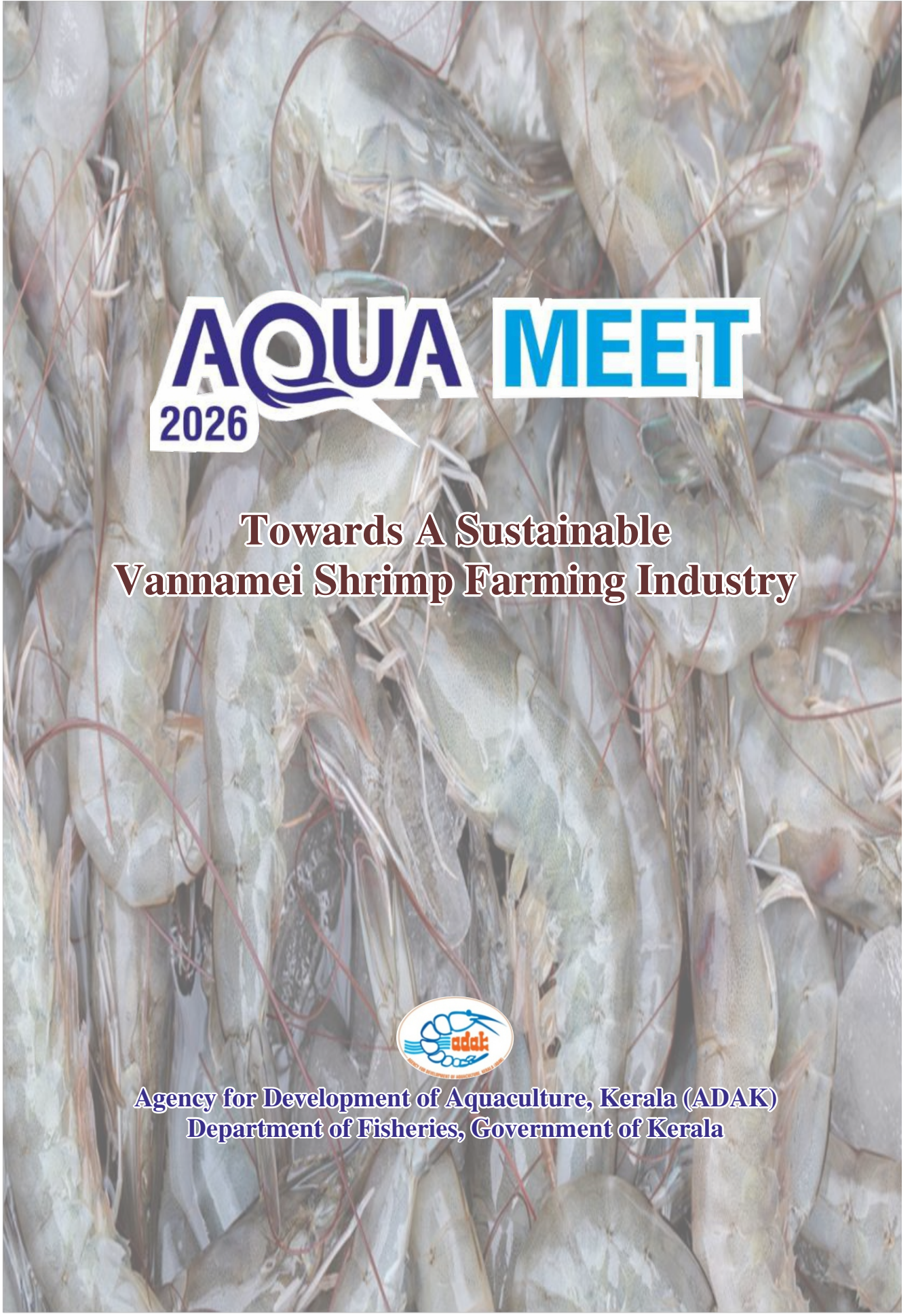

Towards A Sustainable Vannamei Shrimp Farming Industry

Agency for Development of Aquaculture, Kerala (ADAK)
Department of Fisheries, Government of Kerala

Report on

-Towards a Sustainable Vannamei Shrimp Farming Industry

Agency for Development of Aquaculture, Kerala (ADAK)

held on 24th January, 2026

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SAJI CHERIAN
MINISTER FOR FISHERIES,
CULTURE & YOUTH AFFAIRS
GOVERNMENT OF KERALA

THIRUVANANTHAPURAM
17-02-2026
Date.....

MESSAGE

I am pleased to convey that Aqua Meet 2026 was organised as a sector-focused convention for the sustainable development of Vannamei shrimp farming in Kerala. This initiative reflects the Government of Kerala's steadfast commitment to harness aquaculture as a major driver of economic growth and livelihood generation. Vannamei shrimp farming holds immense potential to strengthen our coastal economy and enhance export earnings for the state.

Aqua Meet 2026 has successfully united farmers, scientists, policymakers, exporters and technology providers on a common platform. Such collective efforts are essential for building a globally competitive and environmentally responsible shrimp farming sector. The discussions regarding biosecurity, Best Management Practices and regulatory compliance are vital for ensuring long-term sustainability.

I appreciate the role of ADAK and its partner institutions in promoting scientific shrimp farming practices across Kerala. The exhibition and technical sessions showcased innovations that can significantly improve productivity and resilience in farming systems.

The Government of Kerala envisions a major expansion in Vannamei shrimp production, creating employment and strengthening the blue economy. I congratulate all stakeholders for making Aqua Meet 2026 a landmark step towards Kerala's leadership in sustainable shrimp farming.

With Regards,

Saji Cherian

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ABDUL NASAR B. IAS
SPECIAL SECRETARY TO GOVERNMENT

FISHERIES DEPARTMENT

Date : 16-02-2026

MESSAGE

Aqua Meet 2026 marks a significant milestone in Kerala's efforts to promote sustainable and technology driven shrimp aquaculture. The programme has effectively addressed both the opportunities and constraints in the emerging Vannamei shrimp farming sector. Kerala endowed with extensive brackish water resources and their responsible utilisation can uplift rural and coastal livelihoods. This convention provided a much needed platform for multi-stakeholder engagement and sectoral convergence. The participation of national institutions such as NFDB, MPEDA, ICAR-CIBA and CAA reinforce the technical and policy relevance of the event.

Aqua Meet 2026 facilitated meaningful dialogue on regulatory frameworks, certification systems and market linkages. Capacity building initiatives of this nature are essential for empowering farmers with scientific knowledge and best practices. The exhibition component also highlighted the growing role of innovation, equipment and support services in modern shrimp farming. The Government remains committed to ensure institutional support, credit access and risk mitigation measures for farmers.

I extend my best wishes for the successful implementation of the recommendations emerging from Aqua Meet 2026.

Abdul Nasar B. IAS

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FORWARD

I am happy to present this publication documenting the proceedings and outcomes of Aqua Meet 2026 held at Bolgatty Palace, Ernakulam. The convention was a timely initiative focusing on the sustainable development of Vannamei shrimp farming in Kerala. It successfully brought together farmers, experts, entrepreneurs and institutions across the aquaculture value chain.

The technical sessions offered valuable insights into Good Management Practices, disease control, certification and export potential. Discussions also highlighted the importance of compliance with Coastal Aquaculture Authority regulations and environmental safeguards.

The experience sharing session provided practical perspectives from progressive farmers adopting advanced systems such as Biofloc, Diatom based and RAS. The exhibition stalls demonstrated the increasing availability of modern technology, quality inputs and institutional support mechanisms.

Aqua Meet 2026 has strengthened Kerala's roadmap towards responsible and sustainable aquaculture and enhanced shrimp production. The Department of Fisheries will continue to support initiatives that integrate technology, policy and farmer welfare in aquaculture development.

I congratulate ADAK and all collaborating organisations in successfully organising this landmark event for the sector.

Vikasbhavan,
16/02/2026

Chelsasini V. IAS
Director of Fisheries
Government of Kerala

PREFACE

Aqua Meet 2026 was conceived as a visionary initiative to establish a sustainable and globally recognised model for Vannamei shrimp farming in Kerala. The programme was organised by the Agency for Development of Aquaculture (ADAK) with the objective of integrating farmers, experts, policymakers and industry stakeholders on a common platform. Kerala's aquaculture sector is presently at a transformative stage and Vannamei shrimp farming represents a priority area of growth with immense economic and livelihood potential. This convention served as an important forum to identify constraints, share innovations and formulate strategies for long-term sustainability.

The strong participation of NFDB, MPEDA, SEAI, ICAR-CIBA, CAA, KUFOS, NABARD and AIC significantly enriched the technical and institutional deliberations. The event witnessed active engagement from shrimp farmers and entrepreneurs, ensuring that grassroots realities and field-level experiences shaped the discussions. The technical sessions addressed key themes such as biosecurity, water quality management, disease control, certification, insurance support and export opportunities. The exhibition showcased modern equipment, quality inputs and institutional services that can further strengthen Kerala's shrimp farming ecosystem.

Aqua Meet 2026 reaffirmed ADAK's commitment to farmer-centric, science-based and environmentally responsible aquaculture development. I sincerely thank all contributors and stakeholders for making Aqua Meet 2026 a landmark step in Kerala's blue economy journey.

This report serves as a comprehensive chronicle of the activities and deliberations of Aqua Meet 2026, documenting the journey from conceptualisation to the successful completion of the programme. It captures the technical insights, policy perspectives, strategic recommendations and the roadmap formulated during the sessions. To ensure authenticity and verifiability, key observations and recommendations made by experts and stakeholders have been systematically recorded.

