a series of lectures and video demonstrations. ❖

SEAFDEC/AQD in collaboration with the National Fisheries Research and Development Institute of the Philippines conducted the “Online Training Course

Consultation on fishing technology innovation

The “Stakeholders Consultation Meeting” was organized by SEAFDEC/TD in cooperation with the Food and Agriculture Organization of the United Nations (FAO) on 4 October 2021 in Rayong Province, Thailand. The objective of the Meeting was to gather the views of the relevant stakeholders on fishing technology and innovations, which would then serve as inputs to the Assessment Report on the Sustainability of Currently Used Fishing Technologies and Operations in Thailand and Options for Innovation and Improvements. There were 54 participants in the Meeting including fishers from Rayong and Trat Provinces, a lecturer from Kasetsart University, fisheries officers from the Department of Fisheries (DOF), Thailand, fisheries officers from the Rayong Marine Fisheries Research and Development Center of the DOF, Thailand, representatives from the Asia-Pacific Rural and Agricultural Credit Association (APRACA), credit analyst from the Bank for Agriculture and Agricultural Cooperatives (BAAC) of Thailand, and officers from the SEAFDEC Secretariat and TD. The Meeting discussed the technological and socioeconomic characteristics and ecological effects of the main fishing

เครื่องมือ	สัตว์น้ำที่สำคัญพันธุ์	ความเสี่ยงถูกจับ	ผลกระทบ	ระดับผลกระทบ	ระดับ ALDFG
อวนลาก	ฉลาม	ต่ำปานกลาง	แนวปะการัง/หญ้าทะเล	ปานกลาง	ปานกลาง
	กระเบน	ต่ำปานกลาง			
โดนมึก	-	-	-	ต่ำ	ต่ำ
	ฉลาม	ต่ำ	แนวปะการัง/หญ้าทะเล	ต่ำ	ต่ำ
	กระเบนหัวแหลม	ต่ำ			
อวนลอย	ฉลาม	ปานกลาง			
	โลมาอิรวดี	ต่ำ	แนวปะการัง/หญ้าทะเล	ปานกลาง	ปานกลาง
อวนล้อม	โลมาหัวบาตร	ต่ำ			
	-	ต่ำ	-	ต่ำ	ต่ำ

fleets operating in Thailand, as well as the stock status of the target fishery resources.

In conclusion, the Meeting provided recommendations including the development of an appropriate financial program, mechanism, and tools (e.g. development of a digital platform, affordable interests, among others) to enhance the access fishers to financial services to enable them to invest in new technology and innovation. Also, the economic performance of fishing fleets (including cost and profit) should be

considered to improve fishing technology and adopt socially and environmentally responsible practices for sustainable fisheries development and management.

The Meeting was an activity under the FAO Multi-Disciplinary Fund project “Financing Innovation for Sustainable Fisheries with the Private Sector” with SEAFDEC/TD as the implementing organization. The Project was aimed at supporting the investment and financial decision-making process to support fisheries innovation towards sustainability. ❖

AQD inaugurates new aquaculture facilities; strengthens government partnership



The newly-established aquaculture facilities at SEAFDEC/AQD were officially inaugurated in a ceremony on 9 December 2021 at its Tigbauan Main Station in Iloilo, Philippines. The new facilities included marine and freshwater multispecies hatcheries and broodstock

tanks that were established to intensify the demonstration and techno-transfer program of AQD. Top executives of the Philippine government headed by Department of Agriculture (DA) Secretary, *Dr. William Dar*, toured the facilities with AQD Chief, *Mr. Dan*

Baliao, and AQD Executive Committee members.

As he acknowledged that science and technology are the engines of growth for aquaculture and fisheries, *Dr. Dar* expressed his gratitude to AQD for its work, particularly for the ready-for-adoption technologies developed for economically important aquaculture species. He then challenged the research center to scale up the verification and demonstration of the technologies in partnership with Philippine government agencies including DA-Bureau of Fisheries and Aquatic Resources, National Fisheries Research and Development Institute, and local government units. *Dr. Dar* also added that the Philippine government is rooting for SEAFDEC/AQD and its efforts towards sustainable aquaculture.



AQD hosts lectures on Aquaculture 4.0



Speakers during the 28th Dean Domiciano K. Villaluz Memorial Lecture: Professor Matthew Tan (top right) and Mr. Francis Neil Quijano (bottom), with SEAFDEC/AQD Scientist, Dr. Jon Altamirano (top left), as moderator

Super-intensive indoor aquaculture and innovations in culture infrastructure and equipment were discussed during the “28th Dean Domiciano K. Villaluz Memorial Lecture” hosted by SEAFDEC/AQD last 16 December 2021. During the Memorial Lecture, the Associate Professor in aquaculture at James Cook University and private sector representative to the APEC Policy Partnership on Food Security of Singapore, *Prof. Matthew Tan*, discussed Aquaculture 4.0, fish farming’s adaptation of the fourth industrial revolution (Industry 4.0) defined by

the current trend of smart automation, interconnectivity, and other disruptive technologies. Meanwhile, the architect who is behind Agritektura, *Mr. Francis Neil Quijano*, shared the innovations in modular aquaculture systems that their group designed in response to the COVID-19 pandemic. Agritektura is a multidisciplinary movement that aims to transform communities. Both speakers emphasized the need for fish farmers to understand the cost of technology implementation, and to analyze whether such upgrades will improve the profitability of their

aquaculture operations with respect to the selling prices in the market they are catering to. They also stressed the importance of keeping abreast with new and more efficient technologies and equipment.

The Dean Domiciano K. Villaluz Memorial Lecture is held annually in memory of the first Chief of AQD.



A modular aquaculture set-up with automated aeration, filtration, and nutrient system

Asians acquire knowledge on mangrove crab hatchery

SEAFDEC/AQD offered the “Training Course on Mangrove Crab Hatchery Operations” from 13 to 20 October 2021 via an online learning platform. Through a series of lectures and demonstration videos, AQD experts shared information on the biology of mangrove crabs, site selection, design and construction of hatcheries, broodstock management, nutrition, and disease prevention. Special topics, such as the design and construction of mangrove crab hatcheries and the environmental impacts of aquaculture were also included in the course.

A total of 23 participants from Cambodia, Malaysia, Pakistan, Philippines, and Thailand with various backgrounds successfully finished the Training Course. A real estate



Mangrove crab training participants with SEAFDEC/AQD experts and training staff

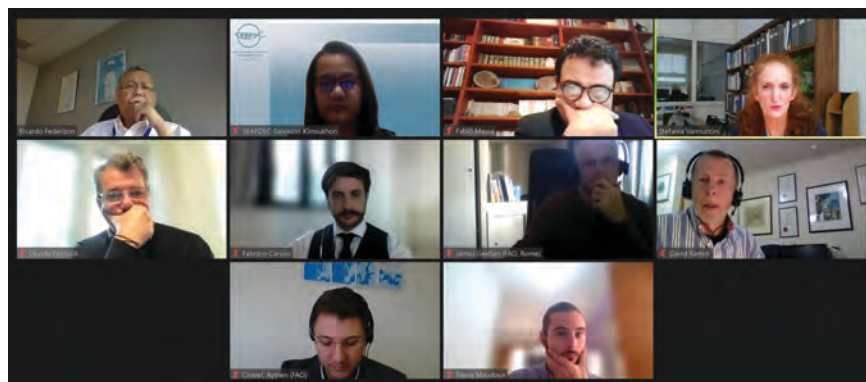
broker from the Philippines attended the training course to expand his knowledge as he wants to venture into mangrove crab culture, while a fisheries officer of the administration in Cambodia liked the

training course because it had complete coverage of hatchery operations and intended to transfer the technology he learned from the training course to the farmers in his country. ❏

SEAFDEC participates in CWP Intersessional Meeting

Hosted by the Food and Agriculture Organization of the United Nations (FAO), the Coordinating Working Party (CWP) Intersessional Meeting on Fisheries and Aquaculture was convened from 2 to 5 November 2021 through the online platform. The SEAFDEC Secretariat Senior Information Officer, *Ms. Saivason Klinsukhon*, and representatives from the 13 partners of FAO/CWP attended the Meeting. The aim of Meeting was to update on the progress of relevant participating organizations to CWP and CWP Task Groups. The discussion of the Meeting focused on the revision of the CWP Handbook of Capture Fisheries and Aquaculture which will be submitted to the 27CWP in 2022, CWP web pages, statistics definition of small-scale fisheries, and emerging needs for statistics standards.

During the Meeting, *Ms. Saivason* reported the progress undertaken by SEAFDEC related to fisheries statistics activities in 2021 which included the



results of the 1st Regional Technical Consultation on Fishery Statistic and Information in Southeast Asia, which came up with the specific recommendations for improving the Regional Framework for Fishery Statistics of Southeast Asia, particularly on statistics on fish processing and fish trade. Nevertheless, there will be a series of RTC to be organized in 2022 and 2023 to discuss other scopes for revision of the Framework.

