



Training Course on Mariculture Technologies in Asia-Pacific

The Yellow Seas Fisheries Research Institute (YSFRI) convened a free online Training Course on Mariculture Technologies in the Asia-Pacific Region from 19 to 23 September. The course was organised by YSFRI, NACA, the Qindao Marine International Cooperation Center and the Asia-Pacific Fishery Commission. The course was guided by the Chinese Department of International Cooperation and Bureau of Fishery and Fishery Law Enforcement, Ministry of Agriculture and Rural Affairs, and the Asia-Pacific Fishery Commission.

The objectives of the training were to strengthen human resources, upgrade the management and technology level of marine aquaculture and to contribute to sustainable development of Belt and Road developing countries and, more broadly, the world.

The training was principally aimed at government officers, researchers, enterprise managers and technicians from developing countries. Over 150 people from 21 countries participated in the course. Participants will receive a certificate in due course.

The programme included:

- Aquaculture in China.
- Introduction to the Yellow Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences.
- Progeny production and culture technology of marine fish.
- Aquaculture of sea breams.
- Global aquaculture development status and technology innovation.
- Tropical coral reef fish breeding and culture technology.
- Selective breeding for Pacific white shrimp, *Penaeus vannamei*: a case analysis.
- Studies on the artificial culture techniques of marine crab in China.
- History, current status of marine shellfish culture and the major cultured species in China.
- Theory and technology of *Porphyra* culture.
- Breeding and culture of sea cucumber (*Apostichopus japonicus*) in China.



- Best management practices for feeds and feeding.
- Epidemiology of farmed shrimp and biosecurity.
- Operational training of rapid detection for aquaculture pathogens.
- Viral nervous necrosis of teleost fish.
- Diagnostic methods for the detection of acute hepatopancreatic necrosis disease.
- Development of coastal integrated multi-trophic aquaculture in China.
- Seawater pond integrated multi-trophic aquaculture.
- Seafood products processing.
- Marine biotoxins and food safety.
- The International Consortium on Artemia Aquaculture: Relevance to larviculture.
- The status of aquaculture development in the Asia-Pacific region.

NACA would like to thank the YSFRI, MARA and their staff for sharing their expertise with the network through this training course.

FAO/NACA Virtual Workshop on Aquaculture Transformation in Asia and the Pacific Region

At the current rate of growth, the planet will have to feed an additional 2 billion people by 2050, requiring an increase in food production of 60–70 percent from current levels. Fish and other aquatic animals and plants are a key part of our future food and nutrition supply and yet many challenges will need to be overcome to grow and sustain aquatic food systems.

'Blue Transformation' is a vision for FAO's work on aquatic food systems for the future of fish and other aquatic foods to achieve the objectives of the 2030 Agenda for Sustainable Development and the FAO aspiration of leaving no one behind through sustainable, inclusive, and resilient food systems for better production, better nutrition, better environment, and a better life.

Blue Transformation requires actions in three major areas:

- Promoting the sustainable intensification and expansion of aquaculture to respond to the growing global demand for aquatic foods.
- Ensuring the sustainable management of all fisheries to deliver healthy stocks, restore ecosystems and secure equitable livelihoods for all.
- Supporting the upgrading of aquatic value chains to improve the social, economic, and environmental outcomes of aquatic food systems.

Blue Transformation cannot be achieved without innovative partnerships. It requires a commitment from international partners, national and local governments, local communities, consumers, farmers and other private sector actors, to work together towards sustainable and healthy aquatic food systems. With the right approach and united action there can be a sustainable intensification and expansion of aquaculture to respond to the demand for aquatic food at the scale needed.

There is a need now to translate the vision for Blue Transformation into clear and workable strategies for transforming the aquaculture sector, recognising the target of 35 percent growth in global sustainable aquaculture production by 2030. The Shanghai Declaration provides some more specific guidance on maximising aquaculture's contribution to the 2030 Agenda and its SDGs .