Aqua Meet 2026 was not merely a single event, but the beginning of a long-term partnership between the Agency for Development of Aquaculture, Kerala (ADAK), under the Department of Fisheries, Government of Kerala and the aquaculture community, industry representatives and Government organisations. It represents a collective commitment to harness Kerala's vast aquatic resources for sustainable growth, positioning the state as a leader in responsible aquaculture. This report reflects the coordinated efforts aimed at shaping a resilient, inclusive and environmentally responsible Vannamei shrimp farming industry.

Ignatious Mandro B.,
Managing Director,
ADAK.

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Topic - 1

ABOUT AQUA MEET 2026

Aqua Meet 2026 was a sector-specific convention dedicated to sustainable Vannamei (Pacific white leg shrimp) farming, a priority area in Kerala's evolving aquaculture landscape. The programme was organised by the Agency for Development of Aquaculture, Kerala (ADAK), an autonomous body promoted by the Department of Fisheries, Government of Kerala. ADAK is responsible for promoting scientific and sustainable aquaculture practices through project implementation, farmer support, training, seed and feed supply, quality assurance and strategic sectoral development.

The meet was conducted in association with the National Fisheries Development Board (NFDB), Marine Products Export Development Authority (MPEDA) and the Seafood Exporters Association of India (SEAI), Kerala Region. It was conceived as a multi-stakeholder platform to identify constraints, explore opportunities and formulate a sustainable development model for Vannamei shrimp farming in Kerala.

Aqua Meet 2026, held on 24 January 2026 at Bolgatty Palace, Ernakulam, brought together farmers, exporters, entrepreneurs, scientists, academicians, policymakers, trade union leaders, technology providers and Government officials. The event aimed to build a transformative alliance for the sustainable development of the Vannamei shrimp industry by integrating scientific knowledge, policy support and market linkages.

1. Vision and Significance:

Aqua Meet 2026 represented a visionary step towards a future where production enhancement, employment generation, economic growth, environmental stewardship and social equity progress together. By combining Kerala's extensive brackish water resources with technical expertise and export potential, the initiative sought to establish a globally recognised model for sustainable shrimp aquaculture. The programme reinforced Kerala's commitment to sustainable Vannamei shrimp farming in alignment with state aquaculture strategies. It enhanced the visibility of

national and export-linked opportunities through partnerships with ICAR-CIBA, CAA, NFDB, MPEDA, KUFOS and SEAI, and provided a platform for direct interaction between farmers, policymakers, experts and industry stakeholders. This interaction accelerated technology transfer and the adoption of Best Management Practices (BMPs), strengthened Kerala's blue economy and supported livelihood enhancement in coastal and farming communities.

2. Objectives:

The key objectives of Aqua Meet 2026 were to:

- Promote economically viable and environmentally responsible practices in Vannamei shrimp farming.
- Strengthen collaboration among farmers, research institutions, Government bodies, exporters and industry partners.
- Build farmers' capacity through technical sessions on bio-security, water and disease management, feeds, Coastal Aquaculture Authority (CAA) regulations and BMPs.
- Highlight institutional support mechanisms available through ADAK, MPEDA, NFDB, ICAR-CIBA, KUFOS, NABARD, AIC and SEAI.
- Foster networking and technology dissemination in alignment with national fisheries development goals.
- Showcase innovations, equipment and products relevant to shrimp farming.

3. Genesis:

The genesis of Aqua Meet 2026 can be traced to the strategic initiative of the Government of Kerala, through ADAK, to establish a "Global Model" for aquaculture development. Recognising the transformative economic and employment potential of Vannamei shrimp farming, a comprehensive and inclusive approach was adopted. The initiative aimed to align the efforts of farmers, technical experts, policymakers and trade union representatives to create a competitive and

resilient aquaculture ecosystem. An Organising Committee and various sub-committees were constituted for the conduct of Aqua Meet 2026.

4. Participants:

The event witnessed broad participation across the aquaculture value chain. Participants included shrimp farmers and prospective entrepreneurs from across Kerala; scientists, academicians and researchers providing technical and scientific inputs; representatives from NFDB, MPEDA, SEAI and other government and industry bodies; and technology providers and service partners specialising in seed production, feed manufacturing, diagnostics and farm management. This diversity ensured meaningful knowledge exchange and strengthened dialogue for sectoral growth. The list of 110 shrimp farmers and the list of 92 industrialists, officers and other stakeholders participated in the programme has been provided separately. Besides, 41 supporting staff also participated in the programme.

5. Inaugural Session:

The inaugural session was formally inaugurated by Shri. Saji Cherian, Hon'ble Minister for Fisheries, Culture and Youth Affairs, Government of Kerala. In his address, he highlighted that aquaculture production in Kerala had increased from 24,198 tonnes to 41,175 tonnes over the last eight years and expressed the vision of achieving an additional production of 50,000 tonnes of Vannamei shrimp over the next five years.

The session was chaired by Shri. K. N. Unnikrishnan, MLA, who highlighted the vital role of shrimp exports in Kerala's economic development. The chief guest, Shri. Hibi Eden, MP, stressed the need to adopt land reform models similar to those implemented in Andhra Pradesh to promote shrimp farming. Smt. Chelsasini V. IAS, Director of Fisheries, delivered the welcome address and Dr. A. Bijukumar, Vice-Chancellor of the Kerala University of Fisheries and Ocean Studies (KUFOS), facilitated the programme. Their participation underscored the strong commitment of the Government and academic institutions towards strengthening Kerala's leadership in sustainable aquaculture. During the inaugural session, four Vannamei shrimp

farmers who achieved outstanding production levels were honoured with shawls and shields in recognition of their achievements.

6. Technical Sessions and Deliberations:

The programme began with a presentation on the *Status and Prospects of Vannamei Shrimp Farming in Kerala* by Shri. Ignatious Mandro B., Managing Director, ADAK. This was followed by two technical sessions.

Technical Session I, chaired by Dr. Dinesh Kaipally, Registrar, KUFOS, included the following presentations:

- *Good Management Practices (GMP) in Vannamei Shrimp Farming* – Dr. P. S. Shyne Ananand, Principal Scientist, ICAR-CIBA
- *Traceability and Certification in the Seafood Value Chain* – Smt. Neenu Peter, Deputy Director, MPEDA
- *Role of the Coastal Aquaculture Authority (CAA) in Coastal Aquaculture* – Shri. Shijo Mathew, Consultant (Technical), CAA
- *Challenges in Shrimp Farming with Special Reference to Pokkali Fields* – Shri. K. X. Sebastian, General Secretary, Kerala Aqua Farmers Federation

Dr. Dinesh Kaipally outlined the pivotal role of the Kerala University of Fisheries and Ocean Studies (KUFOS) in introducing and validating vannamei shrimp farming in Kerala through pilot trials with technical support from CIBA. The demonstrated success of these initiatives, paved the way for expanded implementation by ADAK across the State.

Technical Session II, chaired by Dr. Sahadevan P., Managing Director, Matsyafed, covered the following topics:

- *Role of Government of India and NFDB in Promoting Shrimp Farming* – Shri. Puli Srikanth, Executive, NFDB
- *Crop Insurance for Shrimp Farming* – Shri. Varun S., Regional Manager, Agriculture Insurance Co. of India Ltd.

- *Credit Possibilities for Shrimp Farming and FIDF Linkages* –
  Shri. Ajeesh Balu, DGM, NABARD
- *Export Market Potential of Vannamei Shrimp* –
  Shri. Saju M. S., SEAI, Kerala Region

Dr. Sahadevan much-admired the ADAK for organizing focused programmes to promote and expand Vannamei cultivation in the State. He emphasized that while technical sessions provide essential guidance, the true strength of such initiatives lies in incorporating farmers' practical experiences, concerns and suggestions. He also appreciated the active participation and readiness of local farmers to adopt new aquaculture practices, recognizing their crucial role in driving sectoral growth.

The papers presented in the both the technical sessions have been included as separate topics.

7. Experience Sharing and Discussions:

The session was chaired by Dr. Mohanakumaran Nair, Chairman, State Fish Seed Centre (SFSC) and former Pro Vice-Chancellor, KUFOS and said that Kerala should transition its tide-fed farming systems to emulate Ecuador's highly successful aquaculture model, particularly in developing and adopting disease-resistant shrimp strains. He emphasized that introducing White Spot Disease–resistant varieties and advanced methodologies would significantly strengthen the resilience of Kerala's coastal aquaculture. The promotion of industrial-scale aquaculture in wetlands was recommended, alongside necessary modifications or exemptions to the Land Ceiling Act to enable viable expansion. He also called for streamlining farm registration and licensing procedures to reduce bureaucratic delays and encourage greater farmer participation. Additionally, he advocated for proactive Government support through the provision of field-level disease testing kits to help farmers effectively manage outbreaks and safeguard production.

Smt. Smitha R Nair, Additional Director of Fisheries, outlined the Department of Fisheries' strategic initiatives to expand vannamei aquaculture by identifying new potential areas and ensuring optimal utilization of the State's aquatic resources. She

emphasized the formalization of the sector through mandatory CAA registration and the implementation of a Disease-Free Seed certification programme to promote regulatory compliance and bio-secure farming practices.

Shri. Regimon, CITU leader, detailed recent consultative initiatives and proposed Government interventions aimed at supporting Vannamei shrimp farmers and allied fisheries workers across the State. He reaffirmed that there should be a unified commitment between the Government, aqua-farmers and trade unions to implement coordinated, sustainable solutions for the long-term welfare of aquaculture farmers and allied workers.