Ms. Saivason also reported the progress of preparation of the publication

“Southeast Asian State of Fisheries and Aquaculture (SEASOFIA) 2022” which is expected to be available by April 2022. Moreover, she provided updates on the collaboration between SEAFDEC and FAO on ongoing programs and activities in line with targets under the UN Sustainable Development Goals particularly the SDG 14 (e.g. capacity building on stock assessment and development of appropriate reference point, supporting the collection of research and datasets from Southeast Asia through identifying and record on OpenASFA, among others). ❏

AQD lab now ISO accredited

World-class quality testing can now be enjoyed by fish farmers and researchers for their feeds and water samples at the Centralized Analytical Laboratory (CAL) of SEAFDEC/AQD in Tigbauan, Iloilo, Philippines. On 21 October 2021, the Philippine Accreditation Bureau (PAB) granted the ISO/IEC 17025:2017 accreditation for the biological and chemical testing of the CAL for meeting internationally accepted standards in its analytical procedures and has an effective laboratory quality management system. ISO/IEC 17025:2017 is the most recent version of ISO standard for testing and calibration laboratories which specified the general requirements for the competence, impartiality, and consistent operation of testing and calibration laboratories.



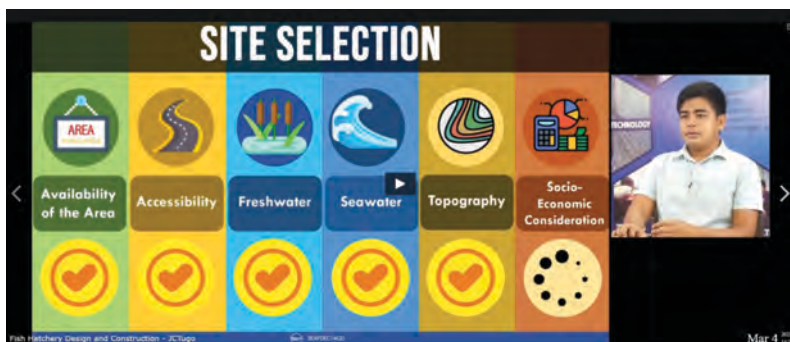
Chemist and officer-in-charge of SEAFDEC/AQD's Laboratory Facilities for Advanced Aquaculture Technologies, Ms. Jeralyn Panizales, processes samples for crude protein analysis

The accredited laboratory services include water analyses such as total coliform count, fecal coliform count, pH level, ammonia-nitrogen, nitrite-nitrogen, and phosphate-phosphorus. Also included in the accreditation is the chemical testing of agricultural products and materials for moisture, ash, and crude protein analyses. The accreditation

also showed that the laboratory has the technical competence and provides reliable, accurate, and defensible test results with the highest attainable standard of quality recognized internationally. In 2020, the CAL analyzed almost 2,000 samples mainly from AQD researchers as well as samples from the public.



NFRDI and BFAR staff attend online training course on marine fish hatchery



The lecture video on hatchery design and construction by Engr. John Aldrin Tugo of AQD

Seven science research specialists from the National Fisheries Research and Development Institute (NFRDI)

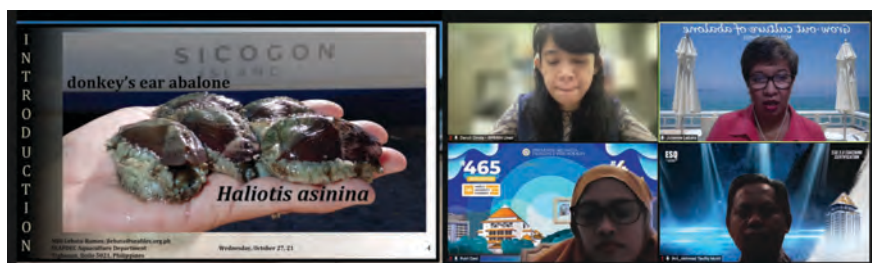
and a fishing regulations officer from the Bureau of Fisheries and Aquatic Resources (BFAR) in the Philippines

participated in the online training course on marine fish hatchery conducted by SEAFDEC/AQD on 18–29 October 2021. The Training Course was composed of seven modules with one module devoted specifically to milkfish culture. The participants learned through recorded lecture videos with topics on broodstock management, larval rearing, hatchery design and construction, nutrition, health management, among others. Furthermore, the online discussions with the AQD experts and participants were done *via* the Zoom platform.



Universitas Airlangga learns abalone culture

The abalone culture techniques developed by SEAFDEC/AQD were shared with the student body and faculty of Universitas Airlangga (UNAIR) in Indonesia through the online training course conducted on 20–22 October 2021. The Training Course was attended by 38 participants who learned about broodstock management and spawning techniques, nutrition, and health management for abalone through recorded lectures, video demonstrations,



and live discussions. Disseminating sound scientific knowledge to an academic institution in Indonesia, which is a SEAFDEC Member Country and also a host country of SEAFDEC Inland

Fishery Resources Development and Management Department (IFRDMD), is a step towards sustainable and environment-friendly aquaculture in Southeast Asia.



Oyster study presented in symposium



Slide presentation of Dr. Ma. Junemie Hazel Lebata-Ramos on oyster study

SEAFDEC/AQD studied the potential of hatchery-bred oyster spat as seeds for grow-out culture to address the declining number of spat fall in natural oyster beds. The SEAFDEC/AQD Scientist, *Dr. Ma. Junemie Hazel Lebata-Ramos*, virtually presented the findings of this research during the 41st Annual Philippine-American Academy of Science and Engineering (PAASE) Meeting and Symposium on 8–11 October 2021. The hybrid event was hosted virtually and in-person in Baltimore, Maryland, USA.



Workshop on Developing Fisheries Management Plan in Krabi Province, Thailand



The first implementation of the EAFM concept in Thailand was in 2017 in the pilot site at Ban Nai Nang District in Krabi Province. The EAFM implementation was successful and the fishing community in the pilot site received the environmental award from the Green Globe Institute in 2019. With the success of the EAFM implementation in Bai Nai Nang, the DOF, Thailand now supports the expansion of EAFM implementation to all Districts in Krabi Province.

Under the project on “Small-scale Fisheries Management for Better Livelihood and Fisheries Resources” supported by the Japanese Trust

Fund, SEAFDEC/TD collaborated with Krabi Provincial Fisheries Office and Department of Fisheries (DOF), Thailand to organize the “Workshop on Developing Fisheries Management Plan for Eight Districts in Krabi Province” from 14 to 16 December 2021 in Krabi Province, Thailand. There were 72 participants who attended the Workshop including representatives from Krabi District and Provincial fisheries offices, heads of fishers groups, and resource persons. During the Workshop, the draft EAFM plans for the respective Districts were developed and handed over to the governor of Krabi Province, which would support the development of the fisheries management plan.



Workshop on Conservation of Sharks and Rays through Parasites’ Perspective

SEAFDEC/MFRDMD organized the “Workshop on Conservation of Sharks and Rays through Parasites’ Perspective” on 1–2 December 2021 at MFRDMD in Kuala Terengganu, Malaysia. A total of 17 participants comprising of researchers, research assistants, laboratory assistants, and MFRDMD staff participated in the Workshop.

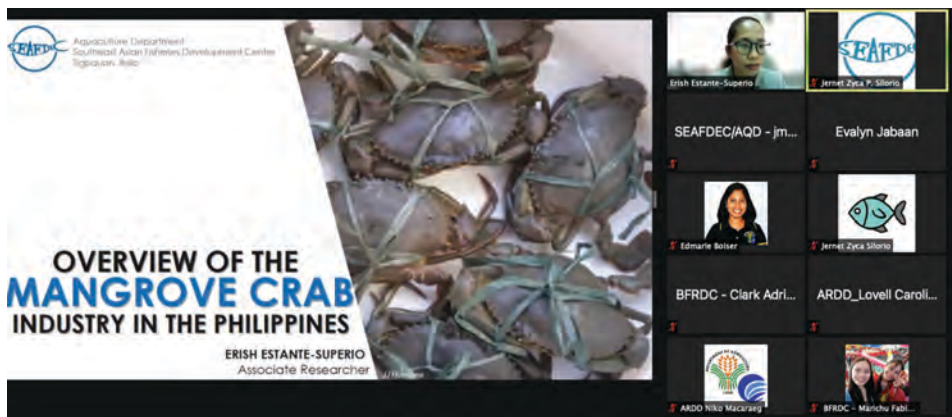
The resource persons of the Workshop were lecturers from the Faculty of Science and Marine Environment, Universiti Malaysia Terengganu (UMT), namely: *Dr. Melissa Beata Martin*, *Dr. Muhammad Hafiz bin Borkhanuddin*, and *Dr. Afiq Durrani bin Mohd Fahmi*, who delivered lectures and facilitated practical work.

