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TARS 2023 Meeting Report

MEETING REPORT

TARS 2023 – SHRIMP AQUACULTURE - REGENERATION

The goal of TARS 2023 was the **Regeneration** of Asia's shrimp aquaculture, bringing stakeholders together to proactively improve the culture model, mitigate disease, match nutrition to genetics, focus on sustainability and develop a strategic plan. The message was that evolving is not enough, regeneration is needed, and responsibility falls on all in the industry. *Shrimp Aquaculture: Regeneration* raised the bar with huge interest among stakeholders across Asia.

- *The first meaning of regeneration focused on new efficiency models, while the second introduced a succession plan for the next generation of shrimp aquaculture professionals.*
- *Technological advancements in disease prevention, smart feed management, pond capacity modelling, market quality, and LCAs are essential for future-proofing shrimp aquaculture in Asia.*
- *A revival in black tiger shrimp necessitates comprehending the specific requirements of primary and premium markets.*
- *During the roundtable breakout session, participants established several traceability criteria between two segments in preparation for sustainability in shrimp aquaculture.*

TARS 2023: Shrimp Aquaculture: Regeneration, held in Bali, Indonesia, was a success. From August 16-17, 253 participants attended, including 70 from Indonesia. The event featured 43 speakers, session chairs, and panelists across 10 sessions aimed at enhancing shrimp farming. TARS 2023 was supported by the Directorate of Aquaculture, Ministry of Marine Affairs and Fisheries (MMAF), Indonesia. Industry partners were INVE Aquaculture, dsm-firminech, BASF, Adisseo, USSEC, USGC, DELOS Aqua, Jefo Nutrition, Grobest, SyAqua and Alltech.

The meeting reflected on the current situation in Asia's shrimp aquaculture, mired by ten-year lows in shrimp prices with a global oversupply situation. **Dr TB Haeru Rahayu**, Director General of Aquaculture, MMAF, Indonesia delivered the opening address. Indonesia has invested IDR175 billion or USD 11.4 million on its zone-based environmentally friendly pond model to spearhead shrimp aquaculture. Further expansion is planned in East Nusa Tenggara, covering an area of 1,800ha.

The flagship of TARS, The State of Industry and Challenges session had the following speakers, from left, Robins McIntosh, Charoen Pokphand Foods Public Ltd, Thailand; Haris Muhtadi, Shrimp Club Indonesia; Brett Glencross, IFFO/University of Stirling, Scotland and Chris van Bussel, Kontali, Norway. The industry panellist was S Santhana Krishnan, SK Marine Technologies, India (right). Session Chair was Ronnie Tan, U.S. Grains Council, Malaysia.

State of Industry and Challenges (SOI)

The flagship session at TARS 2023 was viewed via four vantage points:

- Why Asia's industry is lacking and stagnating within the current crisis with low prices and high production costs.
- Potential of domestic and regional markets for Asia's shrimp.
- While genetics is leading in terms of selective breeding, what is the potential for nutritional innovation?
- The case study on Indonesia's shrimp farming industry.

Lifting the dark clouds that cover Asian shrimp farming

In this presentation, **Robins McIntosh**, Executive Vice President, Charoen Pokphand Foods Public Ltd, Thailand, evaluated strengths and weaknesses of shrimp aquaculture in Asia. "In 2000, there were few issues, and technology could be applied to give a quick turnaround. Today, we have problems but are there technological solutions?"

More shrimp is being produced but without the reduction in costs of production, and markets are not increasing at the same rate. The message was "Farmers have no control on market forces but they do have control on costs. We want technology for higher productivity, with reduced costs and more efficiency. When prices recover, India and Indonesia are in the best position for the future."

Robins highlighted the need to understand and adhere to the law of carrying capacity of ponds, farms, and the environment to maintain shrimp health and reduce failure rates. Data showed that exceeding carrying capacity leads to higher failure rates and increased production costs. In 2010 (pre AHPND - acute hepatopancreatic necrosis disease), production costs were USD 2.80/kg. Post AHPND, during the recovery phase, costs were USD 3.25/kg but in 2021, costs increased again to USD 4.80-5.50/kg due to high stocking densities and other factors. Farm gate prices fell from THB254/kg (USD7.62) in 2014 to THB185/kg (USD 5.6) in 2022.

The message was that disease is not the primary problem but rather the management of systems to reduce stress and chronic mortality. The industry must return to fundamental practices, such as adjusting feeding rates to match the genetic potential of shrimp and limiting failure rates and applying second generation biosecurity.

Creating intra-Asia trade

In the last 12 months, with large drops in shrimp demand in the US and EU, shrimp exports were redirected to China which increased import volumes by 27%. Demand in other parts of Asia has remained stable. Therefore, **Chris van Bussel**, Senior Analyst, Kontali, Norway, brought the focus to marketing vannamei shrimp within Asia itself.

"There is a large potential of domestic markets to partake in Asia's supply of 2.8 million tonnes. Local consumption in Asia is led by China which is increasing at 6-7% per year," said Chris. A challenging producer is India with a minimal volume consumed locally. He categorized Asian countries into groups based on their local consumption levels, identifying highflyers (e.g. Thailand, Vietnam, South Korea) and low-hanging fruits (e.g. China, Malaysia) with substantial local consumption. Chris' overarching message was that Asia's shrimp industry should focus on developing domestic markets and intra-Asia trade to reduce reliance on exports and capitalize on growing local consumption trends.

Modelling precision nutrition with bespoke genetics

Shrimp genetics with lines from fast growth to robustness is credited for much of the expansion of shrimp farming in Asia, but it has still been elusive as to how to match nutrition to genetics to obtain the best from the shrimp. At this TARS, **Brett Glencross**, Technical Director, IFFO- The Marine Ingredients Organisation and University of Stirling, UK, discussed how to meet this challenge.