Farmers, industrialists, officers and other participants actively contributed to the discussions, ensuring a holistic and practical understanding of the support systems available to the farming community. Four leading farmers shared their real-world experiences, challenges and success stories in Vannamei shrimp farming, with special emphasis on the Bio-floc system, Diatom system and Re-circulatory Aquaculture System (RAS), adding valuable grassroot level perspectives to the technical deliberations.

8. Valedictory session:

In the session, Smt. Chelsasini V. IAS, the Director of Fisheries highlighted the urgent need for targeted support to aquaculture farmers who have suffered substantial financial losses, emphasizing its importance for maintaining producer confidence and sectoral stability. She recommended integrating direct feedback from affected farmers into future policy and project formulation to ensure evidence-based and practical decision making. She further stressed that bio-security and environmental sustainability must remain central to all future operations to prevent disease outbreaks and safeguard ecological balance. She also commended the farming community's strong technical awareness, noting that it provides a solid foundation for implementing progressive and environmentally responsible aquaculture policies across the State.

Inagural Session

Honouring the farmers for their achievements

Shri. K. N. Unnikrishnan, MLA, Shri. Hibi Eden, MP, Smt. Chelsasini V. IAS, Director of Fisheries, Dr. A. Bijukumar, Vice-Chancellor, KUFOS, Shri. Ignatius Mandro B., Managing Director, ADAK, Dr. Dinesh Kaipally, Registrar, KUFOS, Dr. P. S. Shyne Ananand, Principal Scientist, ICAR-CIBA, Smt. Neenu Peter, Deputy Director, MPEDA and Shri. K. X. Sebastian, General Secretary, KAFF

Exhibition Stalls

Honouring the invited speakers

Technical sessions

8. Exhibition Stalls:

The exhibition organised as part of Aqua Meet 2026 served as a comprehensive showcase of technological innovations and institutional support systems driving Kerala's sustainable aquaculture sector. Stalls were set up by Government bodies, research institutions and private enterprises to present their products, services and future plans.

ADAK anchored the exhibition with a prominent stall displaying a scientific model of shrimp farming and a range of value-added shrimp products, highlighting post-harvest revenue potential. KUFOS exhibited its latest research on brackish water farming, focusing on sustainable management practices and disease-resilient protocol for Vannamei shrimp. The Coastal Aquaculture Authority (CAA) set up a stall to create awareness on farm registration and regulatory compliance. The Agriculture Insurance Company of India (AIC) presented insurance schemes to protect farmers against crop loss and operational risks.

In the technology and equipment sector, Nandini Gears and Arudra Technology showcased shrimp farming machinery such as paddle wheel aerators, floats and specialised gears. AISMAR Boat Builders exhibited Fibre Reinforced Plastic (FRP) boats designed for pond operations, feeding and harvesting activities. Konnayil General Trading, authorised distributors of CP Feeds and aquatic health products, provided farmers access to international standards in shrimp nutrition. The exhibition successfully bridged the gap between innovation and implementation, demonstrating Kerala's integration of modern technology with sustainable farming practices and strengthening the roadmap for the State's blue economy.

9. Conclusion:

Aqua Meet 2026 emerged as a landmark initiative in Kerala's aquaculture journey. It effectively integrated scientific expertise, policy frameworks, institutional support and market perspectives on a single platform. By fostering collaboration and promoting sustainable practices, the event laid a strong foundation for the long-term growth of the Vannamei shrimp industry in Kerala and reinforced the State's vision of becoming a global leader in responsible and sustainable aquaculture.

Topic - 2

STATUS AND PROSPECTS OF VANNAMEI SHRIMP FARMING IN KERALA

Ignatious Mandro B., ADAK

1. Introduction:

Vannamei shrimp (*Penaeus vannamei*) farming plays a dominant role in the global shrimp industry, contributing nearly 80% of total shrimp production worldwide. This highlights its importance as the most widely cultivated and commercially significant shrimp species. Global production of Vannamei shrimp has shown a steady increase, with an average annual growth rate of approximately 6.8%. By 2024, production reached around 5.1 million tonnes, driven largely by strong growth in international demand. This trend reflects expanding market acceptance and economic viability of Vannamei shrimp farming, particularly in response to increasing consumer awareness of healthy food choices.

The species is highly preferred due to its fast growth rate, high disease resistance and adaptability to both intensive and semi-intensive farming systems. These characteristics make it well suited for large scale commercial aquaculture, ensuring relatively stable production with lower operational risks. Major Vannamei producing countries include Ecuador, China, India, Vietnam, Indonesia and Thailand. These nations have developed strong aquaculture infrastructure, adopted advanced farming practices and established robust export networks, positioning them as key players in the global shrimp market.

Since its introduction in India in 2009, Vannamei shrimp farming has been rapidly adopted by farmers, leading to what is often described as “Blue Revolution” in the country’s aquaculture sector. Its fast growth, high productivity and strong export demand have made it the most important species in Indian shrimp farming. Vannamei shrimp has emerged as the single largest component of India’s seafood exports in terms of both value and volume, playing a crucial role in foreign exchange earnings and contributing significantly to the national economy. In 2024, India

produced approximately 565,082 tonnes of Vannamei shrimp, reflecting the continued expansion of the sector. The species now accounts for nearly 90% of total shrimp aquaculture production in the country. Among Indian states, Andhra Pradesh leads production, contributing to about 70% of the national output, supported by advanced farming practices, strong infrastructure and favourable Government policies.

Kerala has a long tradition of shrimp farming, historically centered on tiger shrimp cultured in *Pokkali* fields and *Kaipad* systems. These traditional methods form the foundation of the State's aquaculture heritage and reflect its strong association with brackish water farming. Although Kerala was once a leading shrimp-producing State, it currently contributes less than 1% of national shrimp production. The State possesses 9,777.05 hectares of brackish water fields owned by 929 individuals or groups, of which approximately 3,000 hectares are suitable for Vannamei shrimp farming. This availability of natural resources offers significant potential for the expansion and intensification of Vannamei culture in Kerala.

The Government of Kerala, through the Agency for Development of Aquaculture, Kerala (ADAK), has actively promoted Vannamei shrimp farming. Support is provided in the form of three-day residential training programmes, one-time subsidy covering 40% of the unit cost, farmer meetings and continuous technical assistance. These initiatives aim to facilitate the adoption of improved practices and modern technologies, ensuring sustainable and profitable shrimp production in the State.

2. Current Production:

Vannamei shrimp production in Kerala has shown a significant upward trend in recent years; however, overall production level remains comparatively lower than the potential for the same. Farming practices range from semi-intensive to intensive culture systems, including the use of lined ponds and advanced technologies such as bio-floc systems, which contribute to improved productivity and resource use efficiency.

At present, Vannamei shrimp farming is carried out over an area of 205.1 hectares, encompassing around 181 farms. This reflects a growing adoption of the species, although the scale of operation remains limited in comparison to the total suitable brackish water area available in the State. Currently, farming activity is mainly concentrated in the districts of Kollam, Thrissur and Kannur, which have emerged as the principal hubs of Vannamei shrimp culture in Kerala.

A considerable portion of the potential farming area lies within traditional Pokkali fields, many of which remain idle. This underutilization is primarily attributed to socio-political issues, which have constrained the expansion of shrimp farming in these otherwise suitable areas. Although the traditional practice of *Kettukalakkal* has not to be followed since 2021 in water bodies registered for aquaculture, farmers continue to face serious challenges during harvest operations. However, with the increased bund height adopted for Vannamei shrimp farming, the risk of inundation of adjacent human settlements has been effectively minimized.

The current average production level is approximately 4,639 kg/ha/crop, indicating moderately good productivity under the prevailing farming conditions in Kerala. This also suggests substantial scope for further improvement through enhanced management practices and the adoption of advanced technologies. Figure 1 illustrates the distribution of shrimp farming units based on production per hectare. Production performance serves as a key indicator of farm efficiency and reflects factors such as management practices, stocking density, feed management, water quality control and biosecurity measures.

About 7% of the farming units fall into the low productivity category, producing less than 2t/ha/crop. These systems are generally characterized by extensive culture practices, inadequate management, disease incidence or other unfavourable conditions. In contrast, only about 2% of the units achieve very high production levels of 15–20 t/ha/crop. These exceptional cases likely involve advanced technologies, high levels of investment and expert farm management.

Overall, the majority of Vannamei shrimp farms in Kerala record production levels in the range of 4–6 t/ha/crop. This indicates that most farms operate under semi-intensive culture systems, which provide a balance between productivity and

cost-effectiveness. The relatively small proportion of farms achieving higher production levels (above 8 t/ha/crop) suggests that intensive shrimp farming practices are still in the early stages of adoption in the State. The current production pattern reflects that Vannamei shrimp farming in Kerala is largely a medium-yield, medium-risk activity, with considerable potential for productivity enhancement through improved technology adoption, farmer training, strengthened biosecurity and scientific farm management practices.

