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Wish You All Happy New Year 2026

Inside ...

43rd Edition

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Exhibition on Aquaculture Sector

27 & 28 January 2026

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Aquaculture North East Summit 2025 discusses future prospects in the Region

The Summit also highlights the need of promoting domestic shrimp consumption in India

Elevated ammonia levels reduce the diffusion gradient across the gills, causing the aquatic animals to concentrate ammonia in their blood. This leads to high blood pH, impaired oxygen transport, gill damage, increased oxygen consumption, and ultimately, a decrease in production performance in intensive systems.

Dear Readers,

Greetings to the readers and advertisers of Aqua International for a Happy, Prosperous and Peaceful New Year 2026. I wish that all of us get organised well personally and in the profession in this New Year 2026. Let us focus on maintaining good health with regular exercise, balanced diet and 7 to 8 hours night sleep. Check whether you are going financially in a right and safe direction and maintain good relation with each other. Why not we adopt our thinking and attitude for an open and positive mindset that we do our bit for the wellbeing of all in the society.

The January 2026 issue of Aqua International is in your hands. In the news section, you may find news about....

Aqua International in association with GAFDA organised 42nd Aquaculture Expo 2025 at Surat, Gujarat, an Exhibition, Panel Discussion and Experts - Farmers Interaction meet on aquaculture sector and came out with ideas to 'Tap the Potential to take Aquaculture in Gujarat state to the next level of development'. Seniors and six Young Entrepreneurs from Gujarat took part and shared their views and suggestions for the development of this sector in the state.

A one-day 'Aqua North East Summit 2025' was held at Guwahati, Assam on 12 December 2025. The Summit was a movement for shaping sustainable aquaculture in NE India and beyond, and scaling up scientific aquaculture in this region. Abundant riverine fishery resource, lots of potential and opportunities are waiting to be transformed.

There were four Technical Sessions like 'Sustainability in Diversified Aquaculture; Species, Culture (farming), Nutrition and Health Management aspects in North East' was chaired by Dr Debtanu Barman. 'Smart Technology Integration (Artificial Intelligence, Internet of Things) to Promote and Advance Precision Aquaculture'. 'Value addition, processing and domestic consumption of shrimps in North East region'. 'Government schemes, Policies and Role of Fishery Co-operatives to Boost Aquaculture in North East' was chaired by Dr Ashok B. Pillai.

Mr Shaji Baby John, 65 years, passed away. Shaji B John is son of former minister and RSP leader, the late Baby John. He is survived by his wife Rita and sons Baby John Jr. and Peter John. Shaji Baby was the Chairman and Managing Director of an Integrated aquaculture and seafood company named Kings Infra Ventures Limited which was formerly known by the name Victory Aquafarm Limited. Shaji's dedication to the field of aquaculture was an inspiration, and his contributions will leave a lasting impact on the industry. In the year 1987, Kings established India's first semi-intensive integrated aquaculture project in its own land admeasuring 126 acres and 28 cents in Tuticorin District, Tamil Nadu. It was learnt that the work on the unique and innovative state-of-the-art Kings Mariculture Techpark at Tuticorin, Tamil Nadu is progressing from 2024 onwards.

Kings Infra Ventures recently signed a major MoU with the Government of Andhra Pradesh to develop a ₹2,500 crore, 500 acre, AI-driven Maritime Aquaculture Technology Park near Srikakulam, aiming to make Andhra Pradesh a global hub for sustainable seafood, integrating advanced tech with processing and R&D facilities.

In the Articles section, **Extraqua – The phytogenic solution for Ammonia control in Aquaculture**, authored by Avitech Nutrition, says water quality is

Contd on next page

NRS GROUP

Our Mission

Aqua International will strive to be the reliable source of information to aquaculture industry in India.

AI will give its opinion and suggest the industry what is needed in the interest of the stakeholders of the industry.

AI will strive to be The Forum to the Stakeholders of the industry for development and self-regulation.

AI will recognize the efforts and contribution of individuals, institutions and organizations for the development of aquaculture industry in the country through annual Awards presentation.

AI will strive to maintain quality and standards at all times.

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a critical factor influencing the success of aquaculture operations. Ammonia is an invisible, pungent, water soluble alkaline gas, and a primary concern because aquatic animals contribute 40% to 90% of the nitrogenous excretion during their growth. Ammonia can react with water to produce ammonium hydroxide, a highly corrosive contaminant that damages cells. Elevated ammonia levels reduce the diffusion gradient across the gills, causing the aquatic animals to concentrate ammonia in their blood. This leads to high blood pH, impaired oxygen transport, gill damage, increased oxygen consumption, and ultimately, a decrease in production performance in intensive systems.

Ammonia accumulates continuously from the nitrogenous excretion of aquatic animals and the microbial decomposition of organic materials. Key management and environmental factors influencing ammonia production and toxicity include stocking density, temperature, pH level, dissolved oxygen concentration, and feed nitrogen content. Promoting the optimal rate of nitrification is key to converting toxic compounds into less harmful nitrate. Thankfully some specialised phytogenic products promote phytoplankton growth which utilizes ammonia during photosynthesis. Avitech claims that, the incorporation of Extraqua effectively reduces ammonia nitrogen and nitrite in ponds. This enhances water quality, promotes growth, improves feed conversion, and increases shrimp productivity. It also enhances overall shrimp well-being, including appearance and carapace health.

Another article titled, **Aquaponics Beyond Sustainability: Why ROI is becoming the decisive Factor for Adoption in Emerging Markets**, authored by Franco Cerda says that Aquaponics has long been promoted as a sustainable solution to food production challenges, particularly in regions facing water scarcity, land limitations, and climate stress. However, despite its environmental advantages, large-scale adoption has remained limited in many emerging markets. This article argues that Return on Investment (ROI)—rather than sustainability alone—is increasingly the decisive factor influencing adoption. Drawing on lessons from arid, capital-intensive economies, the paper explores why financially viable aquaponics systems outperform concept-driven pilots and how ROI-oriented design is redefining the future of integrated food production. Aquaponics is entering a new phase of maturity. Sustainability remains its foundation, but ROI is becoming its gatekeeper. In emerging markets, where capital efficiency is critical, the future of aquaponics will be defined by systems that deliver both environmental benefits and robust financial returns.

Another article titled, "**From Rusty to Refreshing: How to Reduce Iron in Borewell Water**", authored by Sandhya Marine discussed that in aquaculture systems, maintaining optimal water quality is vital for the growth and health of cultured organisms. Litopenaeus vannamei (also known as Penaeus vannamei), a widely cultivated tropical shrimp species prized for its fast growth and high productivity, is particularly sensitive to heavy metal contamination. Heavy metal pollution, including elevated iron concentrations, can interfere with key physiological processes, leading to impaired growth, reduced reproduction, and lower survival rates. Moreover, bioaccumulation of these metals in shrimp tissues—especially in muscle—poses potential risks to both shrimp health and human consumers. Iron is not typically considered an issue in general aquaculture, but it can be an important concern in hatcheries that use well water, as ferrous (dissolved and colorless) iron is particularly harmful to young aquatic animals. In such circumstances, farmers should test for iron regularly and use oxidation along with mechanical filtering in small-scale systems to successfully limit toxicity. For larger grow-out operations food supplementation may be a more feasible strategy to reduce ferrous iron toxicity. Overall, monitoring iron levels and treating them appropriately is critical for protecting aquatic animal health and optimising productivity

The other Article titled, **Major Aquaculture Issues and the Promise of Immunomodulation in Shrimp Farming** authored by Sandhya Marine stated that despite remarkable progress in aquaculture technology and management, shrimp farming remains highly vulnerable to infectious diseases that can rapidly devastate production systems across entire regions. This susceptibility stems from a biological limitation—shrimp depend solely on their innate immune system for protection and lack the adaptive immunity that enables vertebrates to develop long-term resistance or immune memory against specific pathogens. Currently, the industry faces major challenges from three dominant pathogens—White Spot Syndrome Virus (WSSV), Acute Hepatopancreatic Necrosis Disease (AHPND), and Enterocytozoon hepatopenaei (EHP)—which together cause annual global economic losses exceeding ₱88,000 crore. These threats are intensified by environmental stress and limited immune competence, leading to poor survival, slower growth, and inconsistent yields. Reinforcing shrimp immunity through targeted immune modulation is essential for achieving sustainable and profitable aquaculture. Given shrimp's lack of adaptive immunity, they remain susceptible to devastating diseases that threaten productivity. Incorporating immunostimulants like β-glucans, vitamin C, and nano-selenium into shrimp diets offers a proven means to strengthen innate immune responses, enhance survival, and mitigate the impact of major pathogens such as WSSV, AHPND, and EHP. By activating and maintaining a responsive immune system, these interventions equip shrimp to better withstand disease challenges and environmental stress, ensuring more stable and resilient production systems

Another Article titled, Important aspects of state-of-the-art of major carp farming at Moyna Block, West Bengal authored by Subrato Ghosh, says that important aspects of the present state-of-art of major carp farming practice at Moyna CD Block, West Bengal is genuinely presented. It is the commercial carp aquaculture hub in this State having unique features of semi-intensive grow-out culture and production of table fish, and its transportation in live state to different districts of West Bengal and neighbouring States. Write-up is based on information given by Mr Tuhin Hait, an experienced and progressive carp farmer at Moyna on 28 November 2025 and a presentation made by Fishery Extension Officer, Moyna CD Block on 22 June 2024.