FAO and NACA jointly organised the workshop from 13-14 September, via Zoom. The workshop served as a pre-consultation in preparation for a high-level meeting on Aquaculture transformation: innovations and investment for sustainable intensification and expansion of aquaculture in Asia and the Pacific region, which is scheduled for November 2022.

There were around 50 participants, including nominated technical experts and officials, representatives of NACA Lead Centres (CIFA, FARDC, FFRC, IFRO, SEAFDEC-AQD), the private sector, academic and research institutions, and other regional organisations.

Specific objectives of the workshop were to:

- Share key findings of the background papers prepared for the high-level meeting and get feedback from participants particularly on priorities for aquaculture transformation in the region.
- Validate a draft white paper on "Aquaculture transformation: innovations and investment for sustainable intensification and expansion of aquaculture in Asia and the Pacific region", which will be tabled for consideration at the high-level meeting.
- Identify follow up and collaborative actions to put aquaculture transformation into policy and practice for the region.

During the workshop, the purpose and needs for aquaculture transformation were presented together with country reports and regional synthesis, development strategies, and priority actions for transformation. Each presentation session was followed by a panel discussion to generate a more in-depth understanding on some important topics presented.

The outcomes of the workshop will be incorporated into the draft white paper to be presented for further discussion and decisions at the high-level meeting in November.

The workshop opened with a presentation on "Aquatic food systems in Asia and the Pacific Region: Transformation, opportunities and challenges", by FAO RAP; and country and regional highlights on "Strategies for aquaculture transformation", by Jiakun Xu of the Yellow Sea Fisheries Research Institute. Authors of country papers presented highlights on transformation opportunities in their own nations, which were followed by a panel discussion looking for common ground.

On the final day, a regional synthesis "Aquaculture transformation in Asia-Pacific: Key challenges, innovation and priority areas of action" was presented by Yuan Derun, NACA. This was followed by two panel discussions.

The first was on investing in aquaculture transformation in Asia and the Pacific region, featuring Sophie Ryan, Acting Lead of the Global Aquaculture CEO Roundtable and CEO of the Global Salmon Initiative, Dave Robb from SeaBos and Tom Prins from Aqua-Spark.

The final panel discussion was on vision, strategic goals, priority areas and implementation of blue transformation, featuring Wenbo Zhang, J.K. Jena (DDG ICAR, India), Yingjie Liu, Vice President of the Chinese Academy of Fisheries Sciences, and Tim Pickering from the Secretariat of the Pacific Community.

Further details on the outcomes of the high level meeting will be published on the NACA website in due course.

Belt & Road Forum for International Freshwater Fishery Industry Innovation

An online forum was held on 16 August to enable technical exchange between policymakers, fishery extension officers, researchers and entrepreneurs in development of the freshwater fisheries industry through technology innovation. The forum was held under the guidance of the Chinese Department of International Cooperation and Fishery Administration, MARA, and the Chinese Academy of Fishery Sciences (CAFS). It was jointly organised by the Freshwater Fisheries Research Center of CAFS, and NACA.

Aquaculture technology innovation plays a catalytic role in transforming aqua-food systems and accelerating progress towards achieving the Sustainable Development Goals (SDGs). Innovative technologies and systems provide a range of solutions that can increase aquaculture productivity and efficiency, enhance farmers' access to rural services, and improve decision and policy making processes. For example, as seen from the response to the COVID-19 pandemic, digitisation technologies can open new markets through digital marketplaces and e-commerce to reach the last mile.

Belt and Road countries are experiencing fast population growth. Employment and food security should be top concerns for the people in the region. According to the Global Food Security and Nutrition Status issued by UN (2022), there are 800 million people suffering starvation in 2021, an increase of 150 million since the beginning of COVID-19. Obviously, the pandemic made the situation much worse.

Nevertheless, the pandemic pushed the aquaculture industry to innovate even faster. In responding to the challenges posed by the pandemic, many young entrepreneurs in Africa have explored innovative ways of adapting their businesses to the changing market conditions (FAO, 2020). But progress is uneven in geographic and socio-economic terms and in many areas people have a lower access to technological innovations and concepts. There remain several barriers to adoption of new concepts in most rural areas of the Belt and Road countries, such as infrastructure, affordability, and literacy and skills. Removal of these barriers is crucial to leverage new technologies' potential for achieving the SDGs. It is important to address persistent barriers such as the lack of new skills and customised technical solutions that can be easily up taken by relevant stakeholders.