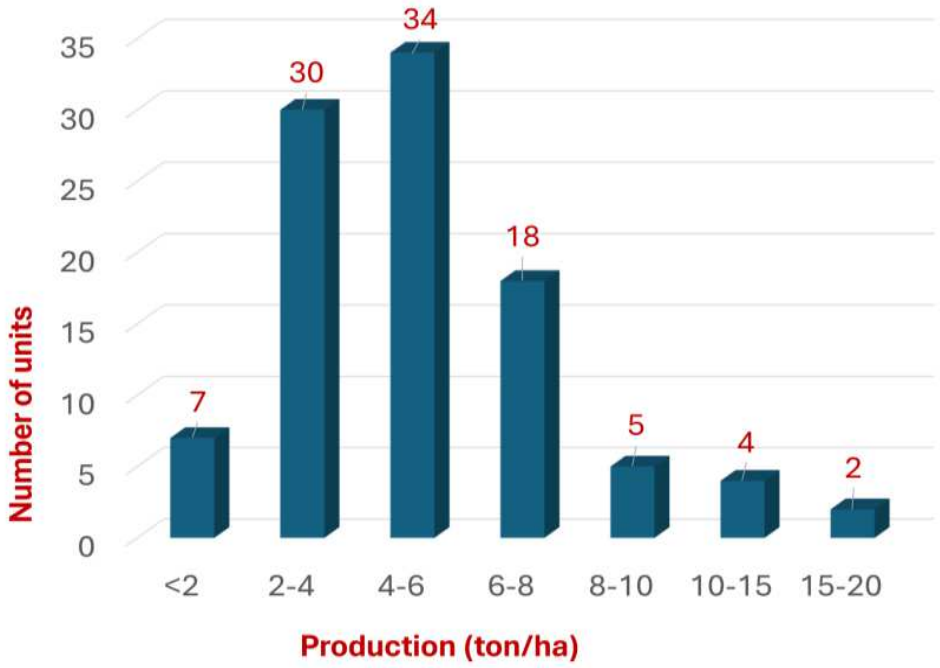

Figure-1 Units based on Production per hectare per crop

3. Present Investment Pattern:

Figure 2 presents the distribution of shrimp farming units based on the level of fixed capital investment per hectare. Fixed capital investment includes expenditures on pond construction, lining, aeration systems, pumps, water supply systems, electrical installations, storage facilities, biosecurity measures and other permanent infrastructure required for shrimp farming. The average fixed capital investment per hectare is ₹8,04,410, indicating that most farms operate within a medium investment range.

Among the total units surveyed, 27% have invested less than ₹5 lakh per hectare, while 41% fall within the ₹5–10 lakh category. This indicates that the majority of farmers adopting Vannamei shrimp farming prefer lower capital investment. Many of these farmers were previously engaged in tiger shrimp farming and already possessed basic infrastructure such as strong bunds, aerators, generators and farm sheds. Although the recommended pond size and depth for Vannamei culture are 0.2–0.4 ha and 1.8 m, respectively, farmers with lower capital investment generally did not subdivide their existing ponds, which often exceeded 1 ha, did not deepen them, only maintaining a water depth of less than 1.5 m. Consequently, these farmers achieved comparatively lower production levels.

Medium-level investments were observed in 24% of the units within ₹10–15 lakh category and 6% within ₹15–20 lakh category. It indicates that a significant proportion of farmers are adopting more advanced farming practices, including improved pond lining, enhanced aeration, better water management systems and strengthened biosecurity measures. Only 2% of the units invested between ₹40–50 lakh per hectare, suggesting that highly capital-intensive farming systems are rare and are practiced only by a limited number of large-scale or technologically advanced operators.

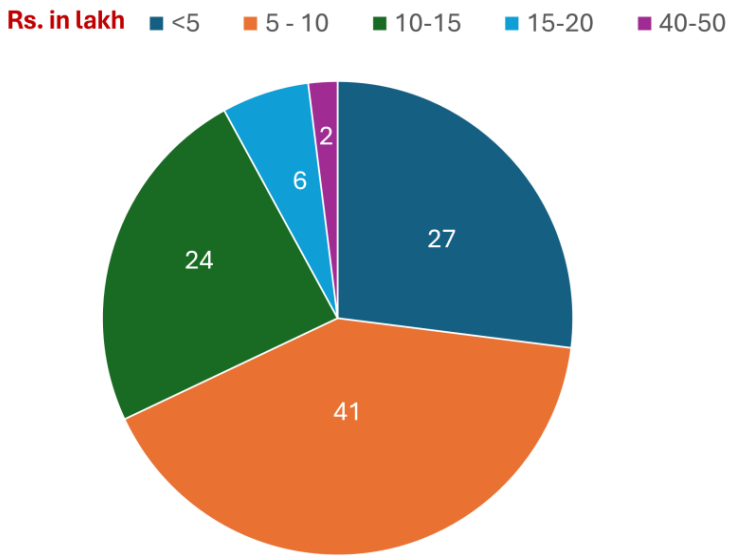

Figure-2 Units based on Fixed capital investment per hectare

Figure 3 illustrates the distribution of shrimp farming units based on operational expenses per hectare. Operational expenses include costs incurred during the culture period, such as seed procurement, feed, electricity, fuel, labour, probiotics, chemicals, pond preparation and routine maintenance.

The average operational expense per hectare is ₹9,77,300, indicating that Vannamei shrimp farming is a moderately high-input activity requiring continuous financial investment throughout the production cycle. Among the surveyed units, 40% fall within ₹5–10 lakh category, representing the largest group, suggesting that most farmers operate under a relatively low operational cost structure. Another 38% belong to the ₹10–15 lakh category, likely reflecting more scientific farm management with higher feed input, improved aeration and stricter biosecurity measures. About 8% of the units incur operational expenses of ₹15–20 lakh per hectare, indicating relatively high operational intensity and advanced management practices.

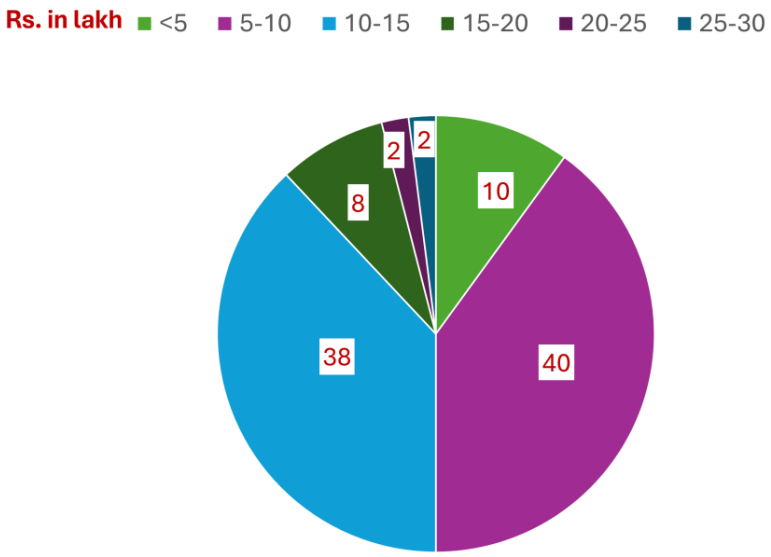

Figure-3 Units based on Operational expenses per hectare

About 2% of the units fall within the ₹20–25 lakh range and another 2% within the ₹25–30 lakh category, showing that very high operational expenditure systems are uncommon. Additionally, 10% of the units reported operational expenses of less than ₹5 lakh per hectare, which may be attributed to immature crops or crop failures

due to factors such as disease outbreaks. The average cost of production is estimated at ₹210.67 per kg.

Overall, the findings indicate that the majority of Vannamei shrimp farms in Kerala incur operational expenses between ₹5 lakh and ₹15 lakh per hectare, accounting for most production units. This suggests that the farmers prefer economically manageable production models with stocking densities of up to 3 lakh per hectare and target yields of around 5 t/ha/crop, rather than highly intensive systems with stocking densities of 6 lakh per hectare and target yields exceeding 10 t/ha/crop. The moderate average operational cost reflects efficient resource utilization and cost-conscious management practices. However, the presence of farms in higher cost brackets indicates a gradual shift towards technologically advanced and intensive culture methods aimed at achieving higher productivity and profitability.

The relatively small proportion of farms in higher investment categories also suggests that farmers remain cautious about financial risk and prefer scalable, cost-effective infrastructure. This investment pattern highlights that Vannamei shrimp farming in Kerala is largely accessible to small and medium-scale farmers, making it a viable and sustainable livelihood option when supported by adequate training, technical guidance, credit facilities and institutional support.

4. Analysis of Return:

Figure 4 presents the distribution of shrimp farming units based on profit earned per hectare, expressed in lakh rupees. Profit was calculated after deducting all operational costs from the total revenue generated through shrimp production. This analysis provides insight into the economic viability and risk associated with Vannamei shrimp farming in Kerala.

The average profit per hectare per crop was ₹5,70,528, indicating that Vannamei shrimp farming is generally a profitable enterprise, although returns vary widely among farms. Variations in profitability are influenced by factors such as farm management practices, production levels, disease incidence and fluctuations in market prices. About 3% of the units incurred losses ranging from ₹5–10 lakh per

hectare, while 13% reported losses of less than ₹5 lakh per hectare. These losses were primarily attributed to disease outbreaks, crop failures and poor water quality management.

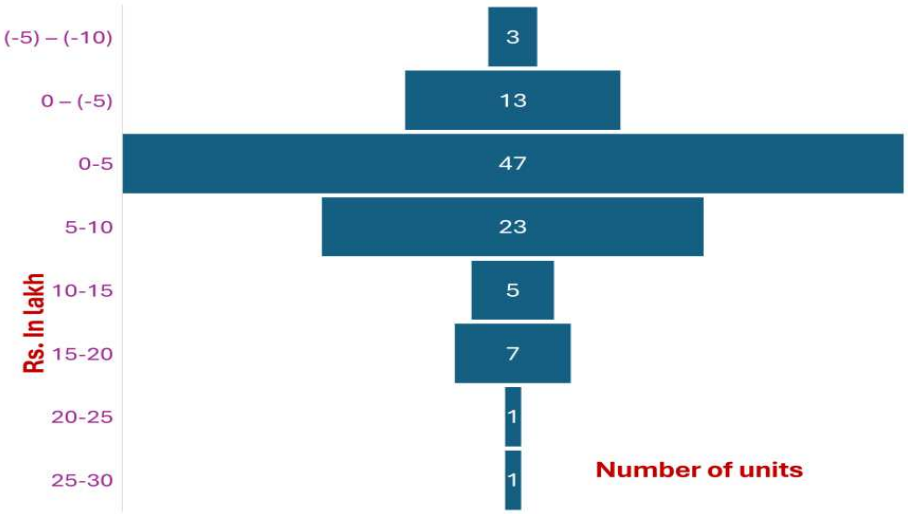

Figure-4 Units based on Profit per hectare per crop

Overall, the majority of farmers earned moderate profits, while only a small proportion experienced loss, highlighting the inherent risk associated with shrimp farming. Although very high profits are achievable, they are limited to a few highly efficient and well managed farms. The observed profit pattern indicates that Vannamei shrimp farming in Kerala can be categorized as a medium-risk, medium-to-high return enterprise. Profitability largely depends on the adoption of scientific management practices, effective biosecurity measures, disease prevention strategies, use of quality seed, feed and favourable market conditions.