Readers are invited to send their views and comments on the news, special feature and articles published in the magazine which would be published under "Readers Column" in the magazine. Time to time, we shall try to update you on various aspects of Aquaculture sector. Keep reading the magazine Aqua International regularly and update yourself. Wish you all fruitful results in your efforts.

M.A.Nazeer
Editor & Publisher
Aqua International

Aquaculture North East Summit 2025 discusses future prospects in the Region

The Summit also highlights the need of promoting domestic shrimp consumption in Indi

The one-day event 'Aqua North East Summit 2025' was organized by Aqua Doctor Solutions, Kolkata in association with the Bengal Chamber of Commerce & Industry and Fishery News at Hotel Taj Vivanta, Guwahati, Assam on 12 December 2025. In the short, enticing preview (video) designed to build excitement and curiosity for this upcoming event, it was mentioned by organizers quite rightly that North East (NE) India is ready to lead India's next Blue Revolution; a new wave of aquaculture is taking shape in NE. The Aqua North East Summit – 2025 was a movement for shaping sustainable aquaculture in NE India and beyond and scaling up scientific aquaculture in this region. Abundant riverine fishery resource, lots of potential and opportunities are waiting to be transformed; conversations in the event will create transformation and discussions will lead to development in NE states.

In addition to Key-Note Session on theme

Dr Manoj Sharma explaining a point on domestic shrimp consumption

'Envisioning Aquaculture Industry in the North East', there were four Technical Sessions. Session-1 titled 'Sustainability in Diversified Aquaculture; Species, Culture (farming), Nutrition and Health Management aspects in North East' was chaired by Dr Debtanu Barman, National awardee Trainer-cum-Mentor on commercial aquaculture and Founder & Chief Executive Officer, Aqua Doctor Solutions, Kolkata.

Session-2 titled 'Smart Technology Integration (Artificial Intelligence, Internet of Things) to Promote and Advance Precision Aquaculture' was chaired by Dr Surya Teja, Co-Founder and Chief Operating Officer of Fishery News.

Session-3 titled 'Value addition, processing and domestic consumption of shrimps in North East region' was chaired by Dr Debtanu Barman, and Session-4 titled 'Government schemes, Policies and Role of Fishery Co-operatives to Boost Aquaculture in North East' was chaired by Dr Ashok B. Pillai, Retd. Executive Director of Fisheries Division, National Co-operative Development Corporation.

In each and every session, five renowned aquaculture experts and professionals on the subject matter participated as invited

Dr Biplab Banerjee, aquaculture expert and one Panel speaker

Resource persons-cum-panelists. Distinguished guests and dignitaries from NE states and other places expressed their thought-provoking opinion and comments in their talks on what are being done and what more can be done. News communicator Subrato Ghosh was present in this programme at Guwahati, had learnt new concepts and insights.

Pamphlets and information brochures on Shrimp insurance, Aquaculture insurance, and others; Schemes under Pradhan Mantri Matsya Sampada Yojana; brochures of Assam Department of Fisheries; information booklets on aquaculture products, pellet-type fish and shrimp feed produced by Indian companies were displayed in the summit. Each of the technical sessions were followed by questions and answers, and lively interaction among distinguished panelists, delegates, aquaculture industry partners, progressive and reputed fish farmers. National level experts in connection with pursuit of research and education in Indian fisheries and aquaculture and those associated with aquaculture industry, R & D wing, NGOs working in this field – all participated in the programme. Some B.F.Sc and M.F.Sc students from College of Fisheries, Raha, Nagaon, Assam participated as listeners in

Technical Session-2 and Panel Discussion in progress

discussion sessions.

Mr Sagar Mehra, Joint Secretary, Inland Fisheries and Administration, Department of Fisheries, Ministry of Fisheries, Animal Husbandry & Dairying, Govt of India gave a very impressive and enlightening Virtual Talk at this Summit.

In Session-3, Dr Manoj M. Sharma, Director of Mayank Aquaculture Pvt Ltd, Surat and eminent shrimp aquaculture expert in India gave an enriching talk online as one of the panelists. He expressed compliments to the organizers for organizing the programme at an appropriate time. He highlighted about aquaculture and fishery opportunities in eight states in NE India; fish as a stable daily diet; very good states of NE where fish eating habit is there (90% population eat fish, 15 to 35 kg / person / year). Out of 150 crore people in India, 77% are non-vegetarians. By the year 2030, NE India aims to reach its fish production potential of 10 lakh tonnes, but the demand is about 20 to 22 lakh tonnes. Efforts have been made by NFDB for fisheries development in NE under PMMSY Programme. About 30-35% of the Aqua Parks have been developed in NE by NFDB at Assam, Nagaland, Arunachal Pradesh and Tripura.

Speaking about his experiences in the last 30 years, Dr Sharma said that beginning in 1994 with an aim to build up shrimp farm in coastal Surat, he established Surat Aquaculture Farmers Association. Now he has become a successful large-scale shrimp farmer with strength and efforts, his shrimps are grown in stress-free environment understanding ponds' carrying capacity. He also spoke about contribution of aquaculture to rural economy; presently about 2 lakh people are gaining employment in Surat in shrimp farming. In order to achieve success, there should exist unity among shrimp farmers in all the States while working and unity between farmers and scientific community. Relation between demand and supply should not get disrupted. Giant freshwater prawn Scampi is sold in Tripura @ Rs 1,500 per kg, shrimps may be sold @ Rs 250 to 350 per kg in domestic markets in NE. A 'Sangathan' (Association) may be developed in this regard. Market is very important, as there is no value of production when good market is not there.

Since 2015, Dr Sharma is working on domestic consumption of farmed shrimp. In his venture called Zhingalala (the vision for domestic market in India), a seafood restaurant including shrimp recipes, he envisages exploiting huge domestic market of farmed shrimp in India. According to him, if 160 lakh tonnes of farmed freshwater fishes are eaten in India every year, then domestic shrimp consumption of 2 to 4 lakh tonnes per year will also be possible. Proper infrastructure has to be developed. It is necessary to maintain production and profitability. Litopenaeus vannamei 50 to 60 Count in size (50 to 60 nos / kg) may be sold in NE states @ Rs 350 to 450 per kg.

In this context, he spoke about awareness (on health benefits of shrimp consumption), availability, affordability, attractibility, acceptability.

Improved genetics has contributed a lot on causing fast growth in chicken, Labeo rohita, Catla catla, Tilapia nilotica and improved farming protocols, where very good market exists. We have to work upon it. India has great shrimp market for local as well as global. We all have to come forward and support the domestic shrimp market vision. Dr Sharma ended by saying 'Long live aquaculture, long live North East'.

Shaji Baby John passes away

Shaji's dedication to the field of aquaculture was an inspiration, and his contributions will leave a lasting impact on the industry. In the year 1987, Kings established India's first semi-intensive integrated aquaculture project in its own land admeasuring 126 acres and 28 cents in Tuticorin District, Tamil Nadu.

Shaji Baby John

Kochi: Mr Shaji Baby John (65) passed away at Manipal Hospital in Bangalore. He was the Chairman and Managing Director of an Integrated aquaculture and seafood company named Kings Infra Ventures Limited which was formerly known by the name Victory Aquafarm Limited.

Shaji's dedication to the field of aquaculture was an inspiration, and his contributions will leave a lasting impact on the industry.

In the year 1987, Kings established India's first semi-intensive integrated aquaculture project in its own land admeasuring 126 acres and 28 cents in Tuticorin District, Tamil Nadu.

While working in MPEDA, Cochin Regional Centre, I had the opportunity to associate with Mr Shaji B John in jointly organising a tiger shrimp aquaculture project in Ezhupunna village of Alleppey district so as to demonstrate augmented shrimp production in Pokkali fields. Inaugural harvest of shrimp from this project was done by MPEDA Chairman Mr C T Sukumaran, informed Mr M. Shaji, Retd Joint Director, MPEDA.

It was learnt that the work on the unique and innovative state-of-the-art Kings Mariculture Techpark at Tuticorin, Tamil Nadu is progressing from 2024 onwards.