The objective of the Workshop was to expose the participants on the conservation of sharks and rays through parasites’ perspective. The topics of the Workshop include elasmobranch parasites, and microbiome and their effects. The participants practiced dissecting specimens, examining and screening parasites under the microscope, and identifying and preserving parasites. Two species of sharks (*Carcharhinus sorrah* and *Sphyrna lewini*) and three species of rays (*Brevitrygon imbricata*, *Maculabatis gerrardi*, and *Neotrygon orientalis*) were used to examine their parasites. The parasites found in the specimens include cestode, copepod, monogenean, and trypanorhyncha.



Participants during the workshop

Online course on crab culture for PH research institute



Online lecture on the overview of the mangrove crab industry in the Philippines

Upon the request of the Philippine National Fisheries Research and Development Institute (NFRDI), SEAFDEC/AQD organized a specialized

online training course on mangrove crab hatchery for their staff. Eight NFRDI staff attended the training course held via an online platform from 13 to 17 December

2021. Through this training course, the NFRDI staff gained technical knowledge in the hatchery of mangrove crab with an emphasis on *Scylla serrata* for sustainable livelihood and employment.

The course was a mix of lecture and demonstration videos on the biology and identification of crab species, hatchery operations, feed preparation, natural food production, disease and health management, and harvest and packing of crab for transport, among others. The mangrove crab experts from AQD conducted lectures and entertained questions during the live sessions via the Zoom platform. ❖

Catfish online course rated 10/10



The Binangonan Freshwater Station of SEAFDEC/AQD conducted the “Online Training Course on Catfish Hatchery and Grow-out Operations” from 26 to 29 October 2021. There were three Filipino trainees who successfully finished the Training Course. One of the trainees, a Business Management Supervisor from the province of Pangasinan, rated the expertise and information shared by the lecturers with a perfect 10. Although he

preferred gaining the actual experience through hands-on activities, he found that the virtual alternative, consisting of a comprehensive module presented through lectures and videos, covered all the fundamental topics. ❖

AQD experts talk at the eel industry meeting



AQD Scientist Dr. Maria Rowena Eguia, presenting the science-based methods in the identification of tropical anguillid eels

Two SEAFDEC/AQD scientists were invited by the Philippine Department of Agriculture-Bureau of Fisheries and Aquatic Resources Regional Office 2 (DA-BFAR Region 2) to give a talk



AQD Scientist, Dr. Frolan Aya, discussing the nursery culture of tropical anguillid eels in the Philippines

during the eel industry meeting on 17 December 2021 in Tagaytay City, Philippines. Eel growers, exporters, consolidators, and BFAR personnel attended the meeting.

DA-BFAR Region 2, as the lead region in the implementation of the National Eel Management Plan in the Philippines, organized the Meeting to determine the status of the eel industry in the Philippines, discuss the problems faced by the industry, and organize the growers into a unified group to help the country on its economic recovery program. During the meeting, *Dr. Maria Rowena Eguia*, discussed the science-based methods in the identification of tropical anguillid eels while *Dr. Frolan Aya* talked about the nursery culture of tropical anguillid eels in the Philippines. ❖

Third Consultation for the SEASOFIA 2022 publication organized

SEAFDEC Secretariat organized the “Third Inter-Departmental Consultation for Finalization of the Draft SEASOFIA 2022” through the online platform on 18 and 20 October 2021. The Consultation was attended by the SEAFDEC Secretary-General, Deputy Secretary-General, senior officials of the SEAFDEC Secretariat, and officers of the Secretariat and Departments, namely: TD, MFRD, AQD, MFRDMD, and IFRDMD who serve as contact

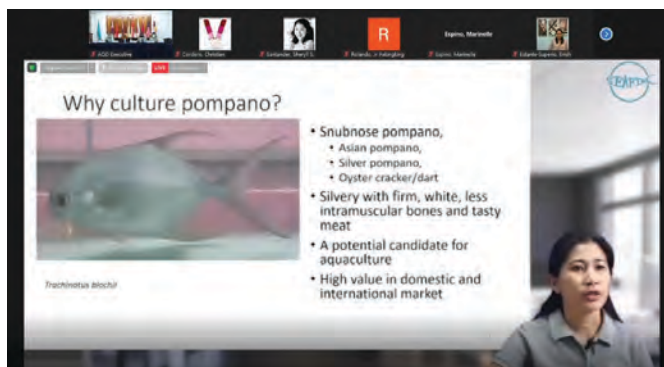
persons or involved in the preparation of the publication “Southeast Asian State of Fisheries and Aquaculture 2022” or SEASOFIA 2022. During the Consultation, the participants provided comments and suggestions to the inputs for SEASOFIA 2022 to make sure that the publication would cover important aspects on the status and trends as well as the issues and challenges in fisheries and aquaculture. Moreover, the Consultation agreed that the progress made by the

countries in the region, SEAFDEC, and other organizations in addressing the issues and challenges should be also included in the publication.

The final draft of SEASOFIA 2022 was submitted to the 44th Meeting of the SEAFDEC Program Committee held in November 2021, and the final publication would be published and available by the 54th Meeting of the SEAFDEC Council in 2022. ❖

SEAFDEC/AQD holds virtual Farmers’ Forum

SEAFDEC/AQD organized the virtual Farmers’ Forum on 16 December 2021 *via* the Zoom platform, which was also live-streamed at the institution’s official Facebook page. The Forum was intended to disseminate the science-based aquaculture technologies developed by AQD to a wider audience. During the event, AQD experts talked about the advances in aquaculture technologies for black tiger shrimp, mangrove crab, and pompano. After the lectures, an aquaculture clinic was also held where fish farmers and other stakeholders consulted with AQD scientists and



AQD researcher, Ms. Ma. Irene Legaspi, delivers the lecture on pompano culture during the Farmers’ Forum

researchers on the problems that they encounter in their farms. The Forum had 480 attendees *via* Zoom. On the day of

the event, the Forum and the aquaculture clinic gained 18,000 and 766 views, respectively. ❖

Workshop on sharks and rays MSY

SEAFDEC/MFRDMD organized the “Workshop on Landing Data Analysis of Sharks and Rays by Species to Determine Value of Maximum Sustainable Yield (MSY)” on 6–7 December 2021 in Kuala Terengganu, Malaysia. The lecturer from the Faculty of Fisheries and Food Science, Universiti Malaysia

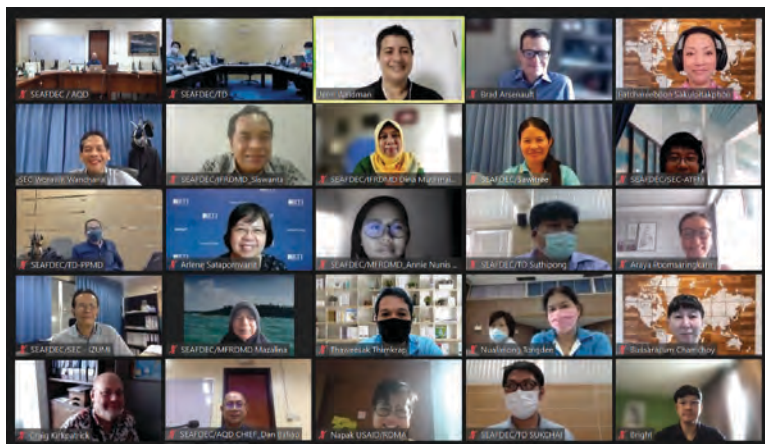
Terengganu (UMT), *Dr. Rumeaida binti Mat Piah*, was invited as a resource person to share her expertise in fish stock assessment. A total of 18 participants who are involved in stock assessment and data analysis including researchers, research assistants, laboratory assistants, and MFRDMD staff participated in

the Workshop. The objective of the Workshop was to enhance the skills of the participants in determining the MSY value using the Schaefer and Fox models to analyze any form of dataset arrangement. The dataset on shark and ray landings by species collected from SAFMA Jetty in Kota Kinabalu, Malaysia from 2018 to 2019 was used for this Workshop. Various arrangements of datasets were given to all participants to practice determining MSY value using both models.