Focussing diet specifications on digestible protein and digestible energy can bring in the use of alternative and lower-quality ingredients to reduce feed costs while maintaining nutritional efficiency. Next is more precision, optimising individual levels of nutrients such as amino and fatty acids, vitamins for each animal and pellet sizes. In shrimp, the focus remains on protein demand (g/shrimp/day). Ingredient supply

remains a challenge. Today, fish meal is added at around 15% in shrimp feeds and while marine ingredients remain a strategic contributor, the importance of ingredient sustainability is growing. Using lifecycle assessment (LCA) data and databases like that of the Global Feed LCA Institute (GFLI) is becoming increasingly important.

On the interaction of nutrition and genetics, he said that by building a model it is possible to see how nutritional parameters come into play and can be manipulated to maximise the potential of a genetic line. His take was, “It is time to revisit our understanding of requirements as we increase system intensity, especially in those systems with less reliance on endogenous sources. The best is precision nutrition, but repeating nutrient requirements studies with new genotypes will be too slow and time consuming. We need to develop better models to understand the holistic requirements and then test those outputs. Fundamentally, animals require nutrients, not ingredients.”

Resilience and growth of industry in Indonesia

Indonesia aspires to be a regional leader in shrimp production, according to **Haris Muhtadi**, President of Shrimp Club Indonesia. However, the industry faces several challenges, including fragmentation with numerous small farms dispersed across the archipelago, complex distribution channels, extended transportation, and difficulties in maintaining shrimp quality. Other issues such as disease outbreaks and biosecurity also persist. "Producers are focusing on EBITDA, which drives our pursuit of precision farming. We advocate for stocking density based on carrying capacity and post larvae quality to improve survival rates."

He proposed strategies to modernize Indonesia's shrimp farming, including precision farming techniques like optimizing stocking density based on carrying capacity and improving post-larvae quality for higher survival rates, better biosecurity measures to achieve harvest targets of 20-30 tonnes/ha in most farms with lined ponds. Haris advised against expanding by adding more ponds, suggesting a focus on efficiency instead, as smaller farms (20-50 ponds) have been more sustainable and controllable than larger ones.

In marketing and branding, he suggested better strategies and unified branding for Indonesian shrimp. He recommended removing practices like prolonged soaking, which are unacceptable in Europe and China. He also proposed a campaign encouraging Indonesians to eat one shrimp daily to lessen export dependency. Indonesia could become a leading investment hub for sustainable shrimp farming but needs to attract investors first.

More on TARS 2023 raises the bar in Asia’s shrimp aquaculture industry in AquaCulture Asia Pacific, September/October 2023.

A good start with genetics, hatchery and nursery

Hatcheries and nurseries deliver good post larvae and juveniles from various genetic lines of broodstock. Entering this equation are manufacturers of early-stage feeds. How can all three come together to address the concerns of hatcheries and farmers? Over the last 10 years, breeding companies have marketed a range of genetic lines for the vannamei shrimp to meet the needs of an industry where there is no standardisation of culture systems but beset with changing environments and disease challenges.

Genetics and environment - What next

According to **Dan Fegan**, Chief Impact Officer, SyAqua Group, Thailand, it is essential for farms to focus on the basics and adapt management protocols to genetic lines for profitability and future success. Hatcheries play a significant role in providing high-quality post larvae and juveniles by combining genetics, nutrition, and management systems. While genetics contribute 10-40% to shrimp performance, environmental factors such as water quality, nutrition, stress, pathogens, and management have a greater impact.

At SyAqua, Dan explained that the genetic selection process involves the annual evaluation of 400 families, looking at growth and followed by disease challenges such as AHPND. This information is then used to select the best families to produce the next generation for commercial production. “Genetics is not a silver bullet. It will not make a bad farm good or a bad manager successful.”

Rizky Darmawan, PT Delta Marine Indonesia (left) with speakers and panellists, from right, Dan Fegan, SyAqua Group, Thailand; Steve Arce, Kona Bay Shrimp-Hendrix Genetics Aquaculture, USA; Dr Olivier Decamp, INVE Aquaculture, Thailand and Dr Craig Browdy, Zeigler Bros Inc, USA.

The days of fast innovation, low costs and high prices have ended, said Dan. Genetic improvements will continue to support improved production efficiency, but it is not enough on its own. The next era is that of "big data" where information can be collected from a large number of farms and a wide range of conditions. Automation of data collection and analysis also holds promise for better understanding and management of resources for greater profitability.

The power of the first 30 days

While post larvae represent a small component of production cost (8-10%), the first 30 days in hatcheries and nurseries can deliver strong post larvae for successful crops, impacting the profitability of a farm, said **Olivier Decamp,** R&D and Business Development Health Director at INVE Aquaculture. Shrimp production costs vary with farming models and local conditions and currently range between USD2.2 and USD5/kg. For all the main shrimp-producing areas, the production cost is equal to or higher than farmgate prices. An important metric is the failure rate, high in Asia, such as 50% in Vietnam, compared to less than 5-10% in Ecuadorian farms.

Proper hatchery rearing protocols, biosecurity measures, and optimal nutrition are essential for expressing genetic potential. Strict nursing measures either in the nucleus or broodstock multiplication centre can be compromised when moving broodstock to the hatchery. Without biosecurity procedures and the use of correct feed, the health and disease-free status of post larvae are impacted. Algae, live food, and water exchange can be a point of entry for potential pathogens.

In discussing microorganisms in the hatchery, Olivier described the k-strategists, dominant in stable conditions versus r-strategists, such as Vibrios, which are dominant under unstable conditions. Some 30-50% of the composition of the microbial communities, is linked with algae, artemia and water inputs. There are new tools to reduce these disruptions. Emphasis should be put on making the system more stable.

A panel led by Rizky Darmawan, CEO of PT Delta Marine Indonesia, discussed the influences on quality post larvae products. They concluded that generally, genetics contribute less than 20% to performance, while water quality, nutrition, stress, pathogens, and management have a stronger impact. Genetics is seen as a tool rather than a solution. Hatcheries can provide high-quality post larvae, but farm performance is influenced approximately 30% by genetics and 70% by management and environment.

More on It all starts at the hatchery level, in AquaCulture Asia Pacific, January/February 2024.