Kings Infra Ventures recently signed a major MoU with the Government of Andhra Pradesh to develop a ₹2,500 crore, 500 acre, AI-driven Maritime Aquaculture Technology Park near Srikakulam, aiming to make Andhra Pradesh a global hub for sustainable seafood, integrating advanced tech with processing and R&D facilities.

Shaji B John is son of former minister and RSP leader, the late Baby John. He is survived by his wife Rita and sons Baby John Jr. and Peter John.

World Aquaculture 2026 Returns to Singapore Following a Successful 2022

World Aquaculture 2026 Returns to Singapore Following a Successful 2022

Singapore – The World Aquaculture Society (WAS) is pleased to announce that World Aquaculture 2026 (WA2026) will be held in Singapore from June 2 to 5, 2026, at the Singapore EXPO Convention and Exhibition Centre, marking a return to the vibrant city-state following the highly successful WA2022 event.

WA2022, the first World Aquaculture conference ever held in Singapore, welcomed over 3,000 participants from around the world and featured 200 exhibition booths — highlighting Singapore's

role as a hub for innovation, sustainability, and international collaboration in aquaculture.

Following the remarkable success of WA2022, Singapore proved to be an exceptional host for a global aquaculture event. With its world-class infrastructure, strategic location, strong government and industry support, and commitment to food security and innovation, Singapore offers an ideal environment for meaningful global exchange. Singapore also offers participants excellent tourism opportunities. A gateway to Asia and beyond, Singapore is a cosmopolitan city and a melting pot of different cultures. The return of WA2026 reflects both the outstanding experience of past participants and the growing importance of Southeast Asia in shaping the future of sustainable aquaculture.

Building on that momentum, WA2026 will once again bring together global leaders, researchers, government officials, industry professionals, students, and policymakers to explore the latest advancements and opportunities in sustainable aquaculture. The event will take place from June 2 to 5, 2026, at the Singapore EXPO Convention and Exhibition Centre.

Conference Theme:
"High Yield Production Through Nutrition, Health, Genetics, and Resources"

This theme emphasizes the essential pillars driving productivity and sustainability in modern aquaculture, reflecting a science-based, integrated approach to industry growth.

WA2026 Highlights Include:

- Scientific sessions and technical presentations, **featuring 102 sessions** covering key topics across the aquaculture sector
- A comprehensive international and national trade exhibition
- Networking and B2B engagement opportunities
- Student-focused programs promoting international knowledge exchange in aquaculture
- Innovation and sustainability showcase highlighting the future of aquaculture.

WA2026 is organized by the World Aquaculture Society (WAS) with WAS-APC and hosted by the Singapore Food Agency (SFA), in partnership with Singapore Tourism Board (STB), national and international institutions including Temasek Polytechnic, National University of Singapore, James Cook University, AquaPolis, Singapore Institute of Technology, and Nanyang Technological University.

Special registration rates will be available for WAS members, WAS-affiliated associations, students, participants from the Asia-Pacific region, and those who register early — offering discounted fees to encourage broader and timely participation in the event.

Further details regarding registration, abstract submission (opening soon), sponsorship, and exhibition opportunities will be available via the official conference website.

For Conference Management, contact Mr. John Cooksey, email worldaqua@was.org and Mr. Noah Cooksey at worldaqua11@was.org

For Booths and Sponsors, contact Mr. Mario Stael, email: mario@marevent.com

General Information contact WAS-APC Chapter secretariat executive officer, email: apcsec@was.org

World Aquaculture Tanzania 2026

5th Annual International Conference & Exposition of the African Chapter of the World Aquaculture Society

Tanzania will host the World Aquaculture Conference (WA26T), in conjunction with Aquaculture Africa 2026 (AFRAQ2026), the largest aquaculture meeting in Africa for 2026. This event offers a prime opportunity for aquaculture researchers, practitioners, decision-makers, and other stakeholders to meet, network, and discuss all aspects of aquaculture in Africa. It follows the resounding success of the World Aquaculture Safari held in Uganda in June 2025.

This marks the third time a WAS global event has been hosted on African soil, following the recent World Aquaculture Safari 2025 Conference in Uganda (June 2025) and the World Aquaculture 2017 conference in Cape Town, South Africa (June 2017). In addition, since 2022, the WAS has successfully hosted the Annual Aquaculture Africa Conferences (AFRAQs) in Egypt (2022), Zambia (2023) and Tunisia (2024).

The venue for WA26T/AFRAQ2026 will be the Julius Nyerere International Convention Centre (JNICC) in Dar es Salaam, one of the largest convention centers in Tanzania. JNICC has recently become a global destination for many professional conferences and tradeshows.

The WA26T/AFRAQ2026 Conference will take place over three days and is composed of an Opening Ceremony, Plenary Sessions, Technical/Scientific Parallel Sessions, Student Sessions, Training Workshops, various Side Events and Meetings and an Exhibition/Trade Show. The conference will focus on the theme "Aquaculture Driving Blue Transformation" and will highlight lessons learned from Tanzania and other African countries regarding the role of sustainable aquaculture in building resilient food systems for economic growth. Tanzania is among Africa's fastest-growing aquaculture producer countries in Africa, offering numerous business opportunities in tilapia and seaweed aquaculture, as well as lots of research activities on other emerging species and technologies. See more details on the Event Brochure here: https://was.org/Meeting/pdf/AFRAQ26_RegBro.pdf

For international visitors, the tourism opportunities before and after the conference are vast, as Tanzania is recognized as one of the world's premier safari destinations. Many are familiar with Tanzania's renowned attractions, including world-class safaris in Serengeti, Ngorongoro Crater, Zanzibar, and Mt. Kilimanjaro, alongside diverse landscapes and rich cultural experiences.

This event is made possible with the hosting support of the government of the Republic of Tanzania and Zanzibar, along with our sponsors from the WAS African Chapter: Aller Aqua (Corporate Sponsor) and AUDA-NEPAD; and our WAS Global Premium Sponsors.

Now is the time to submit your abstract and register online. All conference details can be found on the event page at https://was.org/meeting/code/AFRAQ26. For inquiries, please contact worldaqua@was.org or africanchapter@was.org For more information on exhibition and event sponsorships, reach out to mario@marevent.com.

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* DIRECTION OF USE:

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7 days before stocking	800 g - 1,000 g	1,200 - 1,500 g	1,200 - 1,500 g
Day of stocking	300 g - 500 g	800 g - 1,000 g	800 g - 1,000 g
Every 7 - 10 days after stocking	300 g - 500 g	800 g - 1,000 g	3 - 5 days / use 1,000g - 2,000g

****Dosages can be adjusted according to the water conditions and practices.*

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Young Entrepreneurs in Aquaculture in Gujarat take a Commitment to work with Seniors to take Aquaculture in the state to the next level of Development

Aqua International organizes its 42nd Edition Aquaculture Expo at Surat, Gujarat in association with GAFDA

M.K. Choudhary, Deputy Director of Fisheries, HQ, Govt. of Gujarat and Dr Ritesh Shantilal Tandel, Senior Scientist, ICAR-CIBA Research Centre, Navsari, Gujarat, inaugurated 42nd Aquaculture Expo 2025 at Surat on December 12. Pradip Navik, Saji Chacko, M.A. Nazeer and others are seen during the inauguration of the Expo.

Surat: A 2-day Exhibition and interaction meet among Aqua farmers and experts on Aquaculture titled Aquaculture Expo 2025 was held at Surat International Exhibition Centre, Surat on 12 & 13 December 2025. There was Panel Discussion and interaction meet with the theme: Tap the Potential to take Gujarat Aquaculture to the next level in which young entrepreneurs from Gujarat state took part and shared their views and suggestions for the development of this sector in the state.

M.K. Choudhary, Dr Ritesh S. Tandel, Pradip Navik, Saji Chacko, Jignesh U. Contractor and M.A. Nazeer lightning the Lamp during the inauguration of the Expo.

M.K. Choudhary

M.A. Nazeer

The main objective of the Expo was to bring awareness among aquaculture farmers and other stakeholders on various products, technology, and services available to get better yield / productivity in aquaculture. The Expo was an opportunity to

Pradip Navik

Jignesh U. Contractor

Ravikumar Yellanki

Dr Ritesh Shantilal Tandel

Saji Chacko

aquaculture farmers and other stakeholders to update their knowledge on various aspects in aquaculture. The event was also an opportunity for buyers and sellers as well in the sector.

Mr M.K. Choudhary, Deputy Director of Fisheries, HQ, Govt. of Gujarat presiding over the inaugural session explained the supporting activities of fisheries department to aquaculture farming community in the state.