The MSY value of a given fish stock is the highest possible annual catch that can be sustained over time. It is important to make sure the annual catch does not exceed the MSY level in order to sustain the stock. ❖

SEAFDEC joins the Co-creation Workshop to develop the Public International Organization Grant Activity Description Document



Participants of the Co-creation Workshop

The online Co-creation Workshop was convened on 11–12 November 2021 as part of the Sustainable Fish Asia Local Capacity Development Activity (SuFIA-LCD) project which is funded by the U.S. Agency for International Development (USAID) and implemented

by RTI International in partnership with SEAFDEC and CTI-CFF. The Workshop was attended by the Secretary-General of SEAFDEC, SEAFDEC Department Chiefs, officers from SEAFDEC Secretariat and Departments as well as representatives from USAID/RDMA and

RTI International. The Workshop aimed at using the co-creation process and tools to assist SEAFDEC in formulating the project proposal which will be funded by USAID/Regional Mission for Asia (RDMA) through the Public International Organization (PIO) Grant mechanism. The new project will help to build the capacity and commitment of SEAFDEC Member Countries and stakeholders to manage critical fishery resources (including inland fisheries in the Lower Mekong) through strengthened regional cooperation.

The Workshop came up with the initial draft of the PIO Grant Activity Description Document which will be finalized before further submission to the USAID/RDMA in January 2022.



Tilapia culture technology shared with stakeholders

As tilapia continues to be one of the most cultured freshwater species in the world, information on how to sustainably farm the species remains in demand. During the webinar series organized on 10 December 2021 by the Sustainable Agriculture and Natural Resources Institute (SANRI) in collaboration with the University of Rizal System (URS) Cordona Campus in the Philippines, the SEAFDEC/AQD Scientist, *Dr. Maria Rowena Eguia*, shared her knowledge on tilapia hatchery and breeding management. *Dr. Eguia* discussed the biology and environment requirements of farming tilapia, efficient and sustainable hatchery systems, and proper breeding management. She also answered how-to questions on tilapia farming during a forum. The event was attended by 80 participants from the academe, local government units, and private sectors which aimed at serving as a venue for discussing the latest trends and status of aquaculture technologies and other efforts in addressing food security.



Training Course on Market Access for Small-scale Fisheries Product in Next Normal

SEAFDEC/TD organized the “Training Course on Market Access for Small-scale Fisheries Product in Next Normal” from 22 to 25 December 2021 in the pilot site at Nam Oon Dam Sakon Nakhon Province, Thailand. The 13 participants of the Training were members of the fish processing group in the pilot site. The aim of the Training was to transfer knowledge and development of marketing strategy to the

participants. Moreover, the results from the study of fish processing including production, distribution, and markets as well as the profitability of fishery products conducted in November 2021 were also presented to the participants during the Training. This activity was under the project “Small-scale Fisheries Management for Better Livelihood and Fisheries Resources.”



IFRDMD Carries out the survey of anguillid eels

SEAFDEC/IFRDMD carried out the survey of anguillid eels on 15–21 December 2021 in the Cimandiri and Cikaso River in Palabuhan Ratu of West Java and in the Poso and Tomasa Rivers in Poso of Central Sulawesi.

The survey team collected samples of glass eels, elvers, and yellow eels from the fishing gears installed in both locations. The length, weight, and other morphometric data of the samples were measured and included in the routine data collection. Moreover, the



water quality, habitat condition, and coordinates of the fishing gears were also recorded. The survey team also observed the market chain of anguillid eels in Central Sulawesi.



Demonstration of M.V. PLALUNG, a prototype trawler



The SEAFDEC Secretary-General and Chief of Training Department, *Ms. Malinee Smithrithee*, welcomed *Mr. Somchuan Ratanamungklanon* Inspector General of the Ministry of Agriculture and Cooperatives and Acting Director-General of the Department of Fisheries (DOF) of Thailand together with other delegates and the press to the demonstration at sea of the renovated M.V. PLALUNG in Sriracha Fishing Port, Chonburi Province, Thailand on 22 December 2021. During the demonstration, the vessel's fishing gears

(trawl, gillnet, and collapsible crab trap) and fishing equipment (hydraulic system) were tested.

M.V. PLALUNG is a 29.98 GT wooden fishing vessel with 18.32 m length, 4.40 m breadth, and 1.71 m depth. The fishing vessel was improved as a trawler prototype to support SEAFDEC/TD training and research activities along the coastal areas of Thailand. The fishing vessel was modified in accordance with the Work in Fishing

Convention No. 188 (C188) which promotes decent working conditions for workers in the fisheries sector. Moreover, the new technology on optimizing energy and fuel efficiency to cause low impacts on the environment as well as instruments to reduce manpower during fishing operation including onboard fish handling and preservation were installed on the vessel. After this first demonstration, the M.V. PLALUNG will be further demonstrated and promoted to fishers in Thailand in 2022. ❖



Equipment, i.e. net drum (left) and hydraulic crane (right), applied to reduce manpower onboard the fishing vessel

SEAFDEC participated in the Decade Action Incubator Series–UN Ocean Decade Kick off Conference for the Western Pacific and its Adjacent Areas



The Secretary-General of SEAFDEC, *Ms. Malinee Smithrithee* attended the “UN Decade Kickoff Conference for Western Pacific and its Adjacent Areas” organized by the Intergovernmental Oceanographic Commission of UNESCO through its Sub-Commission for the Western Pacific (WESTPAC) and hosted by the Government of Thailand through its Ministry of Natural Resources and Environment, and Department of Marine and Coastal Resources on

25–26 November 2021. The Conference aims to catalyze partnerships among various ocean stakeholder communities in the region, and initiate co-design of transformative ocean science solutions to the Ocean Decade Challenges to achieve the Ocean Decade Outcomes through the sessions of a high-level segment featuring high-level commitments from UN agencies, governments, business and private sectors, and other stakeholder groups; and a series of interactive

side events entitled “Decade Action Incubators” aiming to facilitate the development of potential Decade Actions such as Decade Programs and Projects, and key cross-cutting issues including capacity development and Early Career Ocean Professionals (ECOPs).

During the high-level segment of the Conference, *Ms. Malinee* delivered the presentation on “Regional Responses to Support the Blue Growth: Responsible Fishing Technologies and Good Aquaculture Practices.” Her presentation highlighted the commitment of SEAFDEC to support the implementation of the Sustainable Development Goal 14: Life Below Water by facilitating the development and management of fisheries in the ASEAN region toward sustainable resources utilization. ❖

SPECIAL REPORT

Hydroacoustic Monitoring of Anguillid Eels: a preliminary study

Zulkarnaen Fahmi, Freddy Supriyadi, Ni Komang Suryati, and Dina Muthmainnah
SEAFDEC/IFRDMD

Anguillid eels are widely distributed from tropical to subtropical areas. As a catadromous fish, anguillid eels spawn in the sea, migrate to freshwater as juveniles, and grow up before migrating back to the sea to spawn (Figure 1). Anguillid eel resources are ecologically, environmentally, economically, and socially important. However, the information and data on eel fisheries are limited; thus, the actual status and trend of anguillid eel resources could not be determined.

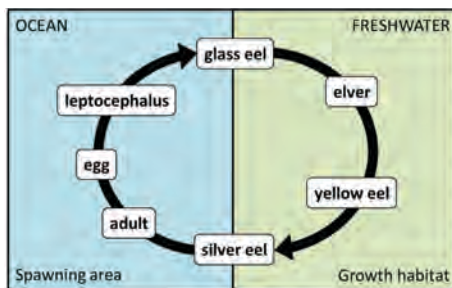


Figure 1. Life cycle of anguillid eels

In order to sustain eel fishery resources in the Southeast Asian region, IFRDMD implemented the project “Sustainable Utilization of Anguillid Eels in the Southeast Asian Region” from 2020 to 2024 supported by the Japanese Trust Fund VI Phase 2. The Project was intended to standardize the data collection system and map the genetic population structure based on the mtDNA approach in study areas including Indonesia, Philippines, Myanmar, and Viet Nam.

However, at the start of the COVID-19 pandemic in 2020, the data collection had become difficult when travel restrictions and lockdowns were imposed in countries around the world. Also, the enumerators could not collect any data since there was no demand for glass eels, juveniles, and yellow eels. To sustain data collection even during the COVID-19 pandemic, IFRDMD devised another method of data collection. In 2021, IFRDMD conducted a stock assessment to assess the current status of anguillid eel resources in Indonesia by using hydroacoustic technology to estimate the density and measure the target strength (TS) of anguillid eels.

Study sites

The hydroacoustic surveys were carried out in the Cimandiri River in Palabuhan Ratu, West Java and Serayu River in Cilacap, Central Java (Figure 2) which are endowed with abundant glass eels and yellow eels, respectively. The Cimandiri River flows about 100 km from east in Mount Pasir Caringin to west in the Indian Ocean in Pelabuhan Ratu (Hakim *et al.*, 2016; Hartono *et al.*, 2016). The Serayu River stretches

about 181 km from northeast Wonosobo Regency to southwest in the Indian Ocean in Cilacap Regency (McNally, 1993).

