



Joint FAO-NACA workshop reviews aquaculture farming system classification scheme



Left to right: Mr Zhou Xiowei (FAO), Dr Cherdhak Virapat (DG, NACA) and Prof. Xu Pao (DG, Freshwater Fisheries Research Center).

Aquaculture is a fast moving industry. Continuous innovation is driving the adoption of new technologies and farming systems. As a result there is a need to update FAO's farming system classification scheme. FAO and member countries use this scheme for the preparation of statistical data.

NACA and FAO organised an expert workshop to review the existing classification system. The workshop aim was to bring the system up to date with contemporary practices. The Freshwater Fisheries Research Centre (Wuxi, China) hosted the workshop from 3-5 December 2018. FFRC is a NACA Regional Lead Centre.

Prof. Xu Pao, Director General of FFRC opened the workshop. Dr Cherdhak Virapat, Director General of NACA gave opening remarks. Mr Zhou Xiaowei of FAO (but also a former FFRC and NACA staff member), welcomed participants.

Invited experts included:

- Mrs Liu Yadan (Chinese Fishery Society).
- Mrs Gao Hong Quan (National Fisheries and Aquaculture Technology Center, China).

- Prof. Peter Edwards (retired, Asian Institute of Technology).
- Prof. Pham Quoc Hung (Nha Trang University, Vietnam).
- Mr Aji Bayu (Ministry of Marine Affairs and Fisheries, Indonesia).
- Mr Suthep Putippayawongsa (Coastal Aquaculture Specialist, Thailand).
- Mr Pongpat Boonchuwong (Department of Fisheries, Thailand).

Experts presented recent advances in farming systems in their respective countries and sectors. Participants reviewed the current farming system classification scheme and proposed amendments.

We were also privileged to visit two innovative farms to observe new practices, one growing growing European pike perch and a second using an in-pond raceway system, described in a separate article (this issue). The workshop outcomes will be published as an FAO Circular in due course. The NACA Secretariat would like to thank FFRC for hosting the meeting and for their excellent hospitality.

Join us for the Global Conference on Aquaculture 2020

FAO and NACA have signed an agreement to convene a global conference on aquaculture in 2020. This will be the fourth conference in a series that began at the dawn of the industry in Kyoto, 1976.

The *FAO Technical Conference on Aquaculture* was the first mainstream international aquaculture meeting. It marked a turning point in the transformation of the industry from art to science. It was the first meeting to consider the social, food security and regulatory aspects of aquaculture development. The conference adopted the *Kyoto Declaration on Aquaculture*, the first such policy instrument.

FAO and NACA convened a second conference in Bangkok, 2000. The *Global Conference on Aquaculture in the Third Millennium* reviewed progress. Aquaculture had become more science-based, and more important in a rural development context. The conference adopted the *Bangkok Declaration and Strategy on Aquaculture Development*. The declaration provides guidance for sustainable socioeconomic and environmental aquaculture development.

The *Global Conference on Aquaculture 2010*, Phuket reviewed the changing role of aquaculture. Social issues including gender had come to the fore. Technological advances were surging. Disease issues were rife. Decades of experience allowed more informed debate on these issues. The conference adopted the *Phuket Consensus*. This was a re-affirmation of commitment to the principles of the Bangkok Declaration.

Aquaculture 2020 will be held late September in Shanghai, China. Arrangements, programme and partner details will be announced via the NACA website in due course.

Expert Consultation on Genetically Responsible Aquaculture

The loss of genetic diversity in broodstock remains an issue of great concern. Many standard hatchery practices can reduce the genetic diversity of seed. The impact on farm productivity and stock health is unknown but may be significant.