Technology innovation is essential to the future workforce in aquaculture. It is a strong enabling factor for better productivity, better nutrition, better environment and better life. Governments and the private sectors can work together to create more opportunities to demonstrate and extend innovative technologies through policy support, education programs, capacity building and financial assistance.

The forum focussed on innovations and developments in freshwater fishery biotech, breeding, culture models, digitisation, and industrialisation, featuring presentations and discussions from experts of international organisations, the Chinese Academy of Sciences, Chinese Academy of Engineering, universities and entrepreneurs in virtual exchanges and discussions. The forum sought to find solutions for industry development to inform policy making in Belt and Road countries, as well as planning and implementation of relevant programmes and projects at global, regional, and national levels.

The programme included:

- The contribution of Chinese aquaculture innovation to south-south cooperation.
- Digital technology innovation and digital fishery development.
- Integrated fishery-solar low-carbon production system.
- Technological innovation promotes global food security and stability.
- Status quo and development trend of global fishery science and technology innovation.
- Prospects for sustainable development of aquaculture in southeast Asia.
- Current situation and future development direction of aquaculture science and technology in central and eastern Europe.
- Aquaculture technology innovation in Indonesia.
- Development and technological progress of aquaculture models in Kenya.
- Sustainable and efficient automated tilapia farming technology development in Egypt.

8th Global Conference on Gender in Aquaculture and Fisheries 21-23 November

GAF-8, the 8th Global Symposium on Gender in Aquaculture and Fisheries – will be held from 21-23 November, 2022, hosted by the Society of Fisheries Technologists (India) (SOFTI), Kochi and the ICAR-Central Institute of Fisheries Technology, Kochi.

GAF-8 is a stand-alone event, that will be packed with a variety of different activities and sessions covering all aspects. The GAF8 session and event themes, call for abstracts and other information will be available shortly.

Please see the GAF website for registration and other details:

<https://www.gafconference.org/register.htm>

Reported Aquatic Animal Diseases in the Asia-Pacific Region during the First Quarter of 2022

With the implementation of the new aquatic animal disease reporting in the Asia Pacific region from January 2021, and in lieu of the published QAAD Reports (last issue published was 4th quarter of 2020), NACA is publishing reported aquatic animal diseases submitted by countries in the Asia-Pacific region. This report covers the first quarter of 2022. The following diseases were reported:

Finfish diseases

- Infection with haematopoietic necrosis virus (IHN): Australia in wild juvenile redfin perch (*Perca fluviatilis*).
- Infection with *Aphanomyces invadans* (EUS): Australia in wild yellow bream (*Acanthopagrus australis*); Bangladesh in catla (*Catla catla*) and rui (*Labeo rohita*); India in *Channa* spp. and mrigal carp (*Cirrhinus mrigala*).
- Infection with red seabream iridovirus (RSIV): India in Asian seabass (*Lates calcarifer*)
- Viral encephalopathy and retinopathy (VER): Australia in farmed giant grouper (*Epinephelus lanceolatus*) and farmed pot bellied seahorse (*Hippocampus abdominalis*); Chinese Taipei in hybrid grouper (*Epinephelus fuscoguttatus* x *E. lanceolatus*).
- Grouper iridoviral disease (GIV): Chinese Taipei in hybrid grouper and blackhead seabream (*Acanthopagrus schlegelii*).
- Carp edema virus (CEV): India in koi carp (*Cyprinus carpio*).
- Infection with Tilapia lake virus (TILV): India in tilapia (*Oreochromis niloticus* and *O. mossambicus*); Philippines in tilapia (*Oreochromis* spp.).

Molluscan diseases

- Infection with abalone herpesvirus: Australia in wild green lipped abalone (*Haliotis laevigata*) and black lipped abalone (*H. rubra*).