Managing productivity with disease mitigation

Major diseases in Asian shrimp farming are EHP, AHPND, white faeces syndrome (WFS), white spot syndrome virus (WSSV), and infectious myonecrosis virus (IMNV). Following two presentations on updates regarding research on *Enterocytozoon hepatopenaei* (EHP) and the use of AI and Big Data Analytics to predict disease trigger points, Dr Daranee Seguin, Thailand chaired discussions with the participation of two Industry players - Dr Loc Tran, Founder and Director of ShrimpVet Laboratory in Vietnam, and Dan Fegan, Chief Impact Officer of SyAqua Group in Thailand.

Dr Daranee Seguin, Thailand chaired the panel at TARS 2023 with industry players (from left) Dr Loc Tran and Dan Fegan and speakers, Aryo Wiryaman and Dr Kallaya Sritunyalucksana

Update on shrimp microsporidian EHP

Kallaya Sritunyalucksana, Principal Researcher of the Aquatic Animal Health Research Team at BIOTEC, NSTDA, said that EHP spreads through oral ingestion of spores, with high stocking density increasing transmission. EHP contributes to WFS when combined with bacterial infections, such as those caused by low toxin-producing Vp-AHPND. Early detection and management practices are essential for facilitating faster recovery. Though EHP is not the direct cause of WFS, it acts as a component cause when combined with bacteria.

Control strategies for EHP include SWP-PCR detection, high pH pond preparation, low-temperature live feed preparation, and identifying mechanical carriers such as bivalves. Disinfectants, including KMnO4, chlorine, and ethanol, along with freezing at -20°C, can effectively inactivate EHP spores. Heat treatment at 75°C for 60 seconds during feed processing inhibits spore infectivity. Post larvae should undergo testing twice (at PL5 and PL12) with a 7-day interval before stocking to ensure they are free of EHP.

AI and Big Data to predict disease trigger points

Aryo Wiryaman, Founder and Chairman at JALA Tech, Indonesia is convinced that AI and Big Data Analytics play a significant role in disease management, predicting disease triggers and allowing for proactive measures. He outlined the application of AI and Big Data Analytics to predict disease trigger points, improve disease management, and enhance the sustainability of shrimp farming. The predictive model focused on diseases such as AHPND, IMNV, WFS, and WSSV, emphasizing the need to incorporate additional variables and data for improved accuracy.

JALA Tech uses Random Forest models and GAN to analyze shrimp farm data, accurately predicting AHPND, WFS, and WSSV with high F1 scores. Disease prediction models for IMNV require enhancement due to high false negative rates. Incorporating additional variables and regional data is

necessary for wider application of AI-based solutions. The integration of data with automation gives opportunities for reducing disease risks and promoting sustainability in Asian shrimp farming.

More on Managing productivity with disease mitigation in AquaCulture Asia Pacific, November/December 2023.

Matching industry needs with precision shrimp nutrition

In addition to providing optimum nutrition at minimum cost, the quality of shrimp feeds also affects feed efficiency, water quality, environmental impacts, disease mitigation and sustainable production methods. Intensive shrimp culture emphasizes precision aquaculture, and feeds serve as a platform for health interventions through functional additives. Formulators aim to use feed ingredients optimally.

The above needs aligned well with the theme at TARS 2023-Shrimp Aquaculture: Regeneration. **Romi Novriadi**, Lecturer at the Jakarta Technical University of Fisheries, Ministry of Marine Affairs and Fisheries Indonesia, led a panel to tackle feed-related issues faced by farmers.

Dr Romi Novriadi, Jakarta Technical University of Fisheries, Ministry of Marine Affairs and Fisheries Indonesia, left, with the speakers; from second left; Achmad Wahyudi, Grobest, Indonesia; Chi Man, Hong Kong; Dr Ooi Ei Lin, APAC, Adisseo and Nguyen Ngoc Diem, Vietnam.

Harnessing shrimp health with functional nutrition

Ooi Ei Lin, Regional Manager Aquaculture APAC, Adisseo, Singapore, shared survey results from five Indonesian farms facing infections during the early culture phases. "Incidents increased and diversified after day 60 of culture. Multiple infections are now common." Good farm management practices, combined with functional nutrition, are crucial for preventing and managing health and nutritional diseases in shrimp farming.

Ooi stressed the importance of understanding the modes of action of functional additives to make decisions on tackling pathogens in shrimp farming. She highlighted that functional nutrition could play a significant role in disease management but emphasized the need for science-based approaches to validate the modes of action of these additives.

Trials assessed growth performance, cumulative mortality, histological effects, gene expression, and serum biomarkers. Gene expression analysis showed effects on antimicrobial peptides (penaidin and crustin), indicating immune response. Biomarkers for immune health demonstrated primed immunity during the grow-out phase, enabling shrimp to resist infections. better cellular immunity against infections compared to controls. Shrimp were challenged with *Vibrio parahaemolyticus* (Vp-AHPND) and viruses to evaluate an additive's impact on immune capacity.

Optimized feed and feeding protocols

Achmad Wahyudi, Technical Director, PT Grobest Indomakmur, Indonesia highlighted that feed quality is crucial for shrimp growth while managing costs. Key factors include nutritional value, uniformity, water stability, and palatability. Regarding feeding protocols, it was suggested that these should be tailored based on genetic lines, stocking density, and growth rate to achieve key metrics such as harvest performance, survival rate, growth rate, and feed conversion ratios (FCRs).

Sustainable feed practices, including the use of lower-protein feeds, can help minimize environmental impacts by reducing waste and improving nutrient digestibility. Farmers increased return on investment (ROI) by using functional feeds and optimized feeding protocols. In Indonesia, for instance, ROI rose from 31% with regular feed to 65% with functional feed. Additionally, collaboration between farmers, feed millers, and suppliers is important to improve feeding protocols and maximize benefits.