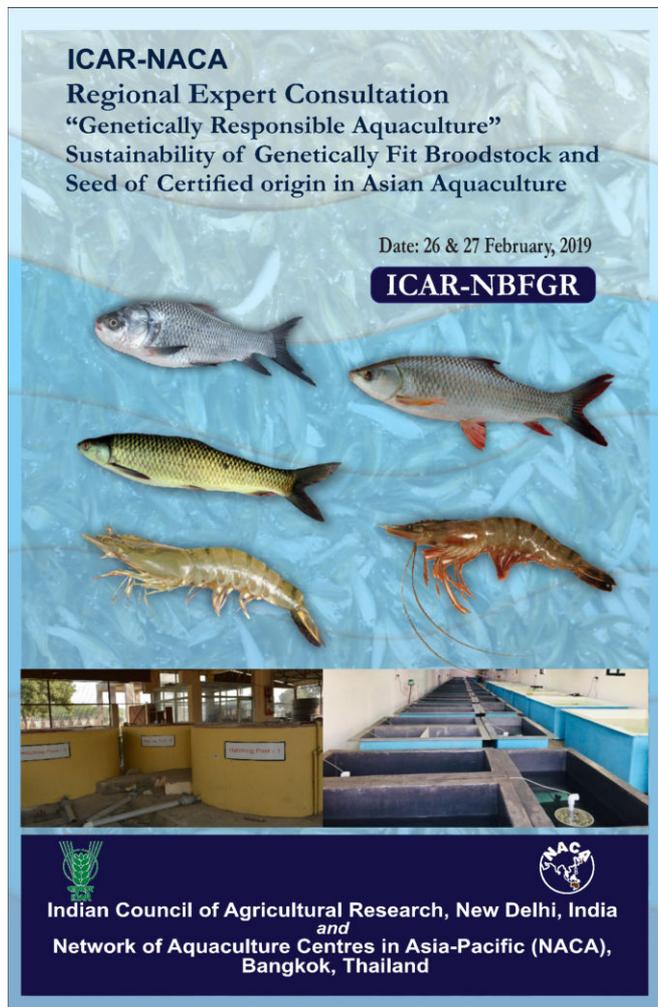
Commercial interests have eased these concerns by offering stocks selected for improved growth. Specific pathogen free seed is also available for some species. But in recent years there has been evidence of seed substitution by third parties. It is difficult for farmers to know if they are getting what they pay for.

The Indian Council of Agricultural Research (ICAR) and NACA will convene the consultation from 26-27 February 2019. The consultation will be hosted by the ICAR National Bureau of Fish Genetic Resources (NBFGR) in Lucknow, India.

The aim of the consultation is to find ways to assure genetic quality in seed production systems. Experts will discuss broodstock management and mechanisms to verify seed origin and quality. The goal is to empower farmers and monitoring agencies with quantifiable standards. Procedures for germplasm exchange and maintenance of on-farm genetic diversity will be proposed.

Representatives from NACA member states are invited to attend. Local expenses (accommodation, meals and transportation) will be borne by the organisers. Official nominees should contact kuldeepklal@gmail.com by **20 January 2019**. Please send a copy of your passport to support the necessary clearances.

For more information please download the prospectus from: <https://enaca.org/?id=1027>



The poster features a blue background with images of various aquatic species: a silver fish, a red fish, a yellow fish, and two shrimp. Below these images is a photograph of a modern aquaculture facility with rows of blue tanks. The text on the poster includes the title 'ICAR-NACA Regional Expert Consultation "Genetically Responsible Aquaculture"', the subtitle 'Sustainability of Genetically Fit Broodstock and Seed of Certified origin in Asian Aquaculture', the date 'Date: 26 & 27 February, 2019', and the logo for 'ICAR-NBFGR'. At the bottom, it lists the organizing institutions: 'Indian Council of Agricultural Research, New Delhi, India and Network of Aquaculture Centres in Asia-Pacific (NACA), Bangkok, Thailand'.

Strengthening governance in aquaculture

Asia has experienced rapid development of aquaculture in the past four decades. This has improved food security, livelihoods and economic development in many Asian countries. It has also become the main source of fish products in the region.

Per capita consumption of fish in Asia increased from 10 kg in 1977 to 24 kg in 2015. Fish now comprises 23 percent of total animal protein in Asian diets. As of 2016, the total value of Asian aquaculture reached 210 billion US dollars. Aquaculture provided 18.5 million jobs in primary production. It provided an equal number in downstream industries.

Yet aquaculture as a new industry is poorly regulated in many countries. Its development has come with environmental problems, animal disease and food safety issues. These have resulted from both inadequate laws and poor enforcement.

By 2030 the world will need another 30 million tonnes of food fish to meet growing demand. Most of this must come from aquaculture. The governance of the aquaculture sector must improve to achieve this sustainably.

The Asia-Pacific Fishery Commission has identified governance as a threat to sustainable aquaculture growth. In response, NACA and FAO will organise a consultation to discuss governance of the sector. FAO has also commissioned NACA to prepare a regional review of regulations.

The review will examine demographic changes in Thai and Cambodian fishing communities:

- What are the changes in demography (ageing, migration) in the fishing communities?
- How are people adjusting in response to changing fisheries conditions and labour availability?
- What are the consequences from these adaptation strategies? Are there any gender differences in the impact of such adaptation strategies?
- What support do fishing communities need to remain sustainable?

Further details on the consultation will be published on the NACA website in due course.