Crustacean diseases

- Infection with white spot syndrome virus (WSSV): Chinese Taipei in whiteleg shrimp (*Penaeus vannamei*); India in *P. vannamei*; Philippines in PLs, juveniles, grow-out and broodstock of *P. vannamei*, eggs, PL and broodstock of *P. monodon*, grow-out of *Macrobrachium rosenbergii* and broodstock of mudcrab (*Scylla serrata*).
- Infection with infectious hypodermal and haematopoietic necrosis virus (IHHNV): India in black tiger shrimp (*P. monodon*); Philippines in grow-out of *P. vannamei* and eggs, PL, grow-out and broodstock of *P. monodon*.
- Acute hepatopancreatic necrosis disease (AHPND): Philippines in PL and grow-out of *P. vannamei* and nauplii and broodstock of *P. monodon*.

- Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (EHP): India in *P. vannamei*; Philippines in PLs of *P. vannamei* and *P. monodon*.

Amphibian diseases

- Infection with *Batrachochytrium dendrobatidis*: Australia in *Adelotus brevis*, *Limnodynastes peronii*, *Limnodynastes dumerilii*, *Litoria caerulea*, *Litoria ewingii*, *Litoria peronii*, *Litoria phyllochroa*, *Litoria quiritatus*, *Litoria verreauxii*, *Platyplectrum ornatum*, *Pseudophryne bibronii* and *Rhinella marina*.

Other diseases

- Bangladesh reported infection with *Streptococcus agalactiae* in tilapia (*Oreochromis niloticus*) and climbing perch (*Anabas testudineus*), and infection with *Aeromonas* sp. in climbing perch and shing catfish (*Heteropneustes fossilis*).
- India reported infectious spleen and kidney necrosis virus (ISKNV) in angel fish (*Pterophyllum scalare*).

E.M. Leaño
Senior Programme Officer
Aquatic Animal Health Programme

The online version of this report, and the QAAD series, is available from:

<https://enaca.org/?id=1220>

International Training Course on Biology and Pathology of the Penaeid Shrimp 2022

The course will be held at Centex Shrimp, Faculty of Science, Mahidol University in Bangkok, Thailand, from 14-25 November. Highlights of the course include:

- Updates on major shrimp diseases including EHP, white faeces, and AHPND.
- Shrimp farming systems and management.
- Shrimp molecular immunity.
- Molecular approaches for disease detection including PCR and CRISPR.
- Hands-on laboratory sessions, including pathogenic viral detection using PCR, histological preparations, EHP assays and bioinformatic analysis.
- An optional field trip to local shrimp farms in Surat Thani.

Reservations close **31 October**. For more information, please contact centexcourse2022@gmail.com or download the flyer from: <https://enaca.org/enclosure/?id=1231>

International Training Course

Biology and Pathology of The Penaeid Shrimp 2022

14 – 25 November, 2022

@ Centex Shrimp, Faculty of Science, Mahidol University, Bangkok, Thailand

FROM RESEARCH TO PRACTICAL BIOTECHNOLOGICAL SOLUTIONS FOR THE SHRIMP INDUSTRY



Highlights

- ★ Updates on major shrimp diseases (EHP, white feces, AHPND, etc.)
- ★ Shrimp farming systems and managements
- ★ Shrimp molecular immunity
- ★ Molecular approaches for disease detection (PCR, CRISPR, etc.)
- ★ Hands-on laboratory sessions, including pathogenic viral detection using PCR, histological preparation, EHP assays, bioinformatic analysis, etc.

“Includes a field trip to local shrimp farms!”