Breaking the mould

Mycotoxins can lead to decreased growth, weakened immune functions, and higher vulnerability to infections, resulting in considerable economic losses for farmers, said **Nguyen Ngoc Diem,** Aqua Technical Expert, APAC, dsm-firmenich. Shrimp are particularly sensitive to mycotoxins, even at low levels of contamination and their occurrences in shrimp feeds is increasing due to factors such as climate change, storage conditions, and logistical challenges. Mycotoxins can degrade protein, reduce muscle fibre density, and impact the quality of shrimp flesh. It is common to find co-contamination of multiple mycotoxins in feed samples, with their synergistic effects causing additional harm. Emerging mycotoxins also present new risks.

On control of feed raw material quality, investing in feed quality assurance, and implementing regulations to govern mycotoxin levels in feed and seafood, Diem advocated for a bottom-up approach, encouraging collaboration between farmers and feed millers to ensure proper application methods for functional additives and consistency in feed pellets.

Potential of feed enzymes

Chi Man, Technical Specialist, Feed Enzymes, Feed Performance Ingredients and Aquaculture, BASF East Asia said that while fish meal remains vital, and soybean meal offers a cost-effective alternative, other ingredients face challenges like scale, pricing, and acceptance. Plant sources such as grains and cereals are already widely studied for their anti-nutrients and enzymes to neutralize them. Based on a study at Mahidol University, Centex, and Biotec in Thailand, Chi highlighted the use of enzymes in shrimp feed to quickly degrade complex compounds like IP6 and IP5, releasing essential nutrients such as phosphorus and amino acids.

Unlike livestock, shrimp rely on the feed for pH regulation since they lack gastric acid. Positive results from the integration of phytase in shrimp feed have demonstrated up to a 30% increase in growth and a 10-20% enhancement in nutrient digestibility. Furthermore, there is the potential for cost savings in water management. An illustrative case from a farm operation in Vietnam revealed a reduction of 10-18% in total variable costs, with an additional potential saving of 5-13% on the overall bottom line. The benefits also include improved biosecurity due to decreased water exchange, and reduced phosphorus and nutrient excretion by the shrimp.

More in the article “Feed forward: Feed, mycotoxins and beyond” in Aquaculture Asia Pacific, March/April 2024.

Industry dialogue: What is holding shrimp aquaculture

The industry dialogue with next-generation players looked at the second interpretation of regeneration i.e. the succession plan for the next generation of players in Asia's shrimp farming industry. Discussions covered current limitations in shrimp aquaculture models and strategies emphasizing marketing over production. "The younger generation provides frank and direct answers, and we need their insights on shrimp farming and the industry's future," said Moderator, Ronnie Tan of the US Grains Council, Malaysia.

The panel of five under 40 young entrepreneurs from the Asian aquaculture industry, from second left, Guntur Mallarangeng, Cynthia Darmawan, Bettina Valerie Lim, Kim Tran and Benny Ng Thiam Hau. Ronnie Tan, USGC moderated the session.

"Risks are high in shrimp farming, but rewards are high. It is dirty and dangerous. As a farmer, there is the joy and satisfaction when you get a successful harvest, especially when prices are high. In Indonesia, for a lot of younger Indonesians, some generation 2 or 3 of family-owned companies in shrimp farming, the challenge is how to make their harvests work? Those who will survive have a competitive advantage as they know how to control their costs, exercise a lot of discipline and can go back to fundamentals," **Guntur Mallarangeng**, is Co-founder and CEO, DELOS Aqua, an Indonesian shrimp aquaculture startup. He is also CEO at Dewi Laut Aquaculture in Cikelet, a 10ha shrimp farm.

Are Asian players too production oriented? "All stakeholders share insights and focus on the 4Ps (product, price, place and promotion) but there is also the mistrust which exists in the industry. Collaboration is important to the industry's evolution," **Cynthia Darmawan** is COO at PT Delta Marine Group with farms on Sumbawa Island.

On low survival rates, **Benny Ng Thiam Hau**, Senior Hatchery and Farm Manager at KS Pekan, Malaysia said that in lined ponds, some farms push for larger sizes (30 to 20/kg) to match the pricing factor to be profitable. Cynthia says that 50% survival rate is not that bad as her farm practice high density farming and managed to stave off losses, with better control of farm management.

On how to make shrimp aquaculture sexy in the Philippines and Vietnam, **Bettina Valerie Lim**, Business Development Executive at Hoc Po Feeds Corporation believes that most of the young generation are hesitant to enter aquaculture but are become interested when they understand better. The new generation can be nurtured, with better mentorship and incentivisation. **Kim Tran**, Head of Formulation, Grobest Vietnam added that if the shrimp industry is more profitable, grow its reputation, adopt more high technology using digital platforms, satellite images or other productivity solutions, it could attract the young.

More in "Making shrimp farming sexy in Aqua Culture Asia Pacific, November/December 2023
https://issues.aquaasiapac.com/link/558737/14/

Marketing amidst resurgence in supply for Asia's black tiger shrimp in 2023

Asian producers fondly remember the black tiger shrimp (*Penaeus monodon*), which boosted commercial shrimp farming from the mid-1980s. Production declined due to white spot syndrome virus (WSSV) since 1996, and SPF vannamei shrimp replaced it in 2002. In 2021, the availability of SPF broodstock led to a revival in monodon shrimp farming in Southeast Asia, China, and India.

The panel, led by **Dean M. Akiyama**, Aquaculture Technical Advisor in Indonesia, included Catherine Lee, Shrimp Export Lead at Goh Siong Tee Marine Products (GST) Malaysia, and Dr. Yufan Zhang, China Aqua Business Development Manager at Alltech. Two presentations provided discussion context. **Manoj Sharma**, Director of Mayank Aquaculture, highlighted the challenges and costs of producing monodon shrimp in India, noting low ex-farm prices. **Regis Bador**, Founder and CEO of Innov'Aquaculture from New Caledonia, explained how monodon shrimp from Madagascar and Mozambique have penetrated Europe's high-end market.