The presence of both loss-making and highly profitable units underscores the importance of proper technical training, strict biosecurity protocols, timely disease diagnosis, efficient cost management and institutional support from agencies such as the Agency for Development of Aquaculture, Kerala (ADAK). With adequate technical and institutional interventions, the proportion of profitable farms can be significantly increased, ensuring sustainable growth of the shrimp farming sector in the State. The successful survival of 79.87% of the farming units for two years without further Government assistance, indicates that Vannamei shrimp farming is a viable entrepreneurial activity for investors.

Figure 5 depicts the distribution of shrimp farming units based on the farm-gate price realized per kilogram at the time of sale. Price realization is a crucial economic indicator directly influencing farm profitability and is affected by shrimp size, quality, market demand, seasonal factors, export trends and the bargaining power of farmers.

The majority of shrimp farming units realized prices in the range of ₹300–400 per kg, accounting for most of the production. This suggests that Vannamei shrimp farmers in Kerala generally receive fair and competitive market prices for their produce. A small proportion of farms achieved prices above ₹400 per kg, indicating that premium price realization is possible but limited to farms with superior management practices, optimal harvest size and strong market linkages.

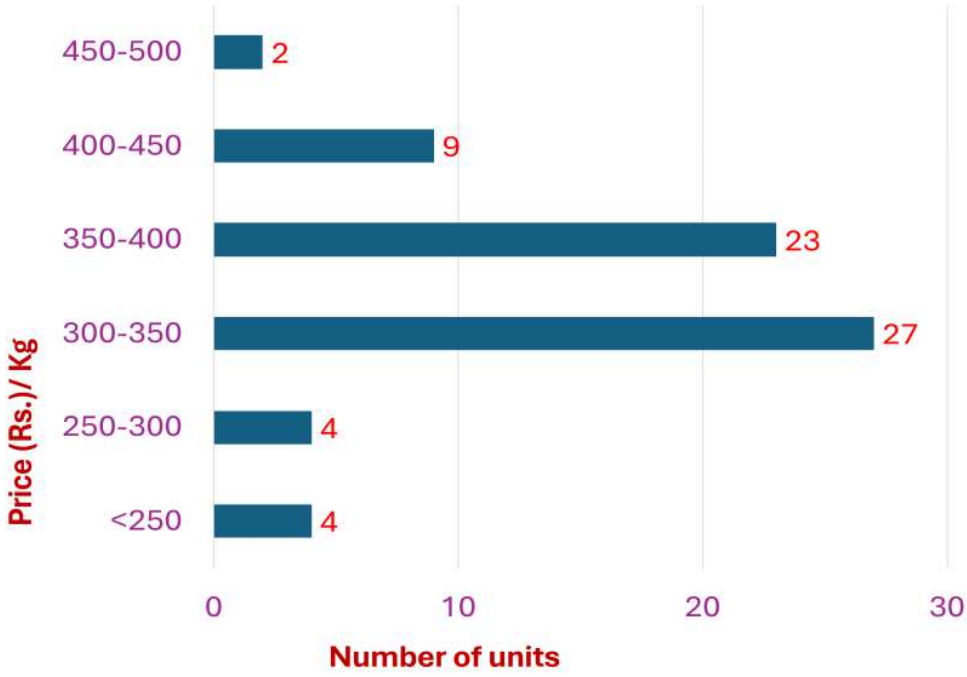

Figure-5 Units based on Farm gate price realization

The price realization pattern confirms the overall economic viability of Vannamei shrimp farming in Kerala. However, improvements in quality control, market intelligence, collective marketing and supply chain efficiency could enable a larger proportion of farmers to access higher price brackets, thereby enhancing overall profitability and resilience of the sector.

5. Challenges and Proposed Measures:

Despite its strong growth potential and profitability, Vannamei shrimp farming in Kerala faces several critical challenges that must be addressed to ensure sustainable and large-scale development. Targeted policy interventions and strengthened institutional support are essential to overcome these constraints.

5.1 High Initial Capital Investment:

One of the primary challenges is the high initial investment required to establish modern shrimp farming infrastructure. Facilities such as lined ponds, aeration systems, water treatment units, power supply arrangements and biosecurity installations involve substantial capital expenditure, often discouraging small and marginal farmers from entering or expanding in the sector. This issue can be addressed by providing credit support through formal financial institutions at subsidized interest rates, introducing contract farming models to reduce financial risk and enhancing Government subsidies for infrastructure development to encourage adoption of improved farming technologies.

5.2 Inadequate Technical Support and Capacity Building:

Limited access to expert technical guidance on water quality management, feeding strategies, disease prevention and biosecurity remains a major constraint. This knowledge gap often leads to inefficiencies, crop losses and reduced profitability. The proposed measures include deployment of qualified technical personnel at the field level to provide continuous advisory services, intensive hands-on training programmes for fisheries department extension staff for a duration of four months at Vannamei shrimp farms located at Ayiramthengu, Njarakkal, Poyya, and Eranholi, implemented in a phased manner and facilitation of farmer exposure visits and on-site training to promote adoption of scientific farming practices and modern aquaculture technologies.

5.3 Disease Outbreaks and Biosecurity Risks:

Disease outbreaks, particularly White Spot Syndrome Virus (WSSV) and *Enterocytozoon hepatopenaei* (EHP), pose serious threats to shrimp farming by

causing severe crop losses and financial instability. It can be mitigated by strict adoption of Good Management Practices (GMP) and Coastal Aquaculture Authority (CAA) guidelines, with emphasis on zero water exchange systems and enhanced biosecurity along with strengthened enforcement of regulatory frameworks to ensure compliance with seed certification, approved farming standards, safe waste disposal and regulated water use.

5.4 Poor Quality and Limited Availability of Seed:

The availability of poor quality or disease-prone seed results in low survival rates, poor growth performance and increased disease incidence. Dependence on external hatcheries and inconsistent quality control further exacerbate this problem. To overcome this, it is proposed for achieving self-sufficiency in nauplii production through the establishment of state supported hatcheries, strengthening seed quality certification and monitoring systems to ensure consistent supply of disease-free, high quality seed and reducing dependence on external sources to improve farm productivity and farmer confidence.

5.5 Climate Change and Natural Calamities:

Shrimp farming in Kerala is highly vulnerable to climate related risks such as floods, cyclones and extreme weather events, which can cause extensive crop loss and infrastructure damage, particularly in coastal and low-lying areas. To mitigate these risks, ensure a comprehensive aquaculture insurance scheme covering both crop loss and infrastructure damage. Comprehensive aquaculture insurance will protect farmers from financial shocks and encourage them to continue farming activities even after natural disasters. Recently, the Agriculture Insurance Company of India has come up with an insurance product for shrimp farming.

5.6 High Cost of Production:

High input costs related to feed, labour, electricity, chemicals and infrastructure maintenance significantly affect profitability, especially for small and medium scale farmers. To reduce production costs, several measures are proposed:

- Establishment of State run feed mills to supply quality feed at affordable prices, reducing dependence on costly private manufacturers.
- Adoption of advanced technologies such as artificial intelligence (AI), CCTV surveillance and Internet of Things (IoT) based monitoring systems to reduce labour requirements and improve operational efficiency.
- Promotion of traceability systems and certification programmes to enable better price realization through quality assurance, food safety compliance and export market access.

5.7 Market and Trade Barriers:

Anti-dumping duties and tariff barriers in major export markets, particularly the United States, adversely affect export competitiveness and farm-gate prices, despite farmers maintaining quality standards. It has reduced demand for Indian shrimp in international markets. As a result, farmers receive reduced returns for their produce despite maintaining quality standards. To address this issue, it is proposed to diversify export markets beyond traditional destinations to reduce dependency on a few importing countries, strengthen domestic marketing channels to absorb production and stabilize prices and promote value-addition.

5.8 Inadequate Power Infrastructure:

Limited access to reliable electricity in potential farming areas affects aeration, water pumping and overall farm operations, increasing operational risks and costs. Financial assistance for installation of solar power systems, transformers and three phase electricity connections can be considered along with promotion of renewable energy solutions to ensure uninterrupted power supply, reduced operational costs and enhanced environmental sustainability.

5.9 Environmental Sustainability Concerns:

Environmental issues such as effluent discharge and salinization of freshwater areas pose serious sustainability challenges. Improper wastewater disposal can degrade soil quality, contaminate groundwater and adversely affect surrounding

ecosystems. To mitigate these environmental challenges, two key measures are proposed:

- Strict enforcement of environmental regulations related to effluent treatment and disposal.
- Promotion of water reuse and minimal discharge systems to reduce environmental impacts and support eco-friendly farming practices.