Dr Ritesh Shantilal Tandel, Senior Scientist, ICAR-CIBA Research Centre, Navsari, Gujarat, Chief Guest on the occasion said that, Gujarat possesses the longest coastline in the country, and the transformation of our barren salt-affected lands into thriving aquaculture hubs is a testament to the Gujarati spirit of entrepreneurship. Today, our state leads the nation in shrimp production, contributing significantly to India's multi-billion dollar seafood exports. But as we celebrate this growth, we must acknowledge that with great scale comes great responsibility, necessitating a shift towards responsible farming i.e Super Intensive Natural Precision Shrimp Farming.

By adopting these high-density, controlled systems and utilizing GIS Mapping, we are creating a digital blueprint for our coastline that ensures biosecure expansion and prevents the over-intensification of our precious natural resources. To sustain this momentum, we must ground our ambitions in rigorous science and localized support. The establishment of the Aquatic Referral Laboratory by the ICAR-CIBA Navsari Gujarat Research Centre (NGRC) is a monumental step in this direction, providing our farmers with a world-class diagnostic hub right at their doorstep. This facility allows for rapid pathogen detection and precise soil and water analysis, moving us away from guesswork toward evidence-based management. By combining Surat's legendary entrepreneurial drive with the technical precision of CIBA's referral lab, we are ensuring that Gujarat's aquaculture remains not only the largest in the nation but the most responsible and technologically advanced in the world. Thanks to Aqua International and GAFDA for the invitation, Dr Ritesh stated.

Mr Suresh J Patel, President, Gujarat Aquaculture Association (GAA) explained the difficulties faced by shrimp farmers in Gujarat state and the representations made by GAA to the Central and State governments. He urged the Gujarat government to allot land and to renew lease of land for aquaculture farming.

Mr Pradip Navik, President, Gujarat Aquaculture Feed Dealers Association

(GAFDA) said that there is a need of promoting shrimp consumption in Gujarat state. He expressed his displeasure over a section of the society in the state opposing shrimp and fish farming activity in the state.

Mr Saji Chacko, President, Society of Aquaculture Professionals addressed the inaugural session.

Mr Jignesh U. Contractor, Member, Gujarat Aquaculture Association expressed his greetings to the participants in the expo.

Dr Kuldeep K. Lal, Director, ICAR - Central Institute of Brackishwater Aquaculture, Indian Council of Agricultural Research graced the Expo and presented mementos to the exhibitors as a gesture of appreciation for their participation in the expo.

Mr M.A. Nazeer, Chief Executive of the Expo and Editor, Aqua International said that, we have so far organised 41 exhibitions and conferences on Aquaculture sector since 1994 in different parts of the country. In Gujarat state alone, this was our 15th Edition of Aquaculture Expo, he added.

Shrimp farmers are struggling presently and farming is not exciting to farmers that much now a days due to diseases and low productivity though Aquaculture is their only livelihood. In addition to that farmers in Gujarat state are facing problem of land allotment and renewal of land lease for shrimp farming. I request Gujarat Government to look into these farmers issues and help them.

I hope this Expo will bring every stakeholder of Aquaculture sector like Farmers, Scientific & Educational Intitutions on Aquaculture, Govt officials, Suppliers of various products and services like Seed, Feed, Health & Nutrition Products, Aerators & Equipment, Processors & Exporters, Raw Material buying Agents, Dealers & Distributors, Commercial & Technical Professionals together on a common platform during these two days event, and I hope this event will help us all to meet, Exchange ideas and gain knowledge on various aspects, and for better business opportunities. He thanked the Exhibitors and Sponsors for making the event happen comfortably with their support. The expo was jointly organised by Aqua International and Gujarat Aquaculture Feed Dealers Association.

A View of participants during Inauguration of the Expo

Tap the Potential to take Gujarat Aquaculture to the Next Level

Suresh Patel, President, GAA, Pradip Navik, President, GAFDA, Rohan Navik, Hitesh Patel, Manthan Tandel, Mayank Sharma, Harshil Mohan Bhai and Raj Zala on the dias during Panel Discussion on the occasion of Aquaculture Expo 2025 held on 12 December 2025 at Surat, Gujarat.

Panel Discussion with the theme: 'Tap the Potential to take Gujarat Aquaculture to the Next Level' was held on the occasion in which six Young Entrepreneurs from Gujarat state actively participated and made the Panel Discussion very informative, thought provoking and useful to the aquaculture sector in Gujarat state.

Young Entrepreneurs Mr Rohan Navik, Mr Hitesh Patel, Mr Manthan Tandel, Mr Mayank Sharma, Mr Harshil Mohan Bhai and Mr Raj Zala felicitated the seniors with Mr Suresh

Patel, President, GAA, Mr Pradip Navik, President, GAFDA, Mr Ravikumar Yellanki, President, AISHA and Mr Saji Chacko, President, SAP with flower bouquets. The young entrepreneurs attracted the attention of the elders and the participants in the conference with their knowledge sharing and the commitment for the industry. The young entrepreneurs assured to work with the seniors of the industry for the development of aquaculture sector in the state.

Young Entrepreneurs are the asset to the industry Mr M.A. Nazeer, Chief Executive of the Expo and Editor, Aqua International said that, young entrepreneurs are the asset to aquaculture sector in Gujarat state and in the country, and asked the youngsters to update their knowledge in all aspects of the sector and work with a commitment for the upliftment of the farmers and the sector.

Group photo of Panelists during Panel Discussion.

Panelists - Seniors:

1. Mr Suresh Patel, President, GAA, Navsari, Gujarat.
2. Mr Pradip Navik, President, GAFDA, Surat.
3. Mr Ravikumar Yellanki, President, AISHA.
4. Mr Saji Chacko, President, SAP.

Panelists - Young Entrepreneurs

1. Mr Rohan Navik, Director, Zeal Aqua Ltd, Surat, Gujarat.
2. Mr Hitesh Patel, Director, Hariom Aquaculture Pvt Ltd., Navsari, Gujarat.
3. Mr Manthan Tandel, Tej Aqua, Valsad, Gujarat.
4. Mr Mayank Sharma, Director, Mayank Aquaculture Pvt Ltd, Surat, Gujarat.
5. Mr Harshil Mohan Bhai, Ratnam Aqua, Valsad, Gujarat.
6. Mr Raj Zala, Director, Xanadu Food Ltd, Surat, Gujarat.

Suresh Patel

Ravikumar Yellanki

Saji Chacko

Raj Zala

Mayank Sharma

Dr P. E. Cheran

B. Masthan Rao, Member of Parliament and Dr Kuldeep K. Lal, Director, ICAR - Central Institute of Brackishwater Aquaculture, graced the Expo and presented mementos to the exhibitors as a gesture of appreciation for their participation in the Expo.


SUCCESS COMBO


Biotech Pvt Ltd


Black Tiger Shrimp


V5
Pro Mari














A view of Aquaculture Expo 2025 held at Surat, Gujarat on December 12 & 13


SUCCESS COMBO


DEVI PRIME
DEVI GRAND


Cerolite


INTRON


Gentle Bio-Sciences Pvt. Ltd.
Gentle Bio-Sciences Pvt. Ltd.