Dean M Akiyama, Indonesia (left) chaired the panel comprising from second left, Manoj Sharma, Mayank Aquaculture, India; Yufan Zhang, Alltech, China; Regis Bador, Innov'Aquaculture from New Caledonia and Catherine Lee, Goh Siong Tee Marine Products, Malaysia

Farming the monodon in India

Over the past 30 years, Manoj has farmed monodon shrimp, transitioned to producing vannamei shrimp, and now partially reverted to monodon shrimp. He outlined the production trends of both vannamei and monodon shrimp in India. The period from 1985 to 2009 was characterized by monodon shrimp farming; from 2009 to 2021 by vannamei shrimp farming; and currently, there is a resurgence of monodon farming with the introduction of new SPF monodon broodstock.

The vannamei shrimp market differs from monodon. Vannamei shrimp sells for higher prices at smaller sizes. Size 50/kg vannamei is USD 3.3/kg compared to monodon's USD 3.0/kg. However, large size (100g) monodon reaches USD 16/kg while for size 20/kg, vannamei is USD 7.3/kg, while monodon is USD 6.5/kg.

Manoj said that the cost to produce monodon shrimp is higher and therefore, less viable for smaller sizes. Monodon post larvae are much more expensive (USD 12-14/1,000PL) than vannamei (USD 3.5/1,000PL). Farming vannamei shrimp dominate due to their lower cost and higher production success rates, making them accessible to mass markets. Monodon shrimp are a premium product

suitable for niche markets but struggle in mass markets due to higher costs and lower demand for smaller sizes. A market crisis with low prices beckons a measured approach to monodon marketing. The suggestion is to offer branded, traceable, and certified monodon products.

Global market dynamics

European buyers prioritize certifications, often resulting in a premium of USD30 cents/kg when standards are met. There are strict import regulations in place. Chinese buyers tend to be highly price-sensitive and often wait for a market downtrend to make purchases. Japanese buyers emphasize quality and direct relationships, focusing on trust-building and frequent visits to ensure quality rather than certifications. In China, there is a preference for live shrimp in restaurants, where steam cooking is common to maintain meat quality, offering the monodon shrimp an opportunity to demonstrate its quality advantage.

As global shrimp production surges, declining global prices particularly affect the livelihoods of Asian farmers as they face increasing production costs. Bador compared the current situation as strikingly similar to that of Colombian coffee, in the 60s-70s. This historical success story in a different industry was directed to the young farmers in this conference in marketing the monodon shrimp

Brand marketing the monodon: A lesson from the Colombian Coffee success

The story is that faced with oversupply and plummeting prices, the National Federation of Coffee Growers of Colombia (FNC) launched a visionary marketing campaign that emphasized the unique qualities of Colombian coffee, creating the iconic Juan Valdez character and promoting 100% Colombian Arabica coffee. This strategy boosted demand by educating consumers about the product's origin and quality.

Regis said that the shrimp industry can adopt similar strategies by focusing on brand identity, storytelling, and differentiation. In Madagascar and Mozambique, producers highlight environmental and community commitments, gaining trust and premium market access. By leveraging narratives, certifications, and gastronomy, monodon shrimp can be marketed as a unique, high-quality product, fostering consumer trust and commanding higher prices in niche markets.

How to maintain the resurgence of the black tiger

Branding, traceability, certifications, and storytelling are essential to differentiate monodon shrimp in competitive markets. Lessons from Colombian coffee and success stories from Madagascar and Mozambique highlight the importance of niche marketing. Increasing shrimp consumption within India could help address oversupply issues. Developing markets for smaller shrimp sizes is crucial.

There was a call for unity. Asian shrimp farmers are encouraged to collaborate and create a distinct market platform for monodon shrimp, positioning it as the "pride of Asia." Emphasising environmental responsibility and community welfare can enhance market appeal and profitability.

More in Marketing amidst resurgence in supply for Asia's black tiger shrimp in 2023 https://aquaasiapac.com/2025/02/08/marketing-amidst-resurgence-in-supply-for-asias-black-tiger-shrimp-in-2023/

Hard Talk on what does it take to produce sustainable Asian shrimp?

While acknowledging that Asia should be responsible and produce sustainable shrimp either for mass or niche markets, business leaders representing different segments at the Hard Talk session displayed some scepticism on the ability to do so. Asia has sustainable shrimp, but a consensus emerged that the industry was not doing enough to communicate its strengths effectively or tell a story. The diverse group of industry leaders shed light on the complexities and challenges of producing sustainable Asian shrimp. They explored strategies for shaping the path toward sustainability in shrimp farming for global markets.

The group identified a lack of a unified sustainability narrative for Asian shrimp. There is no compelling sustainability story for Asian shrimp, and the industry faces challenges in branding and effectively communicating its strengths. Issues such as mangrove conversion, environmental pollution, antibiotic use, and labour conditions continue to affect the industry's reputation.

Addressing negative narratives like those in documentaries (e.g. Netflix's *Seaspiracy*) remains challenging. **Lourdes Chingling Tanco**, Managing Director of MidaTrade Ventures International Inc, emphasized the importance of having a convincing story when connecting buyers and sellers.

The Hard Talk panel at TARS 2023 discussed "What does it take to produce sustainable Asian shrimp?", from right, Prakan Chiarahkhongman, Charoen Pokphand Group, Thailand; Andreas von Scholten, Grobest Group, Hong Kong; Wan Nadhri Wan Fauzi, Blue Archipelago Berhad, Malaysia; Fred Hsi Chung Kao, SyAqua Group, Thailand; and Lourdes Chingling Tanco, MidaTrade Ventures International Inc, Philippines. Ronnie Tan, USGC, Malaysia (left) led the conversation.

Producers encounter a dilemma between maintaining financial viability and adhering to market demands for sustainable practices. The challenge of producing shrimp sustainably while minimizing costs remains significant. Certifications such as ASC are costly and complex, posing difficulties for smaller farmers' participation. Although efforts to make certifications more affordable are underway, they have not yet been fully realized. **Wan Nadhri Wan Fauzi**, CEO of Blue Archipelago Berhad, emphasizes that Asia does possess a sustainability narrative, yet it is not effectively communicated. He also highlighted the profitability issue and the challenge of persuading buyers to pay a fair price for shrimp.