Registration fee

For non-Thai participants

Early bird rate (now-September 16, 2022): 1,700 USD

Regular rate: 1,850 USD

(Prices exclude transfer fee)

สำหรับคนไทย

Early bird rate: ๒๒,๐๐๐ บาท

Regular rate: ๒๔,๐๐๐ บาท

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เข้าฟังเฉพาะบรรยาย ๑๒,๐๐๐ บาท

Optional field trip to Surat Thani (November 26-27, 2022)

900 USD/๑๕,๐๐๐ บาท

*round-trip flight and 1-night accommodation included

Activities

- Shrimp farm visit (3 farms)
- On-site discussion on shrimp farm management

**Reservation period:
now - October 31, 2022**

Reservation: centexcourse2022@gmail.com

Tel: 02-201-5871; Fax: 02-354-7344

100% of fee must be transferred within 14 days after reservation



Disclaimer: In the event that the minimum attendance is not reached, we reserve the right to cancel the workshop. You will be refunded for the amount you have paid.

Angkasa Putra inaugurated as first President of the South-East Asian Fisheries and Aquaculture Student Association

The South-East Asian Fisheries and Aquaculture Student Association (SEAFAS) is the first youth association that includes active students and youth in the scope of fisheries and aquaculture in South-East Asia. SEAFAS was inaugurated by the President Elect of the World Aquaculture Society – Asian Pacific Chapter, Associate Professor Dr Krishna Salin.

The SEAFAS Declaration was carried out as one of a series of events in the Blue Economy Conference and Trade Exhibition 2022 which was held at the Madidihang Auditorium of the AUP Polytechnic (Politeknik Ahli Usaha Perikanan) – the Ocean Institute of Indonesia, Monday 22 August 2022.

Angkasa Putra from AUP Polytechnic was elected as the first President of SEAFAS. He has published more than 30 articles with on marine and fisheries issues in national and international journals, proceedings, magazines, and online media as a positive contribution to the development and improvement of science through youth perspectives. He was inaugurated following a statement by the President Elect of World Aquaculture Society – Asian Pacific Chapter through the Charter of Appreciation and presentation of the SEAFAS flag.



Angkasa Putra, first President of the South-East Asian Fisheries and Aquaculture Student Association, receiving flag from Salin Krishna, President Elect of WAS Asian-Pacific.



“Hopefully SEAFAS will become a new energy in gathering creative, innovative, inclusive, visionary, and implementable thoughts in improving the quality of human resources and developing ASEAN fisheries and aquaculture. Global scientific forums provide a golden opportunity to bridge these thoughts. In addition, the critical spirit of enthusiasm, strong literacy, and optimism are internal weapons to support the dream of the implementation”, said Angkasa Putra.



The Minister of Marine Affairs and Fisheries of the Republic of Indonesia opens the Blue Economy Conference and Trade Exhibition.

The declaration and inauguration were witnessed by the Minister of Marine Affairs and Fisheries of the Republic of Indonesia (Ir. Sakti Wahyu Trenggono, MM, IPU), the Envoy of the President Seychelles for ASEAN (Mr Nico Barito), Deputy Head of Mission Norway Embassy for Indonesia (Mr Kristian Netland), Head of Research and Human Resources for Marine and Fisheries (Dr I. Nyoman Radiarta), the representative of Michigan State University USA (Dr Lauren Jescovitch), Director General of Capture Fisheries (Dr Muhammad Zaini), Director General of Power Strengthening Competitiveness of Marine and Fishery Products (Ir. Artati Widiarti, MA), Director General of Marine Spatial Management (Irjen Pol. Drs Victor G. Manoppo, MH), Director General of Supervision of Marine and Fishery Resources (Laksamana Muda TNI Adin Nurawaluddin, M. Han), Head of the Fish Quarantine, Quality Control, and Safety of Fishery Products (Dr Pamuji Lestari), Director General of Aquaculture (Dr Tb. Haeru Rahayu), Director of AUP Polytechnic (Dr Muhammad Hery Riyadi Alauddin), the representative of Tanin Sevnica Slovenia (Dr Rahul Gadipathi), the representative of MOTIV Cargill Vietnam (Dr Nguyen Duy Hoa), Echelon II Scope Officer of the Ministry of Marine Affairs and Fisheries, expert staff to the Minister of Marine Affairs and Fisheries, the representative of Telkom Indonesia - Indonesia Telecommunication and Digital Research Institute, the representative of the Philippines, the representative of Biocycle, CPP, business partners and industry, Ministry of Marine Affairs and Fisheries, and officials, lecturers, staff, AUP students, and participants in the 2022 Blue Economy Conference and Trade Exhibition.