Red


LivingAcua


NEEVA


SHRIMPS


MADHAV Technology


Black or White


GROBUST


AQUA OLPAD


REHAN SEA FOOD'S

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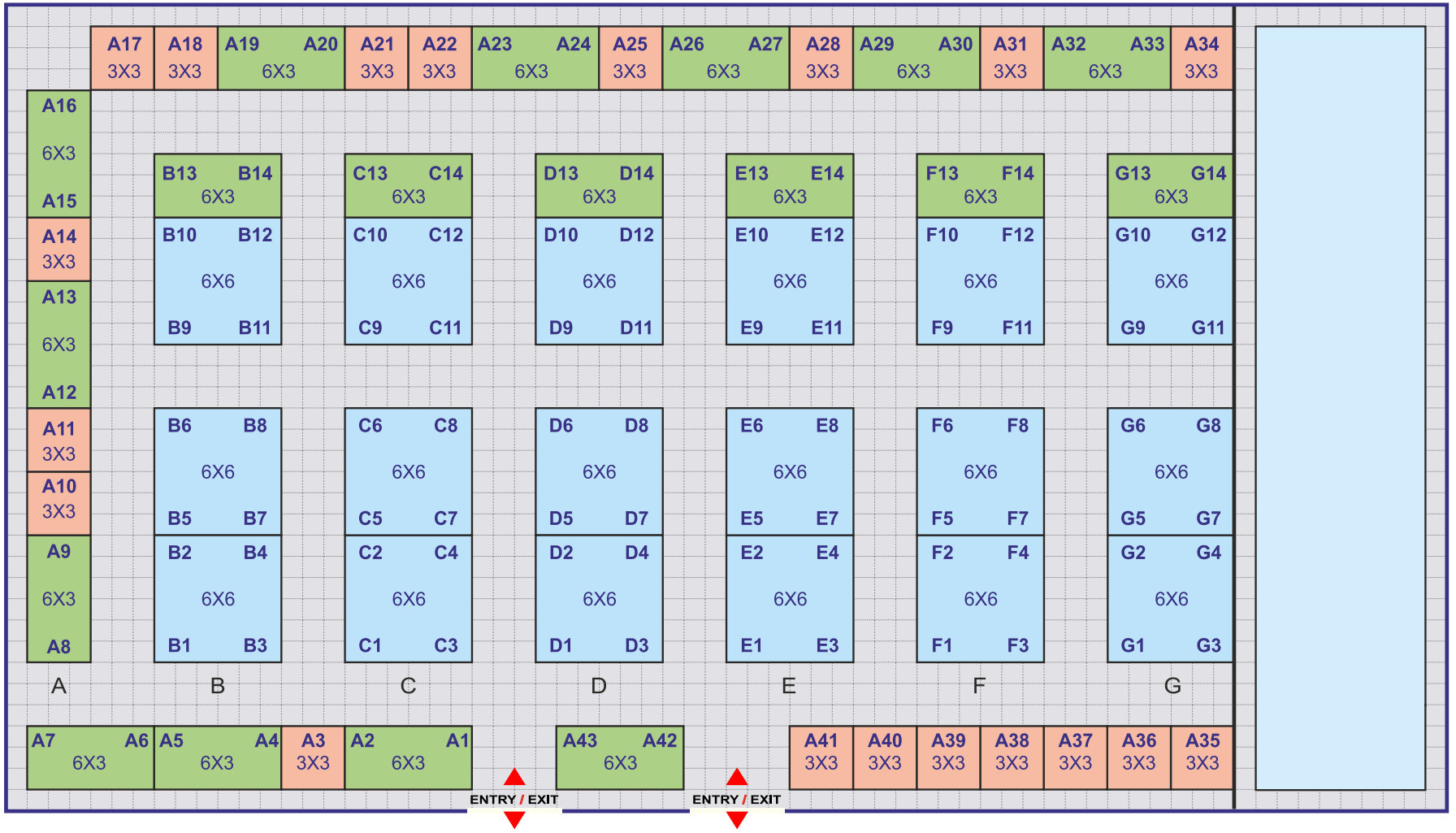
An Exhibition, Panel Discussion & Experts - Farmers Interaction Meet on Aquaculture Sector to Update Knowledge and for Better Business Opportunities

43rd Edition Aquaculture Expo 2026
Exhibition on Aquaculture Sector

LAYOUT OF STALLS



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Totally enclosed spraying space, Precision & Efficient spraying proportion widely ranged from 2%~30%.

Extraqua – The phytogenic solution for ammonia control in aquaculture

The Critical Challenge of Ammonia in Aquaculture

By Avitech Nutrition Pvt Ltd

Water quality is a critical factor influencing the success of aquaculture operations. Ammonia is an invisible, pungent, water-soluble alkaline gas, and a primary concern because aquatic animals contribute 40–90% of the nitrogenous excretion during their growth. Ammonia can react with water to produce ammonium hydroxide, a highly corrosive contaminant that damages cells. Elevated ammonia levels reduce the diffusion gradient across the gills, causing the aquatic animals to concentrate ammonia in their blood. This leads to high blood pH, impaired oxygen transport, gill damage, increased oxygen consumption, and ultimately, a decrease in production performance in intensive systems.

Factors Responsible for Ammonia Build-up in Ponds

Ammonia accumulates continuously from the nitrogenous excretion of aquatic animals and the microbial decomposition of organic materials. Key management and environmental factors influencing ammonia production and toxicity include ***stocking density, temperature, pH level, dissolved oxygen concentration***, and feed nitrogen content.

Detrimental Effects of Ammonia for Aquatic Life

Ammonia accumulation severely compromises aquatic animal health. The resulting high concentration in the blood negatively affects enzyme reactions and cell stability. Physiologically, ammonia reduces internal ion levels, harms gills, and impairs oxygen transport. These physiological stressors lead to increased stress, a weakened immune response, reduced growth rate, poor fertility, poor shell quality and high mortality rates.

Mitigation Methodologies in Aquaculture

Effective water quality management requires minimizing the nitrogenous waste load and promoting its conversion to less harmful forms. Mitigation strategies involve controlling stocking density and ensuring adequate dissolved oxygen via aeration (necessary for aerobic bacteria). Promoting the optimal rate of nitrification is key to converting toxic compounds into less harmful nitrate. Thankfully some specialised phytogenic products promote phytoplankton growth which utilizes ammonia during photosynthesis.

Extraqua: A plant-based solution for comprehensive Ammonia management for aquaculture

Avitech Nutrition offers **Extraqua**, ***a plant-based Ammonia control agent for aquaculture***. Extraqua is designed to efficiently control and inhibit toxic ammonia levels, significantly mitigating harmful effects. Extraqua contains key bioactive compounds, including terpenoids, phenolics, alkaloids, steroids, and glycosides, which drive its three-pronged strategy:

1. **Direct Binding:** Glycosides, which possess surface-active properties, directly bind to ammonia. This action immediately lowers ammonia levels in the pond water and potentially in the gut of the animal if consumed.

2. **Inhibition:** Extraqua effectively controls ammonia release by inhibiting the hydrolysis activity of the urease enzyme, thereby controlling the microbial decomposition of organic matter that converts it into ammonia.

3. **Nitrification:** Extraqua's bioactive compounds accelerate the growth of essential nitrifying bacteria. This facilitates the nitrification process, converting toxic ammonia and nitrite into nitrate which is readily assimilated by organisms, including phytoplankton, whose growth Extraqua promotes.

Comparative Trial Results - Extraqua vs. Yucca based product

A 91-day comparative study was conducted on *Litopenaeus vannamei* shrimp at the Kerala University of Fisheries and Ocean Studies (KUFOS) in Kochi, Kerala comparing Extraqua to a commercially available Yucca-based ammonia binder.

Water Quality Management

The trial demonstrated Extraqua's ***superior ammonia-binding capacity***. Extraqua consistently displayed lower Total Ammonia Nitrogen (TAN) levels. Ponds treated with Extraqua also ***exhibited lower nitrite*** levels. Crucially Extraqua-treated ponds showed ***elevated levels of nitrate***, suggesting that the product facilitated the nitrification process for more efficient water quality management.

Production Performance and Health

Maintaining optimal water quality with Extraqua resulted in significantly improved production parameters.

Parameter	Extraqua Group	Yucca Group
Survival Rate (91 d)	85%	80%
Average Body Weight (91 d)	19.43 g	18.89 g
Feed Conversion Ratio (FCR)	1.24	1.28

The lower FCR observed in the Extraqua group is attributed to its role in sustaining optimal water quality throughout the culture period.

Organoleptic Quality

Extraqua positively influenced shrimp quality: shrimp had a ***better appearance and a fresher aroma***. The carapace consistently displayed a ***vibrant and healthy green colour***, whereas the Yucca group exhibited varying colours. The eyes of Extraqua-treated shrimp appeared vibrant and transparent, complemented by a bluish-white shell.

Conclusion

The incorporation of **Extraqua** effectively reduces ammonia nitrogen and nitrite in ponds. This enhances water quality, promotes growth, improves feed conversion, and increases shrimp productivity. Extraqua also enhances overall shrimp well-being, including appearance and carapace health.

Aquaponics Beyond Sustainability: Why ROI Is Becoming the Decisive Factor for Adoption in Emerging Markets

Franco. A. Cerda Dubó, E: francocerda3@hotmail.com

Abstract

Aquaponics has long been promoted as a sustainable solution to food production challenges, particularly in regions facing water scarcity, land limitations, and climate stress. However, despite its environmental advantages, large-scale adoption has remained limited in many emerging markets. This article argues that **Return on Investment (ROI)**—rather than sustainability alone—is increasingly the decisive factor influencing adoption. Drawing on lessons from arid, capital-intensive economies, the paper explores why financially viable aquaponics systems outperform concept-driven pilots and how ROI-oriented design is redefining the future of integrated food production.

1. Introduction: Sustainability Is No Longer Enough

Over the past decade, aquaponics has gained global visibility as an environmentally efficient food production system that integrates recirculating aquaculture systems (RAS) with hydroponic plant cultivation. Its benefits—reduced water use, nutrient recycling, and lower environmental discharge—are well documented (Goddek et al., 2019).