The Asian shrimp industry is fragmented, making outreach and certifications difficult. An umbrella organization to unify farmers has been suggested but not implemented. Collaboration among diverse players to improve farm efficiency remains challenging. **Andreas von Scholten**, Grobest Group's Chief Commercial Officer, identified the lack of unified branding as a major obstacle.

The industry must invest in sustainable practices despite low shrimp prices and high ingredient costs. Balancing innovation with financial constraints is crucial. "Every FCR gained and ADG improvement is a sustainability metric and should be highlighted," said **Fred Hsi Chung Kao**, SyAqua Group, Thailand. **Prakan Chiarahkhongman**, Vice President of AAHCPS at Charoen Pokphand Group, added, "Farmers need to focus on the 2Ms: monitoring and maintenance."

More in the article "What does it take to produce sustainable Asian shrimp" AquaCulture Asia Pacific, January/February 2024 https://issues.aquaasiapac.com/link/724595/26/

Future proofing for sustainable shrimp aquaculture
Industry stakeholders must prepare for the future of sustainable shrimp aquaculture. Regis F. Bador, Innov'Aquaculture, New Caledonia, moderated this session. The challenge for the five speakers was to focus on strategies to future proof shrimp aquaculture in Asia. These included the areas of farming, production cost, product quality for markets, pathogen control, smart feeding technology and LCAs.

Health and microbiome monitoring for preventive shrimp farm management
Alex Farthing, Co-founder and Chief Scientific Officer at Delos Aqua, stated that traditional methods like plate count and flow cytometry have limitations in capturing microbial diversity and dynamics within shrimp farms. Metagenomic analysis provides deeper insights into microbial changes and disease correlations, enabling early intervention and better disease management. High levels of *Vibrios,* correlated with significant mortality due to EHP infections, underscore the need to understand microbial composition to predict mortality and adjust feed management.

In instances of multi-infections such as AHPND-IMNV-EHP, gut dysbiosis is associated with increased shrimp mortality rates. Microbiome fingerprinting identifies the composition of microbiomes in the gut and hepatopancreas compared to those in water and sediment, facilitating treatment strategies and enhancing shrimp health and survival.

Probiotics and prebiotics are being investigated for their potential use in preventive and therapeutic interventions in shrimp farming. Challenges include validating probiotic efficacy and optimizing prebiotic delivery methods, whether through diet or on-farm addition**.**

Establishing beneficial microbiota in broodstock and maintaining it through hatchery and grow-out phases is critical for effective microbiome modulation. Although resilient microbiota can naturally recover, treatments for dysbiosis at a field scale are limited, making tissue regeneration slow and the microbiome susceptible to changes.

Balancing shrimp farming models with management and carrying capacity in Vietnam
In 2022, the success rates in Vietnam's shrimp farms were only 30-40% due to widespread diseases such as EMS and EHP, which accounted for over 70% of issues. Small farms, typically between 1-3ha, are predominant in the industry, and production costs are a significant concern for these farmers.

Wei Che Wen, Sales and Marketing Manager – Asia, Uni-President Vietnam proposed a farming model for small farmers that includes small ponds for intensive water treatment and nurseries to shorten the grow-out time in culture ponds. Production in such models can reach 20-25 tonnes/ha. He emphasized eight control points, including water treatment, disinfection, filtration, and thorough checks on parameters like pH, hardness, bacterial count, and turbidity.

Vibrio is a major issue and controlling its levels to less than 10^3 CFU/mL in pond water can increase success rates by 30%. Probiotics play a crucial role in inhibiting *Vibrio* growth. The recommendation is to reduce water exchange rates, monitoring ammonia and nitrite levels, and siphoning waste six times a day to minimize organic buildup and shrimp mortality. Feeding practices should be closely monitored to avoid overfeeding, with feeding trays used for accuracy.

Farmers were advised on carrying capacity based on pond types, with recommendations of maximum 2-2.5 kg/m³ in lined and round tanks and 1-1.5 kg/m³ in earthen ponds. Overloading carrying capacity requires strategic actions like transfers or partial harvests to maintain optimal conditions. Wei highlighted the challenges of implementing changes in farming practices, particularly regarding water

exchange rates and ingrained habits. He also stressed the importance of repeated education and reinforcement to create meaningful change among farmers.

Matching product to specific market demand: cost & quality
Herve Lucien-Brun, Aquaculture Consultant at Jefo Nutrition, noted that the shrimp industry grew strongly from 2021 to 2022, with farmed shrimp production up by 11% and market demand rising by 13%. In 2023, inflation, economic issues, and reduced consumer confidence in key markets like China, the EU, the US, and Southeast Asia caused price drops and lower profitability for shrimp

farmers. Larger enterprises benefit from economies of scale and market knowledge, while small producers face significant difficulties.

Energy and feed costs keep rising, with feed making up over 50% of production costs in Ecuador, Thailand, and Vietnam. Poor feeding management hurts productivity and profitability. Farmers should control production costs, match production to demand, optimize quality, and pursue market-appropriate certifications to boost product value.

The rising prices and decreasing availability of key feed components such as soybean meal, wheat flour, and fishmeal necessitate the exploration of alternative protein sources. Dietary proteases can enhance the digestibility of proteins and availability of amino acids, thereby, improving growth performance while reducing feed costs and environmental impacts. He also highlighted the importance of quality assurance, emphasizing that farmers play a crucial role in maintaining shrimp quality. These efforts are incentivized by price differentials based on product quality, as observed in Ecuador. Herve also noted that direct communication between farms and packing plants enhances quality assurance and consumer satisfaction.

Smart Feed Management for Sustainable Shrimp Aquaculture
Dominique Bureau, Professor, Department of Animal Biosciences, University of Guelph & Chief Scientific Officer, Wittaya Aqua International, Canada, highlighted the challenges in feeding shrimp, including difficulties in predicting mortality rates, managing standing biomass, and frequent feed wastage, which negatively impact productivity and profitability. Poor feeding management often results in higher-than-expected feed conversion ratios (FCR) and environmental pollution due to waste feed.