Addressing these challenges through targeted financial support, strengthened technical capacity, effective disease management, improved seed quality, climate risk protection and cost-reduction strategies will significantly enhance the sustainability and profitability of Vannamei shrimp farming in Kerala. Strong institutional involvement from the State Fisheries Department, ADAK, Coastal Aquaculture Authority (CAA), Marine Products Export Development Authority (MPEDA) and Central Institute of Brackish water Aquaculture (CIBA) will be crucial for successful implementation. These measures will boost farmer confidence, attract new investments and ensure the long term growth of the aquaculture sector in the State.

6. Future Prospects and Opportunities:

The future of Vannamei shrimp farming in Kerala presents significant growth prospects, provided that systematic planning and sustained institutional support are ensured. One of the key initiatives proposed is the phased allocation of 2,500 hectares of brackish water fields exclusively for Vannamei shrimp farming over a period of five years. Such expansion would substantially enhance production capacity, strengthen the state's contribution to shrimp exports and improve domestic supply. To support this growth in a sustainable manner, comprehensive technical, financial and social support mechanisms must be extended to farmers. Technical support will facilitate the adoption of improved farming practices and enhance productivity, while financial assistance will help overcome capital constraints. Social support mechanisms will strengthen farmer participation, co-operation and community development, thereby ensuring inclusive growth of the sector.

Strict adherence to Good Management Practices (GMP) and Coastal Aquaculture Authority (CAA) regulations is essential to promote responsible and sustainable aquaculture. These guidelines emphasize biosecurity, environmental protection and quality assurance, which are critical for long-term sectoral stability. In addition, effective enforcement of regulatory frameworks is required to ensure compliance with national standards. Strong regulation will help maintain ecological balance, improve product quality and enhance the credibility and acceptance of Indian shrimp in international markets.

Achieving self-sufficiency in seed and feed production is another important objective for the future. Localized production of high quality seed and feed will reduce dependence on external suppliers, ensure consistency in input quality, lower production costs and ultimately improve farm profitability. Establishing State supported hatcheries and feed production units will play a crucial role in achieving this goal.

Greater emphasis should also be given on the production of high quality shrimp and value-added products to diversify and expand export markets. Value addition through processing, packaging, branding and certification will enhance competitiveness and increase export earnings. Exploring niche markets such as organic and sustainablility certified shrimp can provide premium price realization, particularly among environmentally conscious consumers.

Strengthening the domestic value chain is equally important for the future growth of the sector. Investments in cold storage infrastructure, processing facilities, efficient logistics, marketing networks and organized retail linkages will help stabilize prices, reduce post-harvest losses and improve market efficiency. A strong domestic value chain will also enhance resilience against global market fluctuations and trade uncertainties.

Overall, these future-oriented strategies have the potential to transform “Vannamei shrimp farming” in Kerala into a sustainable, profitable and globally competitive sector. By supporting technological advancement, environmental responsibility, market diversification and institutional collaboration, the sector can significantly contribute to rural livelihoods, employment generation and long-term economic growth.

7. Economic Impact and Export Potential:

The development of Vannamei shrimp farming has significant economic implications and strong export potential. The sector plays a crucial role in livelihood generation across the entire value chain, starting from hatchery operations and farm-level production to processing, marketing, transportation and export activities. This integrated value chain creates substantial direct and indirect employment opportunities and supports income generation for farmers, labourers, processors, traders and other allied sectors.

Vannamei shrimp farming also makes a meaningful contribution to Gross Value Added (GVA) and foreign exchange earnings. Shrimp remains one of India's most valuable seafood export commodities and the expansion of Vannamei culture directly strengthens both State and national economies. Increased production not only enhances export volumes but also improves capacity utilization of processing units, thereby creating multiple effects within the broader economy.

Kerala's well-established seafood processing infrastructure provides a significant competitive advantage to the sector. The presence of modern processing plants facilitates value addition through grading, freezing, packaging, branding and compliance with international quality and food safety standards. Value-added processing enhances product quality, increases export realization and improves overall profitability for stakeholders. In addition, Kerala enjoys a strong reputation in international markets for high-quality seafood products. This reputation, combined with established export networks and market linkages, enables exporters to access premium markets and negotiate better prices. The ability to meet stringent quality, traceability and sustainability requirements further strengthens Kerala's competitiveness in the global shrimp trade.

Overall, Vannamei shrimp farming has the potential to emerge as a powerful economic driver for Kerala. By boosting employment generation, strengthening export performance, increasing foreign exchange earnings and leveraging the State's processing and marketing strengths, the sector can reinforce Kerala's position as a leading hub for high quality shrimp production and seafood exports, while contributing significantly to inclusive economic growth.

8. Conclusion:

The successful development of Vannamei shrimp farming in Kerala depends on strong and sustained collaboration among all key stakeholders, including farmers, seafood exporters, Government agencies, research institutions and private enterprises. Such coordinated efforts are essential for effective planning, efficient implementation of policies and ensuring the long-term sustainability of the sector.

Strategic planning supported by sustainable farming practices and strict implementation of bio-security protocol is imperative. These measures will help minimize disease risks, enhance productivity and maintain ecological balance, thereby ensuring stable and reliable shrimp production. Equally important is the adoption of modern technologies in shrimp farming, monitoring, processing and management systems. Technological advancement will improve operational efficiency, strengthen quality standards, reduce production risks and enhance competitiveness in both domestic and international markets.

With appropriate institutional support, capacity building and policy interventions, Vannamei shrimp farming has the potential to emerge as a key driver of rural livelihoods, export growth and economic development in Kerala. By embracing innovation, scientific management and responsible aquaculture practices, the State can position itself as a leading producer of high quality Vannamei shrimp, reinforcing its presence and competitiveness in the global seafood industry.

Note: *The data presented is based on a survey conducted by the Agency for Development of Aquaculture, Kerala (ADAK) in 2025.*

Topic - 3

GOOD MANAGEMENT PRACTICES (GMP) IN VANNAMEI SHRIMP FARMING

Shyne Anand P.S. and Aravind R., ICAR-CIBA

1. Introduction:

Good Management Practices (GMP) plays a critical role in sustainable and profitable farming of *Penaeus vannamei*. Adoption of scientifically validated GMP guidelines helps in minimizing disease risks, particularly White Spot Syndrome Virus (WSSV), EHP etc improving survival and growth performance, optimizing resource utilization and ensuring compliance with national regulations of the Coastal Aquaculture Authority (CAA) and international standards such as Best Aquaculture Practices (BAP). The following sections elaborate the importance of each GMP component in shrimp farming systems.

2. Site selection:

Site selection is a critical pre requisite for successful and sustainable shrimp farming. The farm should be located in areas with access to good-quality brackishwater having stable salinity, preferably free from industrial, agricultural and domestic pollution. The site must have suitable soil characteristics with good bearing capacity and low acid sulfate potential or alternatively be suitable for HDPE lining. Adequate infrastructure such as reliable power supply, road connectivity and availability of quality seed, feed and technical support should be ensured. The location should be above flood-prone zones, protected from tidal surges and cyclones and allow proper drainage and farm discharge management. Compliance with Coastal Aquaculture Authority (CAA) zoning regulations, maintaining prescribed buffer distances from sensitive ecosystems such as mangroves, creeks and agricultural lands, is essential. Proper site selection minimizes environmental risks, enhances biosecurity, improves productivity and ensures long-term sustainability of shrimp farming.

3. Pond Preparation:

3.1 Drainable ponds:

In drainable ponds, complete draining after harvest is essential to break the disease cycle and eliminate residual pathogens. Drying the pond bottom for a minimum of three weeks allows natural degradation of organic matter and ensures inactivation of WSSV, which is known to survive in soil for up to 19 days. Development of deep cracks (25–30 cm) facilitates oxidation of deeper soil layers, while removal of contaminated soil further reduces pathogen load. Proper drying and disinfection is crucial because accumulated organic matter serves as a persistent reservoir for pathogens, increasing disease risk in subsequent crops.

3.2 Low lying or undrainable ponds:

In undrainable shrimp ponds, proper pond preparation is critical to mitigate acid sulfate soil problems and maintain a favourable soil–water environment. A gentle inlet-to-outlet slope of about 1:500 (≈10 cm fall over a 50 m pond length) is recommended to facilitate partial water exchange and sediment movement where complete drainage is not possible. Such ponds often possess acid sulfate soils containing iron sulfide (pyrite, FeS_2); when the pond bottom is exposed to air, pyrite undergoes oxidation in the presence of oxygen and water, producing sulfuric acid and ferric hydroxides, which impart a reddish coloration to the soil and drastically reduce pH (<5). To avoid excessive pyrite oxidation, deep drying of the pond bottom should be avoided and the pond should be subjected to repeated flushing and partial draining (2–3 cycles) before stocking. Heavy liming is required for initial soil

correction, with CaO applied at 100–200 kg/ ha (or 5–10 kg per 100 m² after shallow soil tilling of 5–10 cm) to rapidly neutralize acidity, reduce iron toxicity and elevate soil pH above 5.5; however, prolonged use of CaO should be avoided and agricultural lime or dolomite is recommended for subsequent pH stabilization. In persistently wet patches, nitrate salts (20–40 g m^{-2}) such as sodium nitrate, calcium ammonium nitrate, potassium nitrate or commercial formulations may be applied to stimulate nitrification and suppress sulphide formation. Optimal redox potential should remain between +100 and +300 mV, indicating well-oxygenated conditions, while soil redox potential below -150 or −200 mV indicate highly reduced conditions conducive to hydrogen sulphide (H_2S) production, which is toxic to shrimp and must be carefully managed through liming, water exchange and aeration.