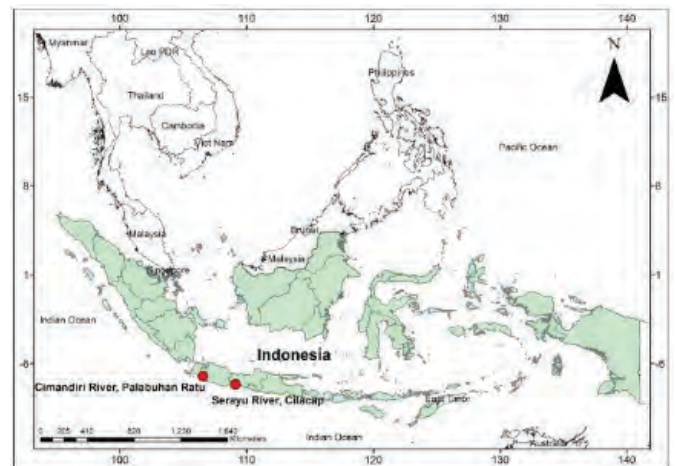


Figure 2. Hydroacoustic surveys of anguillid eels in Cimandiri River in Palabuhan Ratu, West Java and Serayu River in Cilacap, Central Java in Indonesia (red dots)

Anguillid eel density

For the estimation of anguillid eel density, hydroacoustic surveys were carried out during the rainy season. In the Cimandiri River, two surveys were conducted on 12 October 2021 at the daytime (11:29–15:15) and nighttime (19:20–20:48) covering 20.1 km of the river. In the Serayu River, the survey covered 6.2 km of the river on 11 November 2021 only during the daytime (11:12–13:24) due to inclement weather. During each survey, the acoustic device was placed at the side of the boat cruising at 3.8 km.

In the Cimandiri River, the total number of anguillid eels detected at nighttime ($n = 1,206$) was almost twice higher than the total number of anguillid eels detected in the daytime ($n = 696$). In the Serayu River, the total number of anguillid eels detected in the daytime ($n = 2,106$) was three times higher than the total number of anguillid eels detected in the Cimandiri River in the daytime. The levels of anguillid eels density were categorized into low ($0-1$ individual/ m^3), medium ($2-3$ individuals/ m^3), and high (> 3 individuals/ m^3). In the Cimandiri

River, high fish density was detected in the middle part of the river during daytime (**Figure 3A**) while high fish density was seen in the upstream area near the tributary of the river during nighttime (**Figure 3B**). In the Serayu River, high fish density was detected in the middle part of the river during daytime (**Figure 4**). The movement of the anguillid eels in the two rivers could be have been influenced by the sand mining activities during the day at the tributary at the Cimandiri River and at the downstream part of the Serayu River.

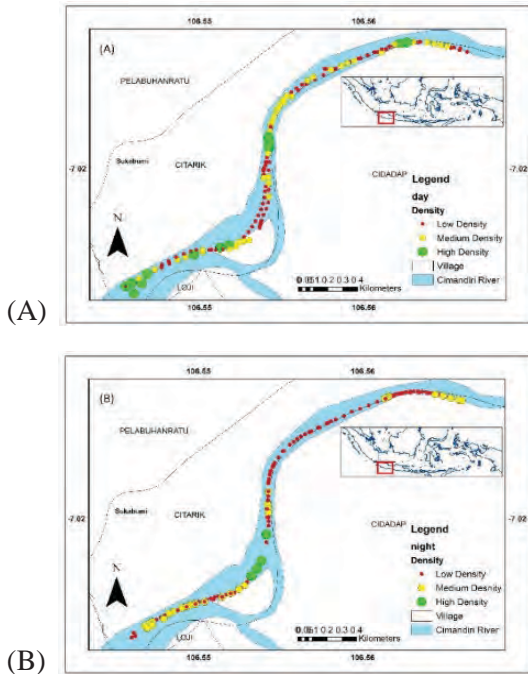


Figure 3. Estimated density of anguillid eels in the Cimandiri River during the surveys at daytime (above) and nighttime (below)

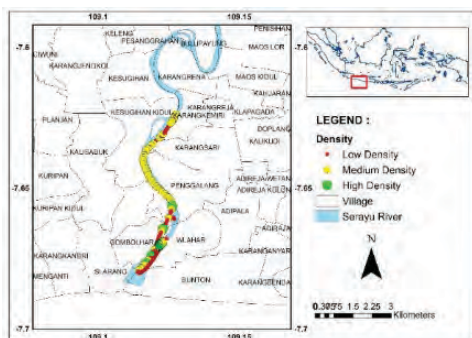


Figure 4. Estimated density of anguillid eels in the Serayu River during the survey at daytime

In addition, the number of fish detected in each elementary sampling distance unit (ESDU) from the middle part of the river to downstream was also recorded, where each ESDU is equal to 0.9 km. For the Cimandiri River, ESDU 1 was near the bridge and village area, ESDU 2 was around the agriculture area, ESDU 3 was near the tributary area, and ESDU 4 was in the estuary close to an electric power plant. During the daytime, the highest number of fish was detected at ESDU 1 ($n = 239$) and the lowest was at ESDU 4 ($n = 81$); while during nighttime, the highest number of fish was detected at ESDU 3 ($n = 608$) and the lowest was at ESDU 2 ($n = 134$) (**Figure 5**).

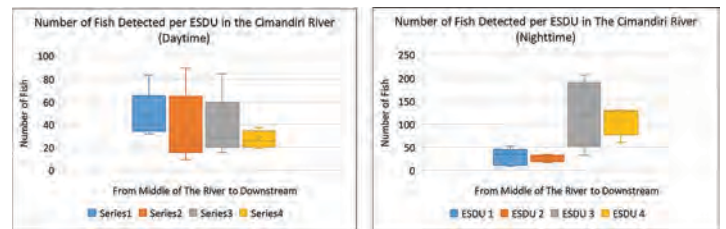


Figure 5. Number of anguillid eels detected at each ESDU in the Cimandiri River during the daytime (left) and nighttime (right) surveys

Target strength

The measurement of target strength (TS) of yellow eels ($n = 6$) sampled from the Cimandiri River was carried out to determine their response to acoustic instruments. The TS measurement was conducted based on Supriyadi *et al.* (2021) on 25 October 2021 at the laboratory of the Research Institute for Inland Fisheries and Extension in Mariana Banyuasin, South Sumatera. The body length, body weight, and swim bladder length of each fish were measured. Each fish was placed in the cylindrical fiberglass tank with a 2-meter diameter filled with water at 1.5 m depth to record the TS. The data were analyzed using the software Echoview 5.0 with a threshold setting of -70 dB, horizontal grid distance based on the time at 0.2 min, vertical grid separation at 0.2 m. The TS value was detected from (-52) to (-66) dB for yellow eels with the body length of 34–48 cm indicating that as the body length of anguillid eels increases the TS value also increases which is a directly proportional relationship.

Way Forward

The TS of other anguillid eel species would be measured to validate the preliminary data. Also, the acoustic surveys would be expanded to other locations.

References

Hakim, A.A., Kamal, M, M., Butet, N. (2016). Kondisi kualitas air sungai, aktivitas penangkapan, dan pemangku kepentingan (stakeholders) pada perikanan sidat di DAS Cimandiri, Jawa Barat. Seminar Nasional II Pengelolaan Pesisir dan Daerah Aliran Sungai. Yogyakarta. Indonesia.

Hartono, Kurniawati, E.K., & Kusumah, H. (2016). Mapping the Potential Discharge for Irrigation and Micro Hydro Energy in Sub Catchment Area Cimandiri Sukabumi. Prosiding Seminar Nasional Hasil Riset. Institut Pertanian Bogor.

McNally, R. (1993). The New International Atlas. Anniversary edition. ISBN-10:0528835483.

Supriyadi, F., Jaya, I., Pujiyati, S., Hestirianoto, T., & Fahmi, Z. (2021). Target strength measurement of Caroun croaker (*Johnius sp.*) and acoustic fish density estimation in Musi Estuary, South Sumatra. 4th International Conference Marine Sciences (ICMS 2021). IOP Conf. Series: Earth and Environmental Science 944 (2021) 012008. doi:10.1088/1755-1315/944/1/012008.

REGIONAL PROGRAMS

Building human capacity on fish stock assessment in Southeast Asia towards sustainable use of fishery resources

SEAFDEC and FAO co-hosted the “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” on 9 and 13–17 December 2021 through the online platform. The resource persons were the experts on fish stock assessment from the FAO as well as University of Washington and University of Wisconsin, USA. The participants include fisheries officers from the SEAFDEC Member Countries (*i.e.* Brunei Darussalam, Indonesia, Malaysia, Philippines, Thailand, and Viet Nam) involved in fish stock assessment; officers from the SEAFDEC Secretariat, Training Department, and Marine Fishery Resources Development and Management Department; and representatives from FAO.