Bureau emphasized the importance of a rational, biologically driven approach to feeding, integrating bioenergetics and nutrient-flow models to predict feed requirements effectively. He demonstrated how a commercial farm production management software (AquaOp Farm) uses predicted growth trajectories and actual growth data to recalibrate feed rations, ensuring animals receive the appropriate amount of feed.

There is a need for improved biomass estimation models and enhanced employee training to optimize feed management. Bureau advocated for combining ration, logic, and equipment technology to develop smarter feeding systems, which can enhance efficiency and ensure shrimp well-being.

LCA for a thriving and sustainable shrimp aquaculture sector
Life cycle assessments (LCA) is the method for quantitatively evaluating a product's environmental impact, highlighting the importance of reducing environmental pressure due to the increasing global population and food demand, said **Bjorn Kok,** from the University of Stirling and Sustainability Consultant at Blonk Sustainability. All phases of shrimp production, including feed ingredients, diesel usage, processing, and end consumer usage, are considered in LCAs.

The environmental footprint of shrimp production includes land use factors, such as deforestation for soybean production and clearing mangroves for shrimp ponds. Feed production contributes minimally to environmental pressure, but farming has a significant impact due to energy consumption (e.g., diesel generators) and greenhouse gas emissions from feed waste in ponds.

On interventions to reduce carbon footprint, Bjorn said that digestive enhancers like Aqualyso® can reduce shrimp carbon footprint by 16% and improve feed conversion ratios (FCR). Lower digestible protein in feed leads to more waste in water, increasing environmental impact.

He recommended the following:

- external verification and transparency in data provided by suppliers or companies.
- stakeholders should embrace LCA as a tool for informed decision-making and sustainability integration.
- By measuring environmental footprints, identifying hotspots, and incorporating LCA into decision processes, shrimp farmers can move toward sustainable aquaculture practices.

Regis F. Bador, (left) led the panel discussions in the session on Future Proofing Shrimp Aquaculture, with speakers, from the right, Bjorn Kok, University of Stirling; *Wei Che Wen, Uni President Vietnam; Alex Farthing, Delos Aqua; Herve Lucien-Brun, Jefo Nutrition and Dominique Bureau, Wittaya Aqua.*

Developing traceability along the supply chain

Asian shrimp aquaculture is highly fragmented and to develop sustainable shrimp, the key is traceability along the supply chain. This year at the ***Interactive Roundtable Breakout*** session, participants were tasked with proposing traceability criteria between two segments; Hatchery & Genetics and Farming (HGF); Farming and Feed Production (FFP); and Processing & Marketing and Farming (PMF). In the final panel session, group leaders presented the collated output from their respective groups. Below are excerpts from the presentations by group leaders as well as the subsequent Q&As by participants.

Group: Hatchery & Genetics and Farming (HGF)

Group Leader, Craig Browdy, Ziegler Feeds, USA presented the collated output from the roundtable leaders, Rizky Darmawan, PT Delta Marine Indonesia; Thomas Gitterle, Ibreed Aqua LLC, USA; Reiny Tumbol, Genics Pty Ltd, Indonesia; Eamonn O'Brien, Skretting, Belgium and Heny Budi Utari, CP Prima, Indonesia.

The HGF panel covered a wide range of topics, including genetics lines, pursuit of post larvae quality, eyestalk ablation, certification standards and the importance of traceability and self-regulation.

Traceability is crucial for production in hatcheries and farms, driven by both internal needs and market demands. Building awareness across the entire supply chain, from consumers to hatcheries, is essential. There should not be significant increases in expense associated with traceability and farmers need to drive this need. However, market forces will drive improvements in efficiency and sustainability.

Craig Browdy (left) with Table Leaders in HGF group, from right; Rizky Darmawan, Eamonn O'Brien; Heny Budi Utari, Reiny Tumbol and Thomas Gitterle.

The group concurred that PL prices are too low and to foster industry improvement and incentivize hatcheries to invest in producing better quality PL, prices must be adjusted. There is already a growing trend in some countries, where top-tier hatcheries charge more for their PL, pushing the industry towards enhancements rather than exploiting farmers. The importance of consistent quality PL was seen when farmers are willing to pay a premium for quality. PL quality is an area where investment has been lacking. There were also discussions on an index to assess PL quality based on PL strength and viability, revealing significant differences based on feeds and conditions.

With regards to hatchery practices and certification, the group noted that certifications are not geared up for the operational practice within the hatchery, and every hatchery has different conditions (water, tanks, stocking density etc), making a one-size-fits-all approach impractical. Furthermore, certifications can be expensive for small-scale farmers and unattainable standards may impede industry's growth. The idea of self-regulation, within company and country, is in the interest of all. In essence, improving the industry from within without imposing certifications and traceability standards is a better way forward.

There is strong demand from non-governmental organizations (NGOs) and retailers on the use of non-ablation. Certification bodies push for non-ablation in hatcheries, but how can industry in Asia transition to non-ablated PL? The ASC standards with regards to non-ablated broodstock states that from Q2 2025; 25% of the production to originate from non-ablation and 50% by Q2 2027; 75% by Q2 2029 and by 6 years (Q2 2031) 100%.

While certification programs frown upon this practice, many in the industry view it as a means to achieve higher PL output, raising questions around production targets vs animal suffering. Research has shown that non-ablated females tend to produce better quality eggs and can reproduce for longer durations, highlighting the economic aspect of the debate. Ablation always produces more and with this comes additional costs involved, including facility requirements, manpower, and specialized

feeds. The choice between ablation and non-ablation, particularly for black tiger shrimp, hinges on nutrition, further highlighting the economic factors at play.

With regards to genetics sources and post larvae quality, the group emphasised that understanding genetic lines and their health status is critical for farmers, who often prefer specific strains for stocking.

Farmers need awareness of genetic origins and health status, and government should enforce hatcheries to provide broodstock origin. Genetic testing using markers is a viable option. Health status and disease tolerance are critical for hatcheries and random sampling and testing by third parties are necessary. Government should issue health certificates for broodstock.