Pike perch and in-pond raceways



In pond raceway system producing largemouth bass. Current through the system is generated by air lift, with the blowers visible on the right side streaming air across angled plates.

During our visit to China for the FAO-NACA workshop on classification of aquaculture farming systems (see cover article), we were fortunate to visit two innovative farms in the Wuxi area.

In-pond raceways

In-pond raceway systems are gaining popularity in China. We visited a farm using in-pond raceways to grow largemouth bass *Micropterus salmoides*, pictured above.

The farm operates a battery of five floating raceways within a five hectare pond. Each raceway is approximately five metres wide, 20 metres long and 2.5 metres deep. Made of fibreglass, the raceways have a plate set on a 45 degree angle at the front end, deep side first. A blower emits a stream of bubbles along the bottom of the plate, generating flow through the raceway by air lift. At the rear of the raceway a sump collects solid wastes for removal by pump.

Concentrating fish in the raceway allows for efficient feeding, aeration and monitoring. As the raceways are of the floating variety, the farm can move them if needs be. The removal of solid wastes reduces the nutrient load on the pond environment.

The raceway system has allowed the farm to increase production. Before adopting the raceway system the farm produced around 72 tonnes of fish from the pond. Each raceway can produce around 15-20 tonnes of fish per year for a total production of 75-100 tonnes. Fish can still be grown in the surrounding pond, although at a reduced rate.

The raceways required significant capital investment, around two million Yuan (US\$300,000). This included all equipment including watch house, feed store and backup generators. The rate of return was high; farm gate revenue is around seven million Yuan per year. The capital investment was rapidly recovered but high-value species must be grown to achieve this. The farm has a second production site producing Japanese seabass, *Lateolabrax japonicus*.

The farm has encountered one issue with the system. As largemouth bass have sharp spines they can injure one another in the close confinement of the raceways.

European pike perch

The second farm we visited is growing pike perch, *Sander lucioperca*, native to continental Europe and western Asia. Pike perch is a cool to temperate water species. The fish is being grown in deep ponds of around 4.5 metres depth to help maintain a steady temperature. The farm recirculates water, there is no discharge.

The 40 hectare farm has a hatchery on site and produces its own seed. Fish are stocked in May at around 5cm body length and at a density of around 18,000 individuals per square metre. The growout period is twelve months. Growth is not uniform with fish varying from 0.6 - 1 kilogram. The farm also sells seed to other farmers.

Pike perch need live feed as they will only eat dead fish when very hungry. A local carp species is also grown on site as forage. Each hectare of pike perch needs around 2.5 to 3 hectares of forage fish to support it. The forage fish are fed with commercial feeds. The farm has three sites with total production of pike perch exceeding 100 tonnes.

An unusual species in the local context, pike perch attracts a good market price. The farm receives around US\$15 per kilogram with retail at least double that. The live restaurant price is around US\$87 per kilogram. The farm has expanded into agro-tourism including fee-paying fishing. It has an attached restaurant where anglers can eat as well. Inflatable carry bags allow anglers to take their fish home live, should they choose.

Incidentally, there is one recorded case of a large pike perch (8 kilograms) attacking and injuring tourists in a Swiss lake. The fish was later caught, cooked and served to the victims by the local police!

Real-time water quality monitoring

Both farms featured real-time water quality and video monitoring systems. Probes in each pond, and in the rear of the raceway system, measure water quality. The data is broadcast live to a base station in the main office and displayed on a screen in view of the manager's desk. Staff can access the real time data on their mobile phones. The system logs the data and can broadcast warnings to staff if a problem arises.



European pike perch in an inflatable carry case to allow anglers to take their catch home live.



On-site pike perch hatchery.



Grow out ponds are 4.5 metres deep to stabilise water temperature.

Quarterly Aquatic Animal Disease Report, April-June 2018

The April-June edition of the Quarterly Aquatic Animal Disease Report contains information from twelve governments in the Asia-Pacific region. The foreword discusses three recent aquatic animal health consultations:

- ASEAN Regional Technical Consultation on Aquatic Emergency Preparedness and Response Systems for Effective Management of Transboundary Disease Outbreaks in Southeast Asia, held 20-22 August 2018.
- Regional Consultation and Related Study on Antimicrobial Resistance Risk to Aquaculture in Asia, 4-6 September 2018.



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



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- Preliminary Consultation on Monitoring of Antimicrobial Resistance in Bacterial Pathogens in Aquaculture, 16-17 September 2018.

The report is available for download from: <https://enaca.org/?id=1024>