However, a critical gap persists between **conceptual success** and **commercial scalability**. Many aquaponics initiatives in emerging markets remain confined to pilot projects, donor-funded programs, or educational demonstrations. The primary reason is not technical failure, but **economic underperformance**. As public and private capital become more disciplined, investors and governments increasingly ask a simple question: Does aquaponics deliver a competitive, *predictable return on investment?*

2. The Shift from Environmental Logic to Financial Logic

Early aquaponics narratives were driven by sustainability logic—reduced water consumption, circular resource use, and alignment with the Sustainable Development Goals (SDGs). While these attributes remain important, decision-making frameworks in emerging markets have shifted toward **financial logic**, particularly under conditions of fiscal pressure and capital scarcity.

Recent studies show that high initial capital expenditure (CAPEX), energy costs, and operational complexity often erode profitability when systems are poorly designed or over-engineered (Bosma et al., 2017; Love et al., 2015). As a result, ROI, payback period, and operational resilience have become central criteria for adoption.

In practice, aquaponics systems that fail to meet basic financial thresholds—typically payback periods of 5–7 years or less in emerging markets—struggle to attract sustained investment.

3. Understanding ROI in Aquaponics Systems

A combination of biological, technical, and economic variables influences ROI in aquaponics:

- System design and scale: Small demonstration systems often lack economies of scale, while oversized systems may carry excessive CAPEX.
- **Species and crop selection**: High-value fish species and fast-growing crops significantly improve revenue density (Mchunu et al., 2018).
- **Energy efficiency**: Energy remains one of the most significant

operational expenses, particularly in warm or arid regions (Badiola et al., 2012).

- **Market access:** Proximity to premium markets and reliable off-take agreements reduces price volatility.

Empirical evidence suggests that aquaponics projects designed with **market-driven production planning** consistently outperform those designed primarily around environmental objectives (Turnšek et al., 2020).

4. Lessons from Arid and Emerging Economies

Arid regions and water-scarce economies—such as parts of the Middle East, North Africa, and South Asia—offer valuable lessons for emerging markets. In these contexts, food production systems are evaluated not only for sustainability but also for their ability to reduce import dependency, stabilize prices, and generate local employment.

In capital-intensive environments, aquaponics systems increasingly adopt:

- Modular designs to control CAPEX
- Hybrid energy solutions to reduce OPEX
- Commercial species portfolios aligned with domestic consumption patterns

These adaptations demonstrate that aquaponics can be economically viable **when ROI is embedded at the design stage**, rather than treated as an afterthought.

5. Why Many Aquaponics Projects Fail Financially

Despite technological maturity, financial failure remains common. The most frequent causes include:

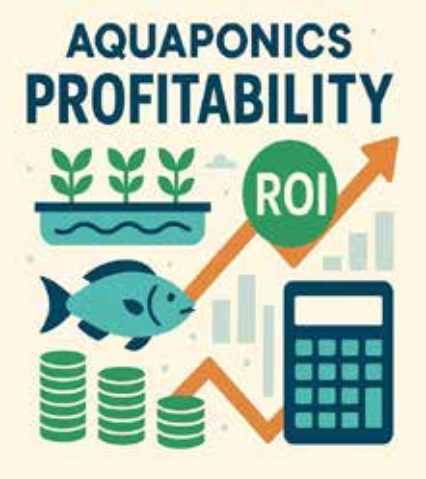
- **Overdesign:** Excessive automation and redundant systems inflate CAPEX without proportional revenue gains.
- **Underestimation of OPEX:** Energy, labor, and maintenance costs are often underestimated.
- **Misaligned production models:** Producing crops or fish without secured markets increases revenue risk.
- **Lack of financial literacy:** Technical teams may lack experience in financial modeling and investment analysis.

Studies indicate that projects combining strong technical expertise with rigorous financial planning show significantly higher survival rates (Palm et al., 2018).

6. From Pilot Projects to Investment-Ready Systems

To move beyond pilots, aquaponics must transition from **technology-driven projects** to **investment-ready assets**. This requires:

- Clear financial modeling (ROI, IRR, break-even analysis)



- Conservative yield assumptions
- Scenario-based risk analysis
- Integration with broader food system strategies

Emerging markets, in particular, benefit from systems that demonstrate not only environmental performance but also **bankability**.

7. Implications for Emerging Markets

For countries facing population growth, water stress, and urbanization, aquaponics remains a promising solution. However, adoption will accelerate only when systems are framed as **profitable agri-business ventures**, not experimental sustainability projects.

- Governments, development agencies, and private investors should therefore prioritize:
- ROI benchmarks alongside sustainability metrics
- Capacity building in financial and operational management
- Policies that support scalable, market-oriented systems

8. Conclusion

Aquaponics is entering a new phase of maturity. Sustainability remains its foundation, but **ROI is becoming its gatekeeper**. In emerging markets, where capital efficiency is critical, the future of aquaponics will be defined by systems that deliver both environmental benefits and robust financial returns.

By aligning technical design with market realities and investment logic, aquaponics can move from niche innovation to a core component of resilient food systems.

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Transforming aquaculture challenges into market opportunities by merging scientific expertise with commercial acumen. | Innovator in Sustainable Aquaculture | BM, PD, and BU Leader | Director of Marine Ops | PhD & MRES UCAM Universidad Católica San Antonio de Murcia- Riyadh, Saudi Arabia.

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More referencecs can be given on request.

From Rusty to Refreshing:
How to Reduce Iron in Borewell Water

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In aquaculture systems, maintaining optimal water quality is vital for the growth and health of cultured organisms. *Litopenaeus vannamei* (also known as *Penaeus vannamei*), a widely cultivated tropical shrimp species prized for its fast growth and high productivity, is particularly sensitive to heavy metal contamination. Heavy metal pollution, including elevated iron concentrations, can interfere with key physiological processes, leading to impaired growth, reduced reproduction, and lower survival rates. Moreover, bioaccumulation of these metals in shrimp tissues—especially in muscle—poses potential risks to both shrimp health and human consumers.

Bore water is commonly utilized for domestic, agricultural, and industrial purposes; however, it frequently contains elevated concentrations of iron. Although iron is an essential trace element required for various physiological functions in invertebrates, excessive levels can become toxic. High iron concentrations in water can cause discoloration, staining, unpleasant odors, and potential health hazards. Therefore, understanding and applying effective iron removal techniques are crucial for enhancing the quality and usability of bore water.

Types of Iron In Water

FERROUS IRON (Fe^{2+}, Clear-water Iron) is a soluble form found in anaerobic groundwater with low oxygen levels. Water with ferrous iron appears clear when first poured, but turns reddish-brown when the iron oxidizes.

FERRIC IRON (Fe^{3+}, Red-water Iron): This insoluble, oxidized form is already present as particulate matter in water, giving it a yellow or reddish tint and creating noticeable stains.

ORGANIC IRON: Iron bonded to organic molecules, typically present in shallow wells or surface-affected water, and can cause yellow/brown discoloration that is difficult to filter using regular methods.

COLLOIDAL IRON is a suspension of microscopic iron particles in water that causes persistent staining and is difficult to remove using standard filtration techniques.

IRON BACTERIA: Microorganisms oxidize iron, causing reddish sludge, foul odors, and taste problems in water systems.

Types of Iron Filters

There are several types of iron filters available, each designed to address different forms of iron and water conditions:

Air Injection Filters

These systems use air to convert soluble iron to insoluble particles, which are then trapped in the filter media. They are efficient at eliminating large levels of ferrous iron and require minimal maintenance.

Chemical Oxidation Filters

These filters use chemicals like potassium permanganate or chlorine to oxidize iron, making it easier to remove. They are suitable for water containing ferrous and ferric iron, but require more maintenance to replace the chemicals.

Greensand Filtration

Greensand filters contain a specialised media coated with manganese oxide that oxidises and removes iron from water. They are adaptable for various iron levels but may need periodic regeneration using potassium permanganate.

Birm Filters

Birm is a filtration medium that promotes the oxidation of iron naturally, eliminating the need for chemical additives. It effectively removes low concentrations of iron from water and offers a long service life BIRM is a catalytic filtration media that accelerates the oxidation of dissolved iron and manganese into insoluble particles. These oxidized particles are then trapped in the filter bed and removed during backwashing.

MANGANESE DIOXIDE FILTERS

These filters utilize manganese dioxide media to catalyse the oxidation and removal of iron and manganese. They provide highly effective filtration but tend to be more costly compared to alternative media options.

CONCLUSION

Iron is not typically considered an issue in general aquaculture, but it can be an important concern in hatcheries that use well water, as ferrous (dissolved and colorless) iron is particularly harmful to young aquatic animals. In such circumstances, farmers should test for iron regularly and use oxidation along with mechanical filtering in small-scale systems to successfully limit toxicity. For larger grow-out operations food supplementation may be a more feasible strategy to reduce ferrous iron toxicity. Overall, monitoring iron levels and treating them appropriately is critical for protecting aquatic animal health and optimising productivity.