Artemia webinars: Video recordings of technical presentations available

The International Artemia Aquaculture Consortium, hosted by NACA, recently convened two technical webinars on *Artemia*. As foreshadowed in the last issue, the technical presentations of both are now available for viewing.

Webinar on management of Artemia resources of the Great Salt Lake, Utah USA

The International Artemia Aquaculture Consortium (IAAC) hosted a webinar on Management of the Artemia Resources of the Great Salt Lake, 5 May 2022, at 14:00 UTC. The purpose of the webinar was to familiarise participants with recent international developments in *Artemia* research cooperation, and to examine the Great Salt Lake as a case study in successful management of *Artemia* resources in a multi-stakeholder environment. The programme / available recordings are as follows:

Link: <https://artemia.info/news/?id=33>

- Welcome and aims of the webinar
Patrick Sorgeloos, Artemia Reference Center, Belgium
- History of sustainable harvest management on Great Salt Lake
Thomas Bosteels, Great Salt Lake Brine Shrimp Cooperative Inc., Utah USA
- Initial policy efforts to protect Great Salt Lake
Timothy Hawkes, Utah State Representative
- Managing salinity and nutrients on Great Salt Lake: A cooperative approach involving multiple stakeholders
Thomas Bosteels, Great Salt Lake Brine Shrimp Cooperative Inc., Utah USA
- More mature law and policy efforts to protect water supply: Enhanced stakeholder engagement, what does the future hold?
Timothy Hawkes, Utah State Representative
- Q&A
Moderated by Simon Wilkinson, Network of Aquaculture Centres in Asia-Pacific

- Closing remarks
Mike Rust, National Oceanic and Atmospheric Administration, USA

Webinar on the history of Artemia activities in Africa

The Kenya Marine and Fisheries Research Institute in partnership with the International Artemia Aquaculture Consortium hosted a webinar on the History of Artemia in Africa on 4 May 2022.

A diverse range of *Artemia* activities in different African countries were presented, to take stock of where the continent is, explore opportunities and address the various challenges impeding the production and utilisation of *Artemia* for improved livelihoods and overall aquaculture development in Africa. The programme / available recordings are as follows:

Link: <https://artemia.info/news/?id=32>

- The programme, for which recordings are available, was as follows:
- Welcome remarks
Eric Okuku, KMFRI Mombasa Centre Director
 - Aim of the workshop
Patrick Sorgeloos, Artemia Reference Center, Belgium
 - Introduction of *Artemia* in Keyna
Prof. Rasowo, Technical University of Mombasa, Kenya & Eddy Naessens, INVE Aquaculture, Belgium
 - History of *Artemia* activities in Kenya
Morine Mukami, Kenya Marine and Fisheries Research Institute
 - History of *Artemia* activities in Tunisia
Mohamed Salah Romdhane, National Institute of Agricultural Sciences of Tunisia
 - History of *Artemia* activities in Libya
Gilbert Van Stappen, Artemia Reference Center, Ghent University, Belgium
 - History of *Artemia* activities in Uganda
Martin Serrwanda, Mountains of the Moon University, Uganda



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NACA is a network composed of 19 member governments in the Asia-Pacific Region.



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- History of *Artemia* activities in Tanzania
Imani Kapinga, Tanzania Fisheries Research Institute, Tanzania
- History of *Artemia* activities in Mozambique
Rafael Rafael, Aquaculture Research Center, Mozambique
- History of *Artemia* activities in South Africa
Horst Kaiser, Rhodes University, Grahamstown, South Africa
- History of *Artemia* activities Algeria, Eritrea, Namibia, Madagascar and Botswana
Patrick Sorgeloos, Artemia Reference Center, Ghent University, Belgium
- Q&A, discussion, conclusions and recommendations
- Closing remarks
Simon Wilkinson, Network of Aquaculture Centres in Asia-Pacific