Photo: Claude E. Boyd

3.3 Lined ponds:

In lined ponds, the absence of soil does not eliminate bio security risks, as biofilms and sludge can harbor pathogens. High-pressure water washing combined with manual scrubbing ensures effective removal of organic deposits and biofilm from pond surfaces. Disinfection with sodium hypochlorite providing 30 ppm active chlorine for at least 60 minutes or ideally 12-24 hours contact time ensures microbial inactivation. Complete sludge removal is critical, as sludge accumulation leads to anaerobic conditions and toxic metabolite formation. Provision of shrimp toilets covering 5–7% of pond area with adequate depth facilitates centralized waste collection, while regular sludge pumping enhances overall pond hygiene and water quality.

3.4. Soil disinfection procedures against EHP:

Enterocytozoon hepatopenaei (EHP) poses a serious threat to shrimp growth and productivity. Effective inactivation of EHP spores in pond soil is critical for disease prevention. Disinfection using potassium permanganate at concentrations above 15 ppm or chlorine above 40 ppm has proven effective in destroying resistant spores. Such targeted disinfection minimizes the risk of chronic infections, growth retardation and economic losses associated with EHP outbreaks.

4. Water intake and treatment systems:

Good quality brackish water should be used for shrimp culture. Water intake may be through tide-fed or pump-fed systems from nearby, reliable water sources having ideal brackish water salinity. The source water must be free from industrial, agricultural and domestic contaminants and should not receive untreated effluents. Prior to intake, water quality parameters such as salinity, turbidity, pH, alkalinity etc should be assessed to ensure suitability for *P. vannamei* culture. Use of properly designed intake canals, filtration systems and reservoir ponds further enhances water quality and biosecurity, thereby reducing disease risks and improving overall farm performance.

In areas with turbidity levels of 250–500 NTU, the use of sedimentation tanks becomes mandatory to allow settling of suspended solids before water enters the farm system. Settling water for 4–5 days significantly improves clarity and quality.

Application of Poly Aluminium Chloride (PAC) at 5–7 ppm enhances coagulation and flocculation of fine particles. Use of PAC combined with $KMnO_4$ (3 ppm) also helps to reduce organic load, thereby improving biosecurity and water quality stability.

Three stage filtrations using 120 µm, 80 µm and 40–60 µm screens during water intake prevent entry of disease transmitting vectors, predators and carrier organisms into culture ponds. Proper filtration significantly reduces the introduction of WSSV carriers such as crabs, insects and wild crustaceans. This physical barrier serves as the first line of biosecurity and enhances the effectiveness of subsequent water treatment measures.

Reservoir ponds are ideal: at least 15% of the total farm area for reservoir pond is a fundamental GMP requirement. Reservoir ponds act as buffer systems for water storage, treatment and conditioning before use in culture ponds. Treated reservoir water reduces biosecurity risks, stabilizes water quality and ensures uninterrupted water availability during emergency situations or limited intake periods.

5. Farm level bio security measures:

Strict biosecurity protocol is essential to prevent pathogen entry and spread within the farm. Bird and crab fencing effectively reduce transmission of WSSV and other pathogens by vectors. Restricting movement of personnel and equipment between ponds minimizes cross-contamination. Foot dips using $KMnO_4$ (500 ppm) and hand dips with iodine (100 ppm) serve as effective disinfection barriers, reinforcing farm hygiene and disease prevention.

6. Selection and quality assessment of seed:

Stocking of high-quality, disease-free shrimp seed is a critical determinant of survival, growth and overall production success in shrimp aquaculture. Seed should be sourced exclusively from CAA-approved hatcheries and must be PCR-certified as specific pathogen free (SPF), with special emphasis on EHP and WSSV. Healthy PL are characterized by active swimming behavior, full gut, uniform body pigmentation, minimal size variation and well-developed rostral teeth (>5 teeth), with uniform size typically exceeding 8–12 mm and biomass below 300 PL per gram for PL10–12.

Proper planning and coordination with hatchery operators regarding farm salinity prior to dispatch are essential to minimize stress during transport. Seed transportation should be conducted under insulated conditions with adequate oxygenation, maintaining optimal stocking densities (e.g., 2500–3000 PL per 3.5 L bag for PL8–10 and 1600–1800 PL per bag for PL10–12) and transit duration must be limited to 10 to 12 hours and ideally within 6 to7 hours. Gradual acclimatization of PL to pond temperature and salinity, at a rate not exceeding 0.5 ppt per hour, is vital to reduce osmotic shock and post-stocking mortality. Adoption of nursery-based or two-phase culture systems further enhances seed performance by improving early survival and uniformity prior to grow-out stocking.

7. Feed management:

Feed management is a critical component of shrimp farming, as feed accounts for approximately 40–60% of the total production cost. Therefore, efficient feeding strategies are essential to maximize growth, minimize feed wastage and maintain water quality. During the early culture phase (20–30 days of culture), blind feeding is generally practiced at a rate of 1.8–2.5 kg per lakh post-larvae (approximately 300–600 g/day). Beyond 30 DOC, feeding should be strictly regulated based on biomass estimation using cast net sampling. The use of check trays is an effective tool for monitoring feed consumption and adjusting feeding rates; tray feeding is typically maintained at 2–4% during 20–30 DOC and at 2.5–10 g/kg of feed during 30–120 DOC. If more than 25% feed remains in the tray, one feeding should be skipped and the subsequent feeding reduced by 40%.

When feed residue is less than 5%, the same feeding quantity can be continued, whereas 5–10% residue warrants a 10% decrease in feed. Feeding should be reduced or suspended during moulting (particularly at night), plankton blooms or crashes, rainfall, cloudy weather, stress conditions, low dissolved oxygen and extreme temperature events. Slight underfeeding is considered safer than overfeeding, as excessive feed deteriorates water quality and increases disease risk. Automatic feeders ensure uniform feed distribution and reduce feed wastage. Proper feed storage is an integral part of farm biosecurity, while the judicious use of probiotics, immune stimulants and bioremediators supports gut health, improves feed utilization and enhances overall shrimp performance.

8. Water quality management:

Maintaining optimal water quality is a core Best Management Practice (BMP) in shrimp culture, as even small deviations can rapidly stress shrimp and reduce survival and growth. Alkalinity should be maintained at 120–150 ppm (up to 200 ppm) through periodic liming to buffer pH and keep daily pH fluctuation below 0.5 units (ideal 7.5–8.0); during rainy days, 100–200 kg lime/ha helps counter dilution and acidification. Dissolved oxygen (DO) must remain >5 ppm, as hypoxia (<2.8 ppm) causes stress and lethal levels around 1.27 ppm can lead to mass mortality, making continuous aeration and DO monitoring essential. Total Suspended Solids (TSS) should be kept below 300 ppm (higher levels require aeration), as >500 ppm can cause gill choking, while turbidity of 75–150 NTU is desirable for pond productivity; excess turbidity and organic load should be managed by regular sludge removal. Oxidation–Reduction Potential (ORP) serves as an indicator of pond ageing and organic accumulation, guiding corrective actions. Routine use of pH, DO, TDS meters and monitoring of Total Ammoniacal Nitrogen (TAN) are critical to prevent toxic conditions. In low saline or inland saline shrimp farming, balanced mineral management is crucial, maintaining Ca:Mg at 1:3, Na:K at ~28:1, to support osmoregulation, moulting and overall health. Consistent monitoring and timely corrective measures ensure stable pond conditions, improved shrimp performance and reduced disease risk.

Application of organic-based probiotics promotes beneficial microbial communities. These microbes improve nutrient recycling, suppress pathogenic bacteria and stabilize water quality. Avoiding water exchange during the first two months reduces disease introduction risks. Limited water exchange (8–15%) during the third month, using treated reservoir water, helps maintain water quality without compromising biosecurity.

9. Aeration and power backup systems:

Adequate aeration and reliable power-backup systems are critical BMPs in shrimp culture, with requirements strictly dependent on stocking density and the culture system. Aeration demand peaks at night and early morning and during cloudy weather, rainy seasons, algal bloom crashes and high biomass phases, when dissolved oxygen can drop rapidly. Aerators should be positioned ~3 m away from pond dykes to ensure effective circulation and prevent erosion. As a guideline, traditional ponds require ~1 hp per 350–400 kg biomass, while BFT systems need ~1 hp per 200 kg shrimp (about 25–30 hp/ha) due to high oxygen demand. Blower systems (1–1.5 hp) can support 70–100 tons biomass, but must be supported with 24-hour power backup. Different aeration devices serve distinct functions: paddle wheel aerators generate strong horizontal circulation and help control sludge movement; air blower–diffuser systems produce fine bubbles for high oxygen dissolution and excellent bottom DO improvement but provide minimal water circulation; Venturi aerators and propeller aspirator pumps are also can be used for supplementary aeration based on the pond and culture systems.

10. Disease Management:

Disease management and emergency response are critical components of Best Management Practices (BMPs) in shrimp culture, as disease outbreaks can cause sudden and severe losses if not handled promptly. Effective disease prevention begins with biosecurity measures, including the use of SPF seed, proper pond preparation, inlet water filtration and disinfection, controlled entry of people and equipment and regular health monitoring. Continuous observation of feeding response, behavior, color and molting pattern allows early detection of problems. In emergencies such as sudden DO crash, toxic ammonia/nitrite spikes, algal bloom collapse or disease signs (lethargy, empty gut, surface swimming, mass mortality), rapid BMP-based response is essential—immediate increase in aeration, partial water exchange (where permitted), application of probiotics and carbon sources, pH and alkalinity correction and removal of dead or moribund shrimp to prevent pathogen spread. The availability of 24-hour power backup, standby aerators and emergency chemicals (lime, zeolite, oxygen-releasing compounds) is crucial for crisis management. Importantly, responsible health management and seeking laboratory confirmation (PCR/histopathology) forms the backbone of BMPs. A proactive disease management plan combined with a well-defined emergency response protocol minimizes crop loss, limits pathogen transmission and ensures sustainable and biosecure shrimp farming.