During the Consultative Planning on 9 December 2021, the participants shared information and views on the level of understanding and knowledge of fish

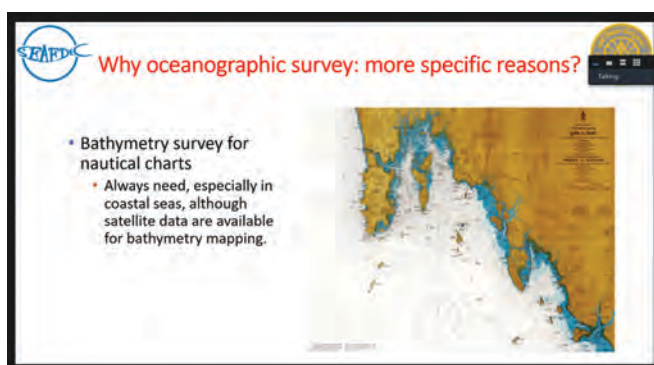
stock assessment methods being used by the countries, as well as discussed the plan for future comprehensive training courses.

Subsequently, during the Training Session on 13–17 December 2021, the participants learned the basic fisheries stock assessment principles and types of data analyses and obtained a better understanding of formulating appropriate fisheries management policies in their respective countries.



This Consultative Planning and Training Workshop was conducted in response to the instruction made by the SEAFDEC Council for SEAFDEC to enhance the countries’ capacity to determine the reference points of the stock status for proper fisheries management plan. The event was supported by the Japanese Trust Fund through the project “Assistance for Capacity Development in the Region to Address International Fisheries-related Issues.”

Regional Training on Ocean Environment and Marine Resources



Presentation of the training

SEAFDEC/TD organized the “Regional Training Course on the Relationship between Ocean Environment Variability and Fisheries Resource Abundance and Oceanographic Sampling” from 22 to 26 November

2021 via the online platform. There were 29 participants including junior fishery officers and researchers from the ASEAN Member States (AMSs) who attended the Training. The objectives of the Training were to improve the knowledge of the

participants of the relationship between ocean environment variability and fishery resource abundance and enhance their capacity to carry out oceanographic surveys focusing on sampling methods. After the Training, it is expected that the participants would be able to apply to their work the knowledge and skills they have obtained from the Training. The Training Course was an activity under the TD project “Sustainable Utilization of Fisheries Resources and Resources Enhancement in Southeast Asia.”

SEAFDEC Webinar Series: Regional Responses to U.S. Marine Mammal Protection Act

SEAFDEC organized the Webinar entitled “Regional Responses to U.S. Marine Mammal Protection Act” on 2–3 November 2021 through the online platform. The participants include representatives from the SEAFDEC Member Countries as well as SEAFDEC officials from the Secretariat, TD, and MFRDMD. The aims of the Webinar were to update the status of the U.S. Marine Mammal Protection Act (MMPA) regarding “Implementation of Fish and Fish Product Import Provisions of the Marine Mammal Protection Act” as well as exchange information on major issues/concerns of SEAFDEC Member Countries related to U.S. MMPA.

The resource persons from the U.S. NOAA Fisheries Service and INFOFISH presented the overview and highlights on major issues related to the exportation of fish and fishery products from Southeast Asian countries to the U.S. as well as trade information on fish and fishery products focusing on products exporting from AMSs to the U.S., respectively. Moreover,

the participants were also updated on the Implementation of Fish and Fish Product Import Provisions of the MMPA and Applicability for Comparability Finding which would be effective on 1 January 2023. During the discussion, the SEAFDEC Member Countries shared their respective issues, actions, and needs related to the U.S. MMPA. To support the countries in implementing the U.S. MMPA, the technical assistance for capacity building would be provided by the U.S., SEAFDEC, and other

international/regional relevant agencies. In addition, TD also shared the outcomes of the past capacity-building programs such as on record of cetacean sightings and development of fishing gear and technology to reduce bycatch of marine mammals.

The Webinar was one of the activities of the Japanese Trust Fund project “Assistance for Capacity Development in the Region to Address International Fisheries-related Issues.”



Participants of the webinar

Regional Training Course on Implementation of Port State Measures for Inspection



Under the project “Strengthening Regional Cooperation and Enhancing National Capacities to Eliminate IUU Fishing in Southeast Asia,” SEAFDEC/ TD organized the “Online Regional Training Course on Implementation of Port State Measures for Inspection” from 26 to 29 October 2021 in collaboration with the Food and Agriculture Organization of the United Nations

(FAO), the U.S. National Oceanic and Atmospheric Administration (NOAA), and the Department of Fisheries (DOF), Thailand.

The aims of the Training were to: 1) update the status and implementation of the PSMA; 2) build up the understanding and capacity of the participants on the implementation of PSM; and 3) enhance

the knowledge, skills, and experience of the participants on inspection to support the PSM implementation and port control. The Training was participated by 44 officers from the ASEAN Member States who are engaged in the implementation of the PSM and/or port control activities at the inspection level. The resource persons were *Dr. Matthew Matthew* from FAO, *Dr. Kathryn Patterson* from NOAA, *Ms. Jaruwan Songphatkaew* and *Ms. Jitpisut Sanboonpeng* from the Department of Fisheries, Thailand.

It is anticipated that the Training would further strengthen the regional cooperation to support the implementation of PSM in Southeast Asia. After the training, the participants could serve as trainers for PSM inspection in their respective countries.

Regional Workshop to Support the Livelihood and Well-being of Small-scale Fishers

The “Regional Workshop on Effective Practice for Supporting the Livelihood and Well-being of Small-scale Fishers (SSF) in Southeast Asia” was organized by SEAFDEC/TD from 27 to 28 October 2021 via the Zoom platform. There were 40 participants in the Workshop including fisheries officers from the ASEAN Member States (AMSs) who are responsible for small-scale fisheries development and possess experience in livelihood support programs for fishing communities; representatives from the Asia-Pacific Rural and Agricultural Credit Association (APRACA) and Bank for Agriculture and Agricultural Cooperatives (BAAC) in Thailand; experts from Kasetsart University (KU) in Thailand; and technical staff from SEAFDEC/TD. The Workshop was aimed at 1) enabling the participants to understand the options for effective practices in supporting and improving



the livelihood of the SSF; 2) reviewing the approaches to facilitate microfinance services for SSF; and 3) providing recommendations to support the livelihood and well-being of SSF.

During the Workshop, the fisheries officers from the AMSs shared the lesson learned from the success cases in their respective countries that applied effective practices to support and improve the livelihoods including the adaptations to the COVID-19 situation of small-scale fishers. Also, the programs

and approaches to access microfinance services were introduced by the representatives from the APRACA and BAAC, and experts from KU. Moreover, the participants discussed the key issues and ways forward to support and improve the livelihood and well-being of small-scale fishers. The Workshop was an activity under the project “Small-scale Fisheries Management for Better Livelihood and Fisheries Resources” implemented by TD during 2020–2024 with support from the Japanese Trust Fund.



Community-based freshwater aquaculture training held

The “Online Training Course on Community-based Freshwater Aquaculture for Remote Rural Areas of Southeast Asia” was conducted by SEAFDEC/AQD with support from the Government of Japan Trust Fund on 16–25 November 2021.

There were 12 participants from Brunei Darussalam, Malaysia, Myanmar, and Philippines who completed the Training Course via an interactive learning platform. The trainees found the Training Course to be sound and



adoptable as it covered aquaculture practices including pre-production, production, marketing, disease

surveillance and treatment, fish handling, and processing.



First online sandfish training course a success

SEAFDEC/AQD conducted the first online training course on sandfish (*Holothuria scabra*) seed production, nursery, and management from 6 to 15 October 2021 via the Zoom platform. The online course included live lectures on sea cucumber culture and management, grow-culture, community-based resource enhancement, and processing. There were also recorded lecture videos on biology, ecology, and fisheries of sea

cucumbers; spawning induction, larval rearing, and early juvenile management; and natural food production among others. A total of 10 participants from France, Malaysia, Maldives, Pakistan, the Philippines, Singapore, and Turkey completed the Training Course. At the end of the Training Course, the participants appreciated the resource persons from AQD who addressed their questions with full expertise as



well as the training modules which covered all the needed information including business, research, and stock enhancement.