Major Aquaculture Issues and the Promise of Immunomodulation in Shrimp Farming

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Introduction:

Despite remarkable progress in aquaculture technology and management, shrimp farming remains highly vulnerable to infectious diseases that can rapidly devastate production systems across entire regions. This susceptibility stems from a biological limitation—shrimp depend solely on their innate immune system for protection and lack the adaptive immunity that enables vertebrates to develop long-term resistance or immune memory against specific pathogens. Currently, the industry faces major challenges from three dominant pathogens—White Spot Syndrome Virus (WSSV), Acute Hepatopancreatic Necrosis Disease (AHPND), and *Enterocytozoon hepatopenaei* (EHP)—which together cause annual global economic losses exceeding ₹88,000 crore. These threats are intensified by environmental stress and limited immune competence, leading to poor survival, slower growth, and inconsistent yields.

Immune modulation

Immune modulation has therefore become a crucial strategy to strengthen shrimp defenses in intensive aquaculture systems. This approach enhances innate immune mechanisms—such as hemocyte activity, antimicrobial peptide production, and humoral enzyme responses—through dietary, environmental, or biotechnological means. Feed-based immunostimulants like β-glucans, vitamins, and minerals activate shrimp hemocytes and trigger broad-spectrum immune responses that improve pathogen resistance and readiness for subsequent infections.

Beta-glucan:

β-glucans are among the most effective shrimp immunostimulants, acting through receptor-mediated recognition pathways that upregulate immune genes, increase hemocyte counts, and stimulate enzymes such as lysozyme and prophenoloxidase. Together, these activities improve the effectiveness of pathogen identification and killing. The effectiveness of each form of beta-glucan in boosting immunity varies, thus it must be carefully assessed based on the species being used.

Vitamin-C:

Vitamin C serves as both an antioxidant and immune booster, improving shrimp survival and enhancing key antioxidant enzymes like superoxide dismutase (SOD), catalase (CAT), and prophenoloxidase. It shields hemocytes from oxidative stress during infections and encourages melanization and tissue healing. Excessive dosages may have pro-oxidant effects that inhibit favorable immunological responses, even while appropriate supplementation boosts immunity.

Nano-selenium:

Nano-selenium, an essential trace element, functions as a component of antioxidant enzymes such as glutathione peroxidase. It prevents lipid peroxidation, controls reactive oxygen species, and supports immune cell proliferation. By minimizing oxidative stress, nano-selenium enhances both cellular and humoral immunity, making it a highly effective and safe immunostimulant for disease prevention in shrimp culture.

Conclusion:

In summary, reinforcing shrimp immunity through targeted immune modulation is essential for achieving sustainable and profitable aquaculture. Given shrimp's lack of adaptive immunity, they remain susceptible to devastating diseases that threaten productivity. Incorporating immunostimulants like β-glucans, vitamin C, and nano-selenium into shrimp diets offers a proven means to strengthen innate immune responses, enhance survival, and mitigate the impact of major pathogens such as WSSV, AHPND, and EHP. By activating and maintaining a responsive immune system, these interventions equip shrimp to better withstand disease challenges and environmental stress, ensuring more stable and resilient production systems.

Important aspects of state-of-the-art of major carp farming at Moyna Block, West Bengal

Subrato Ghosh, Kolkata, West Bengal, Email: subratoffa@gmail.com

Sri Hait explaining a point to FEOs

Highlight points

In this write-up, important aspects of the present state-of-art of major carp farming practice at Moyna CD Block, West Bengal is genuinely presented. It is the commercial carp aquaculture hub in this State having unique features of semi-intensive grow-out culture and production of table fish, and its transportation in live state to different districts of West Bengal and neighbouring States. Write-up is based on information given by Sri Tuhin Hait, an experienced and progressive carp farmer at Moyna on 28/11/2025 and a Presentation made by Fishery Extension Officer, Moyna CD Block on 22/06/2024. Readers will get information on some newer and innovative methods in carp farming which have been developed by fish farmers at Moyna.

Introduction

As a part of In-service Training Programme organized for the newly-appointed Fishery Extension Officers (2nd Batch) under Directorate of Fisheries, Government of West Bengal at Government Fish Technological Station, Junput, Purba Medinipur during 24/11/2025 to 08/12/2025, participating FEOs had a field visit to Sri Tuhin Hait's carp farm at Vill. Dakshin Changrachak, under Ramchak Gram Panchayat, PS Moyna and Moyna Community Development Block, Purba Medinipur on 28/11/2025. Sri Hait, aged 49 years, is a progressive fish farmer. He has taken a 25 acre (1 acre = 100dec) water body on lease for major carp grow-out farming. Dr S. N. Jana, Assistant Director of Fisheries, Purba Medinipur; Sri P. Samanta, Fishery Extension Officer, Moyna Block and Sri P. Das, another progressive carp farmer guided the participating FEOs to Sri Hait's farm on 28/11/2025. I was also in the team.

Sri Tuhin Hait

Photo Courtesy Gurvinder Singh

Pre-stocking management and stocking

According to Sri Hait, in 1990, rice cum major carp integrated fish farming system started at Moyna, continued for 12-14 years. Since 2004, monsoon paddy farming stopped, only fish (major carp) farming and winter (boro) rice farming were done. From 2010 onwards, only major carp farming practice is done, no paddy farming. Vast tracts of freshwater bodies exist at Moyna for fish farming, ranging from 20-300 bigha in extent (1 bigha = 33dec). Those are dewatered once in 2-3 years, bottom soil disinfected and re-filled with water.

Lime (Calcium carbonate) is applied during pond preparation @ 100-150kg/acre. Then Mohua oil cake applied @ 500-700kg/acre (water depth 5-7 feet). After 21 days, toxic action of this plant-based toxicant is neutralized. Pesticide Cypermethrin applied to kill aquatic insects. Then organic juice combined with commercially-available Minerals applied in water bodies. For every 33dec water body, 5kg mustard

FRP boat for operation in large water bodies

Moyna Fish Farmers Welfare Association

oil cake/groundnut oil cake, 4kg rice bran, 6kg wheat flour, 4kg chitey gur or sugarcane molasses, 500gm yeast powder are mixed, along with pond water 6-7 times in weight of the entire mixture. It is kept in a closed drum for 3-4 days. On 5th day, half of this mixture is diluted and applied in entire water body, and rest half on the next day. It is done during pre-stocking water body management.

Big-sized carp fingerlings @ 2000nos/acre are stocked after application of juice and Minerals. *Catla catla* is 700-750gm in size at stocking, *Labeo rohita* 300-400gm. Sometimes stocking density is increased upto 70000nos/acre water body, i.e. 3500nos/acre. Proper management conditions are maintained all throughout culture period and higher production is obtained. Farmers stock *L. rohita* 1450-1500nos/acre (70-75%), *C. catla* 200nos (10%), *Cirrhinus mrigala* 15-20%. Some farmers prefer to stock 150nos *C. catla* and 50nos *Hypophthalmichthys molitrix* per acre in upper water column. In every 100 bigha water body, 10% area is separated by constructing earthen embankment and earmarked for production of big-sized carp fingerlings and/or yearlings, from (stocking of) advanced fry or normal fingerlings stage.

Partial harvesting is done on 100-120th day of culture; about 300-350nos of grown-up fishes are harvested and sold, weighing 900-1000gm. Complete harvesting is done in between 160-180 days, fishes are 1000-1400gm in weight. A production of 2500kg/acre of major carps is obtained by fish farmers in one crop, maximum 3000kg/acre. But remarkably Sri Tuhin Hait is producing 5500kg major carps in six months from every 1 acre water body. Two crops are raised in one year. Multiple stocking – multiple harvesting concept is also followed.

Important aspects

Ash obtained after burning sun-dried cow dung cakes ('Ghutey' in Bengali), burnt ash from rice mills, burnt straw ash has beneficial impact on fish growth when applied in water bodies. Turmeric and edible salt if added to formulated non-pelleted supplementary feed and fed to growing carps – it prevents occurrence of fungal diseases. Copper sulphate may be used @ 200gm / bigha to kill excessive green algae and duckweeds in smaller water bodies.