Group: Farming and Feed Production (FFP)

Group Leader Romi Novriadi, Jakarta Technical University of Fisheries, MMAF, Indonesia summarised discussions at the roundtables led by table leaders, Fuci Guo, Royal Agrifirm Group, Canada; June Wu, Canada; Liew Chiow Yen, dsm-firmenich, Singapore; Chi Man, BASF, Hong Kong; Ho Gim Chong, Skretting, Vietnam; Martha Mamora, Adisseo, Indonesia; Zhihua Pei, Cargill, USA; Hsiang Pin Lan, USSEC, Taiwan; William Kramer, Hoc Po Feeds Corporation, Philippines and Brett Glencross, IFFO, UK.

They highlighted key issues on traceability in the supply chain for feed production including on feed ingredients and additives.

Romi explained that traceability requires tracking product origins from producers to farm practices. Data capture and transfer within the supply chain are crucial. By using a standardized global data structure, data sharing can be streamlined. However, achieving traceability for feed ingredients is difficult, especially in Southeast Asia due to diverse ingredient origins.

Table Leaders in the FFP group, left, Ho Gim Chong, Hsiang Pin Lan, Zhihua Pei, Chi Man, Fuci Guo, Romi Novriadi, June Wu, Brett Glencross, Liew Chiow-Yen, Martha Mamora and William Kramer.

Issues with feed ingredients and additives include availability, quality, and price increases. Evidence of source species, labeling integrity, and safety documents is required. Sourcing fishmeal and soy responsibly is crucial, along with transparency in sourcing and transport. However, sourcing non-GMO soymeal is challenging and expensive, limiting its accessibility for aquafeed producers in Southeast Asia. The insect meal industry faces high production costs and limited supply but is working towards aligning with international standards and reducing costs. On the concern with shrimp virus DNA in feeds, the group noted that proper feed processing can deactivate pathogens, but education campaigns are needed to address farmer misconceptions about feed contamination.

Trust and understanding are essential between feed mills, middlemen, and farmers for the use of functional feeds. Feed mills struggle with maintaining various feed types and inventory. Farmers seek

clarity on feed composition, ingredient sourcing, and certified active ingredients. They also desire transparent labelling on dosage and trial results, especially concerning shrimp growth performance.

Balancing certification requirements with safeguarding proprietary feed formulations (IP) is possible through third-party audits.

Collaboration between farmers, feedmillers, and processing plants is essential to meet certification requirements. Initiatives such as the fishery improvement project aim to enhance fishmeal traceability and sustainability, with certifications like MarinTrust as potential outcomes.

Sustainability metrics like LCAs, GHG, and CO_2/kg feed were highlighted. A common assessment framework is needed to compare metrics consistently, such as shrimp-to-shrimp comparisons. LCAs and carbon neutrality are essential for sustainable feed. The discussion also covered standardized methods for metric assessment and implementation (Global Metrics for Sustainable Feed) and feed modelling systems.

Farming and feed production contribute significantly to CO_2 emissions. Sustainable practices, such as bioenergy use and advanced technologies, can help reduce the carbon footprint. Tools like GFLI software are valuable for assessing environmental impacts, but data variability remains a challenge, particularly for smaller producers and complex ingredients.

Group: Processing & Marketing and Farming (PMF)

Group Leader, S Santhana Krishnan, Marine Technologies Pvt Ltd India presented the output from table leaders: Cameron Maclean, eFishery, Indonesia; Maria Filipa Castanheira, ASC, the Netherlands; Syamsul Arrifin, Global Seafood Alliance, Indonesia.

The panel shed light on the intricacies of traceability in their respective segments and the challenges faced by shrimp farmers and processing plants.

S Santhana Krishnan (left) with table leaders in PMF group, from right; Cameron Maclean, Maria Filipa Castanheira and Syamsul Arrifin.

Regarding the traceability of antibiotic usage, current practices include pre-harvest testing and processing plant checks for antibiotic residues such as chloramphenicol and metabolites of nitrofuran, similar to the procedures in India. However, incorporating middlemen into testing programs and harmonizing policies across producing countries is necessary. It is essential to have harmonized policies for all producing countries, independent of specific market regulations so that rejected

batches are not redirected to markets with less stringent requirements. Control of antibiotic use should span the entire production chain. Traceability implies that rejected products should be traced back to their origin at the farm, rather than being halted at the processing plant.

Retailers in the US and Europe are driving the push for comprehensive traceability, requiring visibility into shrimp origins, feed sources, and farming cycles. Barcoding and automation are emerging as

solutions to track shrimp from farms to processing plants. Small-scale farmers complicate traceability due to issues like tracking from point of harvest to plant, particularly in Indonesia.

Blockchain is considered a promising tool for ensuring tamper-proof data and effective product recalls. However, small farmers require training to successfully integrate into such systems. On acceptable levels of traceability, while 100% traceability remains the ultimate goal, partial traceability (e.g., 70%) may be considered acceptable under certain circumstances. Nevertheless, low levels of traceability can adversely affect certification and industry reputation.

The group is optimistic about building traceability systems, despite their complexity. Solutions like barcoding tubs during harvesting are being explored. This allows tracking shrimp from ponds to processing plants via scanning and other technologies. These advancements give processing plants greater control from harvest to consumer.

Automation and communication have started to enhance traceability. Automation bridges the gap between farmers and processing plants, streamlining processes and linking stakeholders seamlessly. Efficient communication, including labelling and rapid exchanges, is crucial for managing the complexities of sourcing shrimp from multiple farms.

In the future, animal welfare and carbon emissions will continue to be subjects of study before they can be integrated into traceability systems. However, the industry is focused on enhancing processes and adopting technologies to meet consumer expectations for responsible sourcing.

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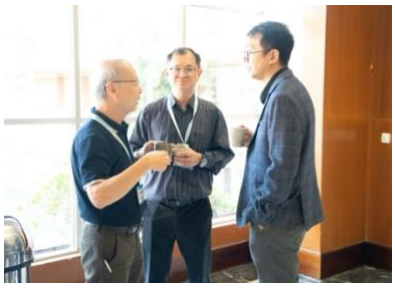









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