Workshops for EAFM in Tonle Sap Lake, Cambodia



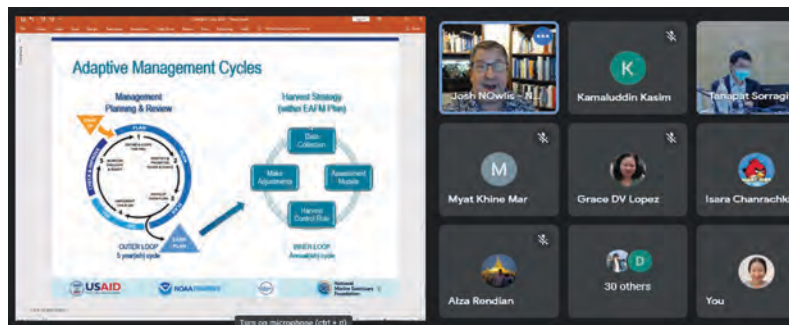
SEAFDEC/TD in cooperation with the Fisheries Administration (FiA) of Cambodia organized a series of workshops for the ecosystem approach to fisheries management (EAFM) at the pilot site in Boeung Tonle Chhmar, Cambodia on 30 November and 10–11

December 2021 via the online platform. The aim of the first workshop was to define the scope of the fisheries management unit, identify the issues and key stakeholders, and gather the necessary information to develop the EAFM plan at the pilot site. A total

of 24 participants including fishery officers, fishers, experts from FAO, EU, and UNESCO, and staff from TD attended the Workshop. During the first workshop, the draft EAFM plan was outlined which will serve as the basis for the development of the fisheries management plan in the pilot site; and the EAFM plan was finalized during the subsequent workshop. Finally, the key stakeholders agreed to implement the EAFM plan which includes establishing a management mechanism, restoring the critical conservation area, promoting environment-friendly fishing practices, and promoting alternative livelihood for income generation for the fishing community. ❖

Training on fisheries management and FishPath tool

SEAFDEC/TD in collaboration with the US National Oceanic and Atmospheric Administration (NOAA) organized the “Online Training on Implementing Adaptive Fisheries Management and the Use of FishPath Decision Support Tool” from 5 to 8 October 2021 via Google Meet platform. The Training was attended by 25 participants including officers related to fishery management and/or ecosystem approach to fisheries management (EAFM) from the ASEAN Member States (AMSs), namely: Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, and Viet Nam as well as staff from SEAFDEC/TD. Under the project “Small-scale Fisheries Management for Better Livelihood and Fisheries Resources” implemented by TD,



the Training was aimed at building the capacity of the officers from the AMSs to implement adaptive fisheries management measures and introducing the FishPath decision support tool.

During the Training, the EAFM concept was revisited as presented by the resource person from TD, and the participants from the AMSs reported

the status of EAFM implementation in their respective countries. Moreover, the representative from NOAA, *Dr. Josh Nowlis*, introduced the FishPath tool which is an online decision support tool that streamlines the process of identifying feasible options for the three central components of a harvest strategy, *i.e.* data collection, stock assessment, and management measures. ❖

Training and Study on Gender Integration in Fisheries Management in Thailand

(Continued from Page 23)



by men and selling of fish was performed mainly by women. In the fishers group, the women and men assisted each other in conducting the group activities. The key factor for the success of the fishers group was the strong cooperation among the members and the strong leadership of the group committee.

The training and the gender study were conducted under the project “Small-scale Fisheries Management under the Small-scale Fisheries Management for Better Livelihood and Fisheries Resources” implemented by TD during 2020–2024 with support from the Japanese Trust Fund. ❖

FUTURE ACTIVITIES

Date	Venue	Title	Organizer(s)
2022			
24–27 January	Onboard M.V. SEAFDEC 2	Comparison on the Catch Per Unit Effort of Fishery Resources by Trawling Using the M.V. SEAFDEC 2 and research vessel of the DOF Thailand in the Gulf of Thailand	TD
25–27 January	Online	Advancing end-to-end traceability: Critical Tracking Events (CTEs) and Key Data Elements (KDE) along capture fisheries and aquaculture value chains	INFOFISH
26–28 January	Online	Online Training on the Use of eACDS Application in the Part of Movement Document (MD), Statement of Catch (SC), and Catch Certification (CC) for Myanmar	TD
15 February	Online	SEAFDEC Inter-Departmental Information Workshop	Secretariat
21–24 February	Online	Training on Gender Awareness and Gender Mainstreaming in Fisheries in Indonesia	TD
14–18 February	Rayong and Chanthaburi Provinces, Thailand	On-site Open-house and Fishing Demonstration using the M.V. PLALUNG for Local Fishermen in Rayong and Chanthaburi Provinces, Thailand	TD
7–11 March	Lyon, France	74 th Meeting of the Standing Committee of CITES	CITES
8–11 March	Dhaka, Bangladesh and online	36 th Session of the FAO Regional Conference for Asia and the Pacific	FAO
16–17 March	Online	Regional Validation Workshop on GOTFish Project	FAO, SEAFDEC & other partners
16–17 March	Online	5 th Meeting of the Regional Scientific and Technical Committee for SEAFDEC/UNEP/GEF Fisheries <i>Refugia</i> Project	TD/Fisheries <i>Refugia</i> Project
23–24 March	Bangkok, Thailand and online	RES&POA-2030: Regional Workshop on Development of the Key Indicators and Detailed Roadmap	Secretariat
28–31 March	Bangkok, Thailand and online	9 th Asia-Pacific Forum on Sustainable Development	UN/ESCAP
29 March	Online	SDG14 Roundtable : Conserve and Sustainably Use the Oceans, Seas, and Marine Resources for Sustainable Development	UN/ESCAP
29 March	Online	International Year of Artisanal Fisheries and Aquaculture 2022: Spotlight on small scale aquaculture in Asia	FAO, ISCF, INFOFISH
30 March	Online	International Year of Artisanal Fisheries and Aquaculture 2022: Spotlight on small scale fisheries in Asia	FAO, ISCF, INFOFISH
18–21 April	Online	2 nd Regional Workshop on the Study on Impacts of COVID-19 Pandemic on the Fisheries Sector of the ASEAN SEAFDEC Member Countries	Secretariat
18–21 April	Online	Special Meeting on Policy Briefs: COVID-19 Impact Mitigation in Fisheries and Aquaculture of Southeast Asia	Secretariat
April (Tentative)	Ranong Province, Thailand	Fisheries Management Training at the learning site in Ranong Province, Thailand	TD
April (Tentative)	Trat Province, Thailand	Field trip survey for the Evaluation SOPs for Artificial Reefs Installation to Enhance Marine Resources: Case Study of Fish Enhancing Devices (FEDs)	TD
1–13 May (Tentative)	Samut Prakan, Thailand	Regional Training Workshop on Larval Fish Identification and Fish Early Life History Science	TD/Fisheries <i>Refugia</i> Project
10–12 May	Samut Prakan, Thailand	Online Training on Fish Handling Techniques Onboard Fishing Vessels	TD
14–17 May (Tentative)	Samut Prakan, Thailand	Regional Training Course on Determining Spawning-nursing Ground and Season and Developing management plan Using Larvae Survey Results	TD
23 and 25 May	Online	54 th Meeting of the SEAFDEC Council	DOF Malaysia, Secretariat
25 May	Bangkok, Thailand, and online	Training Course Program on Inland Fisheries EAFM for the Department of Fisheries, Thailand	TD
8–10 June	Online	Shrimp 2022: Recovery through resilience and innovation	INFOFISH
20–24 June	Virtual meeting	27 th Session of the Coordinating Working Party on Fishery Statistics (CWP)	FAO

SEAFDEC/AQD launched two new publications

(Continued from Page 24)

the Filipino language. During the online event, AQD Scientist and main author of the extension manual, *Dr. Maria Rowena Eguia*, emphasized that an increasing number of people were accessing manuals on freshwater aquaculture in the Filipino language based on data from the SEAFDEC/AQD Institutional Repository. As the demand increased for freshwater aquaculture products, the clamor for information on farming them also ascended. She added that producing publications in the local language is a way of assisting the small-scale local fish farmers.

Moreover, the second publication launched was the proceedings “Promotion of Sustainable Aquaculture, Aquatic Animal Health, and Resource Enhancement in Southeast Asia,” a collection of 30 articles comprised of country reports, status, and recommendations addressing important aquaculture issues in the region. The book was a product of a workshop with the same title conducted on 25–27 June 2019 in Iloilo City, Philippines by AQD and funded by the Japanese Trust Fund. During the book launching, AQD Scientist and one of the four editors of the proceedings, *Dr. Frolan Aya*, underscored that the publication is a valuable reference to find solutions to the challenges faced by aquaculture stakeholders.



Training and Study on Gender Integration in Fisheries Management in Thailand

SEAFDEC/TD in collaboration with the Rayong Marine Fisheries Research and Development Center (EMDEC) of the Department of Fisheries (DOF), Thailand conducted the “Training on Gender Analysis and Questionnaire Development” from 12 to 13 October 2021 which was participated by 10 officers from EMDEC. The aims of the Training were to build the capacity of the participants and enhance their understanding of gender integration in fisheries and develop the questionnaire for the study on gender integration in fisheries management.