During 1994-2009, there was no use of commercially-available {produced by Company(s)} fish feed and medicine in fish farming water bodies at Moyna. But during 2010-2025, there has been much use of these commercially-available inputs and other aquaculture products also. Application of Calcium carbonate once in a month @ 6-7kg/bigha water body is essential, but should be stopped on conditions when ammonia toxicity arises and algal growth is excessive. Ammonia must be eliminated from bottom soil

Yeast - a new aquaculture input

Date 1	Application of lime in morning and Potassium permanganate in evening
Date 2	Feed applied
Date 3	Deltamethrin or other compound applied to kill fish lice *Argulus* sp
Date 4	Feed applied, more in quantity than Date 2
Date 5	Commercially-available water sanitizer applied
Date 6	Feed applied, like Date 4
Date 7 or 8	Application of Zeolite @ 10kg/acre and Ammonia eliminator Yucca – both function as soil probiotics
Date 9 and Date 10	Feed applied
Date 11	Application of organic juice and Minerals; application of Probiotics in full dose after application of juice and Minerals
Date 12 to Date 30	Formulated feed applied daily
Date 22	Copper sulphate crystals placed inside cotton cloth, kept immersed in water body

Work done every month after stocking of big carp fingerlings

and water. Water exchange is done; 50% new water is introduced into fish farming plots. Rice bran is applied to increase zooplankton production. Sugarcane molasses or date palm molasses may be added to burnt ash and applied in water bodies. Baking soda is applied @ 2kg/acre/month to maintain the balance between Carbon and Nitrogen (ratio). Addition of burnt ash in water bodies in late evening eliminates ammonia.

Management during winter months

Fungal diseases appear in growing carps during winter, inadequate supply of protein in fish body is the cause. Normally fishes do not eat when fungal infection is observed in gills. Fishes should be fed only @ 1% of body weight during winter instead of 3-4% body weight. Emphasis is given to produce natural planktonic food matter in water bodies. Temperature balance is maintained in water during winter, 4.5-5.0 feet water depth is maintained. High abundance of phytoplankton is maintained during winter, water turns quite thick. At every 15 day interval, Calcium carbonate (agricultural lime or limestone) is applied in early morning @ 20kg/acre every time in winter months, which is a higher dose in comparison to that in summer months. It is first added to water in small rectangular cement cisterns, liquefied material is applied in somewhat hot to warm condition, sprinkled in entire water body. Water is heated up to some extent in this process and temperature balance maintained. On conditions when both pH and phytoplankton densities in water are high, then lime is applied during evening.

Fish feeding practices

In the bag feeding method practiced at Moyna, ingredients include de-oiled rice bran 70-80% (which should have less than 10% fibre and more water retention capacity; DORB having 20-25% fibre is not good), ground nut oil cake 10%, soyabean meal or maize meal 10%. In addition to this farm-made formulated feed, floating-type pelleted feed of reputed Company is applied during evening @ 2% of body weight daily. After pond preparation, big-sized fingerlings and sub-adults of Indian major carps are stocked. Initially application of juice produces natural planktonic food matter upon which carps feed. Thereafter fishes are acclimatized slowly to formulated feed in perforated bags, application begins when fishes are 500gm in weight. Beginning with 3.5% of body weight, it is slowly reduced to 2.5%, 2% and finally 1% when fishes grow up and achieve almost harvestable size. Each of the bags carries 8-10kg feed, kept in completely submerged state, renewed (refilled) every day. Edible salt 10kg and turmeric 7-8kg are added to every 1000kg feed. Yeast also added to keep the intestinal tract of carps under culture fresh and free from infection-causing bacteria. Turmeric helps to prevent bacterial and fungal infection in gills.

Organic juice preparation for plankton enrichment in water bodies

For both phytoplankton and zooplankton production in every 1 acre water body, juice is prepared accordingly: Deoiled rice bran 10kg, mustard oil cake 5kg, groundnut oil cake 2.5kg, sugarcane molasses 1.25kg, yeast 500-700gm. The mixture is kept soaked in water in open drum, stirred with a bamboo stick everyday, juice is obtained after 5-7 days. It is applied in pond after addition of minerals 3-4kg. Edible salt may be applied along with Potassium permanganate during evening every month. When pH level falls, Potassium permanganate is applied @ 300-350gm/acre. When salt @ 20-25kg/acre is added to Potassium permanganate and applied, it eliminates bottom soil toxicity and clears off too much slimy mucus from outer fish body.

For zooplankton production in water body only during winter months, Sri Hait is using 6-7kg sugarcane molasses (for water depth 6-7 feet) and 50-60gm Bakery yeast for every 1 acre water body. In warm pond water (heated previously), live yeast is added and then molasses (which maintains ideal energy level of fis. hes), kept in airtight container for 12

Programme and Expo at Moyna

hours. This organic mixture is applied in water body on next day.

In order to produce and enhance zooplankton content in order body, a formulation may be used every month; it is juice. For every 1 acre water body, 8-10kg wheat flour or Auto bran, 3kg sugarcane molasses and 100gm yeast are used. The mixture is kept for fermentation for 48 hours in a drum with lid open. For causing only phytoplankton growth, Sri Hait uses another formulation for every 1 acre water body; Nitrogen (in the form of urea) 400-500gm, wheat flour or Auto Bran 8-10kg, yeast 100gm. It is kept for fermentation for 48 hours in lid open condition and applied, may be used round the year.

Fishery Extension Officer's viewpoints

From a Presentation of the FEO, Moyna CD Block, we are informed that only paddy cultivation was done in the vast tracts at Moyna till 2007. During 2007-2014, paddy-cum-fish culture was practiced and subsequently from 2014 onwards, semi-intensive major carp culture is being done. There are about 150nos of freshwater bodies in this Block, each of which are above 100 bigha in extent (in addition to smaller ones). The largest water body, namely Baitalchak Maath, is about 400 acre. Fish farmers at Moyna apply insecticide Deltamethrin @ 150gm/acre after filling in water. Potassium permanganate applied @ 10gm/acre on next day after use of insecticide and Minerals applied @ 1kg/acre two days after application of Potassium permanganate.

Ingredients in bag feed include DORB 65%, ground nut oil cake 25%, mustard

Preparation of organic mixture

oil cake 5%, soyabean oil cake 2%, Vitamin-Mineral mix 2% and yeast 2%. Every two feed-filled bags are placed below water level linearly at 15-20 feet distance apart. Lime is applied monthly @ 15kg/45-48dec, Potassium permanganate 5gm/dec, drag netting done every month. Fish stocking in every 1 acre water body is done accordingly: *L. rohita* 2200nos (250-300gm), *C. catla* 200nos (400-450gm), *C. mrigala* 500nos (250gm), *H. molitrix* 100nos (250gm). After six months, *L. rohita* achieves 1100-1200gm body weight, *C. catla* 2500-2700gm, *C. mrigala* 1000-1100gm, *H. molitrix* 2500-2700gm. Average fish production is 8000kg/hectare/crop, one crop is 6-8 months.

In the multiple stocking – multiple harvesting method, after 105 days of culture, fish farmers harvest 35% of fish stocked and they stock the same percentage of fish (big-sized fingerlings) for culture. After 150 days of culture, they harvest remaining 65% of big fishes and stock the same percentage of fish. About 50-70nos of pick-up van having 1000-1500lit containing capacity at back are used for live fish transportation daily from Moyna wholesale fish markets.

End note

Recently Sri Tuhin Hait has set up a high standard carp hatchery at his home premises at Vill. Dakshin Changrachak, under Ramchak Gram Panchayat, PS and Block Moyna, as an approved beneficiary in Carp Hatchery scheme, sponsored by West Bengal Fisheries Department having subsidy component. Sri Hait is producing 1.5 million major carp fry from every 30 Bati spawn (1 Bati holds 1,00,000 spawn) in his new carp hatchery and nursery ponds. He can sense the discomfort and disease condition of fish (if any) during night hours; can sense whether fishes are making typical splashing or gasping sound either due to dissolved oxygen depletion, or *Argulus* sp attack, or symptoms of ulcer and bacterial infection. He is also maintaining a stock of stunted fingerlings of Amur carp in one of his ponds.

In the fish farming water bodies, machine and motor are fitted in FRP boats or Aluminium bodied boats which are operated to apply supplementary feed and other inputs. The 3HP boats when operated help in aeration and consequently Dissolved Oxygen content is increased. In morning hours, after taking tea in local tea shops in transparent tea glass (100ml capacity), Sri Hait observed large numbers of zooplankton in water sample. But as day progresses with increase in sunshine intensity, only a few are observed in tea glass. According to him, when water sample taken in tea glass in full is faintly greenish in colour, it denotes that both phytoplankton density and pH are low. But when water is more greenish, then both phytoplankton density and pH are high. He has observed this matter. When water pH is 8.0 in morning hours and 8.5-8.7 during evening, then application of feed should be reduced.

Presently floating pelleted feed having 40-42% protein is used to produce marketable-sized Indian major carps. In earlier days, when bottom soil quality of water bodies was very good, then 2kg feed having 12% protein content was used to produce every 1kg fish. Protein level of 21-24% in fish feed is sufficient, says Sri Hait. I listened to Sri Hait's statements attentively during the interaction programme at his farm site on 28/11/2025. It can be said that successful fish farming practice at Moyna is a blend of science & technology and technical knowledge of farmers.

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