Subsequently, a study on gender in fisheries management in Rayong Province, Thailand was conducted from 14 to 22 October 2021 to obtain an understanding on the roles of women and men in fisheries and identify the key success of the Kaoyod Fishers Group. The data collection, analysis, and validation were carried out using the questionnaire with 43 respondents who provided information on fishing and fishers group activities. It was found that the domestic roles between women and men were equal, while the roles in fisheries indicated that activity on fishing at sea was carried out

(Continued on Page 21)

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.

SEAFDEC ADDRESSES

SECRETARIAT

P.O. Box 1046, Kasetsart Post Office,
Chatuchak, Bangkok 10903, Thailand
Tel: +66 2940 6326 Fax: +66 2940 6336
E-mail: secretariat@seafdec.org
<http://www.seafdec.org>

TRAINING DEPARTMENT (TD)

P.O. Box 97, Phrasamutchedi,
Samut Prakan 10290, Thailand
Tel: +66 2425 6100 Fax: +66 2425 6110 to 11
E-mail: td@seafdec.org
<http://www.seafdec.or.th>

MARINE FISHERIES RESEARCH DEPARTMENT (MFRD)

52, Jurong Gateway Road,
#14-01, Singapore 608550
Tel: +65 9046 4787; Fax: +65 6334 1831
E-mail: Ong_Yihang@sfa.gov.sg
<http://www.seafdec.org>

AQUACULTURE DEPARTMENT (AQD)

Main Office: Tigbauan, 5021 Iloilo, Philippines
Tel: +63 33 330 7000, 511 9170
Fax: +63 33 330 7002

Manila Office: Rm 100-E, G/F, Philippine Social
Science Center (PSSC) Commonwealth Avenue, Diliman,
Quezon City 1101, Philippines
E-mail: aqdchief@seafdec.org.ph
<http://www.seafdec.org.ph>

MARINE FISHERY RESOURCES DEVELOPMENT AND MANAGEMENT DEPARTMENT (MFRDMD)

Taman Perikanan, Chendering
21080 Kuala Terengganu, Malaysia
Tel: +609 617 5940, 617 1543
Fax: +609 617 5136
E-mail: mfrdmd@seafdec.org.my
<http://www.seafdec.org.my>

INLAND FISHERY RESOURCES DEVELOPMENT AND MANAGEMENT DEPARTMENT (IFRDMD)

Jl. Gub. HA. Bastari No.08 Rt.29 Rw.07 Kel.Silaberanti Kec.
Seberang Ulu I-Jakabaring, Palembang 30252
South Sumatra, Indonesia
Tel: +62 711 5649600; Fax: +62 711 5649601
E-mail: ifrdmd@seafdec.id
<http://www.seafdec.id>

Advisory Board:

Malinee Smithrithee,
Secretary-General and TD Chief
Koichi Honda,
Deputy Secretary-General and TD Deputy Chief
Ong Yihang, *MFRD Chief*
Dan D. Baliao, *AQD Chief*
Masaya Katoh, *MFRDMD Chief (Acting)*
Zulkarnaen Fahmi, *IFRDMD Chief*

Editorial Board:

Nualanong Tongdee,
Information Program Coordinator
Worawit Wanchana,
Policy and Program Coordinator
Saivason Klinsukhon, *Senior Information Officer*

Editors in Chief:

Nualanong Tongdee
Shiela Villamor Chumchuen

Editors:

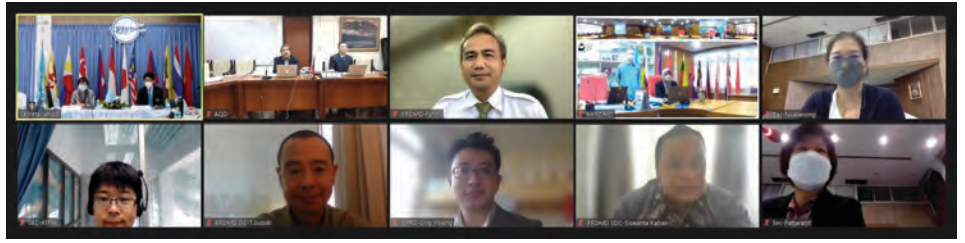
Saivason Klinsukhon (Secretariat)
Kongpathai Sarapaivanich (TD)
Ong Yihang (MFRD)
Edgar Amar (AQD)
Mazalina binti Ali (MFRDMD)
Dina Muthmainnah (IFRDMD)

Layout: Sunutta Pudtal

2021 SEAFDEC Department Chiefs' Meeting organized

The "SEAFDEC Departments Chiefs' Meeting" convened on 2 December 2021 through the virtual platform was attended by the SEAFDEC Secretary-General, Deputy Secretary-General, SEAFDEC Department Chiefs and senior officials from the SEAFDEC Secretariat, TD, MFRD, AQD, MFRDMD, and IFRDMD.

The Meeting was informed on the recommendations provided to SEAFDEC during the 53rd Meeting of SEAFDEC Council, 44th Meeting of SEAFDEC Program Committee, and 24th Meeting of ASEAN-SEAFDEC Strategic Partnership of the Fisheries Consultative Group, and discussed the progress of the actions made by the Departments. For the information-related matters, the Meeting took note of the results of the 22nd Meeting of the SEAFDEC



Information Staff Program, especially on the issues that need to be considered by the concerned Departments such as hosting the repositories of SEAFDEC Secretariat, TD, and MFRDMD at AQD and theme of SEAFDEC Calendar 2023. In addition, the Meeting also took note of the progress of preparation of the Southeast Asian State of Fisheries and Aquaculture (SEASOFIA) 2022 and the Study on Impacts of the COVID-19 Pandemic on Fisheries Sector of the ASEAN-SEAFDEC Member Countries. Regarding the implementation of the

Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030 (RES&POA-2030), the Meeting was informed on the planned activities on monitoring and evaluation with the involvement of the SEAFDEC Departments and Member Countries. Furthermore, the Meeting discussed the preparation of the 54th Meeting of SEAFDEC Council in 2022 and the plan of SEAFDEC to celebrate the International Year of Artisanal Fisheries and Aquaculture 2022 (IYAFA 2022).



New Chief of SEAFDEC/IFRDMD



Mr. Zulkarnaen Fahmi

On 28 December 2021, *Mr. Zulkarnaen Fahmi* started his term as the Chief of IFRDMD. *Mr. Fahmi*, as he is fondly called, was approved by the SEAFDEC Council to succeed *Dr. Arif Wibowo* whose term of duty at IFRDMD ended in December 2021. In addition to his post as the Chief of IFRDMD, he is also the Head of Research Institute for Inland Fisheries and Extension of the Ministry of Marine Affairs and Fisheries in Palembang, Indonesia. *Mr. Fahmi* began his career as a researcher at the Centre of Fisheries Research and Development in Jakarta,

Indonesia in 2005. He is a scientist and expert on marine and freshwater fish stock assessment and published several scientific publications. He is also an active member of various fisheries management organizations and involved in the Tuna Stock Assessment Working Group. His knowledge and expertise in fisheries research and management would significantly contribute to the programs and activities of IFRDMD on inland fisheries development in the Southeast Asian region.

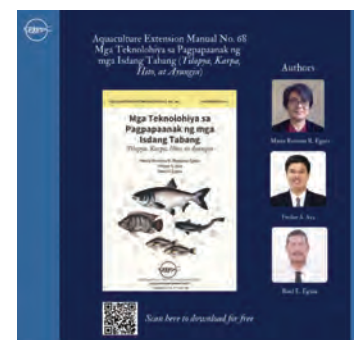
During the first meeting with the IFRDMD staff, *Mr. Fahmi* stressed the importance of IFRDMD's work plan on inland fisheries in Southeast Asia to respond to the issues, especially the sustainability of fishery resources, water quality, food security, and poverty alleviation. He encouraged all the staff to work with strong commitment. IFRDMD staff warmly welcomed him and looked forward to serving better the needs of inland fisheries stakeholders in the SEAFDEC Member Countries.



AQD launched two new publications

SEAFDEC/AQD organized the virtual Book Launching event on 16 December 2021. A manual on aquaculture techniques for freshwater species written in the Filipino language and a collection of scientific articles on sustainable aquaculture, resource enhancement, and aquatic animal health were published and made available for free download.

The latest addition to Aquaculture Extension Manual (AEM) series of AQD is "Mga Teknolohiya sa Pagpapanaan ng mga Isdang Tabang," a four-in-one manual on the hatchery of tilapia, carp, catfish, and silver tharapon written in



(Continued on Page 23)