Early reporting of disease outbreaks to local authorities and neighbouring farmers is essential for regional biosecurity. Timely communication enables coordinated response measures, preventing large-scale disease spread. Dead and moribund shrimp act as potent sources of infection, if not handled properly. Disposal in designated pits with lime or bleaching powder effectively inactivates pathogens. Preventing access of scavengers further reduces the risk of disease transmission within and outside the farm. Infected water should never be discharged without proper treatment, as this can contaminate surrounding ecosystem and farms.

Unregulated use of antibiotics and chemicals poses risks to shrimp health, environmental safety and export acceptance. Strict adherence to CAA-recommended dosages and approved compounds ensures food safety and maintains ecological

balance. Responsible chemical management supports sustainable and compliant shrimp farming practices

Proper sludge management reduces environmental pollution and disease risks. Collection of sludge in designated pits followed by drying facilitates safe disposal or reuse. For farms exceeding 5 ha., installation of an Effluent Treatment System (ETS) is mandatory. Discharging water only after adequate treatment ensures compliance with environmental regulations and protects coastal ecosystems.

Compliance with CAA regulations ensures environmental protection and sustainable farm operation. Following CAA norms enhances farmer credibility, reduces regulatory risks and promotes responsible aquaculture development.

11. Harvest and post-harvest handling:


Harvest and post-harvest handling are critical stages in Good Management Practices (GMP) to ensure product quality, food safety and market acceptance in shrimp farming. Harvesting should be carried out during early morning or late evening hours to minimize thermal stress and maintain shrimp freshness. Partial or total harvesting must be planned based on size uniformity, survival and market demand, while avoiding harvesting during disease outbreaks unless advised by competent authorities. Prior to harvest, feeding should be stopped for 8–12 hours to reduce gut content and water contamination. Harvesting equipment such as nets, baskets and pumps must be clean, disinfected and used exclusively for healthy ponds to prevent cross-contamination. Immediately after harvest, shrimp should be washed with clean, chilled potable or treated brackishwater and transferred to ice slurry at a shrimp-to-ice ratio of 1:1 to rapidly reduce body temperature. Sorting, grading and packing should be carried out under hygienic conditions using food-grade containers. Proper cold chain maintenance during transport to processing plants is essential to

prevent spoilage and microbial growth. Wastewater and solid wastes generated during harvesting and post-harvest operations must be treated and disposed of responsibly in accordance with CAA regulations and environmental guidelines. Adoption of GMP during harvest and post-harvest handling ensures high product quality, reduces post-harvest losses and supports compliance with national and international food safety standards such as BAP and HACCP.

12. Conclusion

Strong biosecurity is the farmer's first and most cost-effective defense against disease in shrimp farming. By controlling the entry of pathogens through SPF seed, clean water, restricted movement of people and equipment and regular health monitoring, farmers can control disease outbreaks rather than struggle with losses later. Adopting biosecurity as a routine BMP reduces crop failure, lowers production risk, cuts unnecessary chemical use and ultimately ensures sustainable yields, better profits and long-term farm sustainability.

Topic - 4

TRACEABILITY AND CERTIFICATION IN THE SEAFOOD VALUE CHAIN

Neenu Peter, MPEDA

1. Introduction:

India is a leading seafood exporting nation, with aquaculture contributing a major share to export earnings. During FY 2024–25, India exported 16,98,170 MT of seafood valued at US$ 7.45 billion (₹62,408.45 crore), with frozen shrimp continuing as the principal export commodity. The growing emphasis by importing countries on food safety, sustainability and transparency has made traceability and certification integral to the seafood value chain. Compliance with international regulatory frameworks has therefore become essential to sustain market access and enhance the credibility of Indian seafood products.

2. Aquaculture Shrimp Value Chain in India:

The aquaculture shrimp value chain in India encompasses broodstock import and quarantine, hatchery operations, nursery rearing, grow-out farming, harvesting, processing, cold storage and export. This chain is supported by critical infrastructure such as the Aquatic Quarantine Facility at Chennai, broodstock multiplication centres, bio-secure farms, seafood processing plants and cold storage facilities. Shrimp production primarily involves *Penaeus vannamei* and *Penaeus monodon*, with significant production spread across maritime States. These interconnected stages underline the importance of traceability to ensure transparency and accountability from production to export.

3. Traceability- Concept and Significance:

Traceability refers to the ability to track aquaculture products throughout the value chain, from the pond of origin to the final consumer. An effective traceability system enables identification of the farm and pond, harvest date, quantity harvested and the buyer at each stage. Such systems enhance food safety, facilitate recall

during emergencies, support regulatory compliance and improve consumer confidence. For exporting countries, traceability is a prerequisite for accessing major international markets and meeting non-tariff regulatory requirements.

4. International Regulatory Framework:

The European Union Regulation (EU) 2023/2842 mandates that fishery and aquaculture products be traceable at all stages of production, processing and distribution. For aquaculture products, details such as the name and registration number of the production unit, geographical area of harvest, date and quantity must be maintained in digital form and made available to competent authorities upon request. The regulation will be implemented from 10 January 2029.

Similarly, the United States Food Safety Modernization Act (FSMA), under Section 204(d), establishes additional traceability recordkeeping requirements for certain foods, including seafood. For aquaculture products, information related to the location and identification of each container or pond from which the product is harvested must be maintained. Records may be stored in paper or electronic format, must be preserved for two years and should be retrievable within 24 hours during inspections or outbreak investigations. The compliance date for these requirements is 20 July 2028.

5. MPEDA's Initiatives for Traceability

MPEDA has been implementing a comprehensive traceability framework through enrolment of aquaculture farms and adoption of digital platforms. Enrolment enables the generation of Farm IDs, residue monitoring, pre-harvest testing and issuance of export facilitation certificates. At present, MPEDA-enrolled aquaculture farms cover an area of 1,16,520 hectares, with spatial mapping strengthening transparency and regulatory oversight. Aqua farmers can enroll with MPEDA through mobile app- **Aqua Trace.**

To ensure smooth trade with the United States, MPEDA entered into a Regulatory Partnership Agreement with the USFDA. In-country inspections were conducted during 2025 for Government agencies and stakeholders, with further

inspections scheduled during 2026. These initiatives have reinforced India's preparedness to meet evolving regulatory expectations.

6. Addressing Non-Tariff Barriers:

With the expansion of land-based farming sector, India is facing challenges on sustainability front, biosecurity breaches leading to disease outbreaks and trade barriers due to detection of banned antibiotics/ pharmacologically active substances and shrimp viruses in cultured shrimp.

(i) DS2031CertificatetotheUS:

In compliance with Section 609 of the US Public Law 101-162, shrimp exports to the United States require the DS-2031 certificate, certifying that shrimp is harvested through aquaculture and in a turtle-safe manner. MPEDA has been issuing digitally signed DS-2031 certificates with the approval of the US Government.

(ii) Pre-Harvest Testing and SHAPHARI Certification

Pre-harvest testing of aquaculture products is mandatory for exports to the European Union to ensure compliance with residue and food safety standards. To further promote responsible aquaculture, MPEDA launched the SHAPHARI Certification Programme on 7 February 2020, based on FAO-recommended certification criteria. The programme aims to promote residue-free and pathogen-free products, encourage responsible use of chemicals, promote better management practices, and address environmental and socio-economic sustainability. SHAPHARI certification involves preliminary audits, certification audits and periodic surveillance audits conducted by empanelled auditors of MPEDA. The SHAPHARI logo was launched on 28 February 2025. As of now, 16 hatcheries, 19 individual farms covering 271.64 hectares and two cluster farms covering 72.57 hectares have been certified. Several hatcheries and farms are currently under various stages of certification.

7. Institutional Strengths and Existing Gaps:

MPEDA is supported by a strong institutional framework, including a network of offices in all maritime States, quality control laboratories, ELISA laboratories and specialized pathology and microbiology facilities. Despite these strengths, challenges persist in achieving complete traceability coverage. These include gaps in registration and renewal of aquaculture farms, jurisdictional overlaps between regulatory authorities and limited accountability among intermediaries such as agents and aggregators.

8. Way Forward:

Strengthening traceability and certification requires wider adoption of good aquaculture practices, systematic record-keeping and ensuring validity of farm registrations. Promoting SHAPHARI certification across farms and hatcheries can enable certified products to command premium prices in international markets. Integrating certification throughout the processing value chain and building a distinct brand identity for SHAPHARI-certified products will further enhance competitiveness. The implementation of Aqua Trace, with GIS-based mapping and pond-wise data capture will also play a critical role in ensuring preparedness for future global regulatory requirements.

Topic - 5

ചെമ്മീൻ കൃഷിയ്ക്കുള്ള വിള ഇൻഷുറൻസ്

വരുൺ എസ്., അഗ്രികൾച്ചർ ഇൻഷുറൻസ് കമ്പനി ഓഫ് ഇന്ത്യ ലിമിറ്റഡ്

ചെമ്മീൻ കൃഷി ഇന്ന് അക്വാകൾച്ചർ മേഖലയിലെ ഏറ്റവും സജീവവും ഉയർന്ന സാമ്പത്തിക മൂല്യവുമുള്ള മേഖലകളിലൊന്നായി വളർന്നു കഴിഞ്ഞിരിക്കുന്നു. തീരദേശ പ്രദേശങ്ങളിലെ ആയിരക്കണക്കിന് കുടുംബങ്ങളുടെ ഉപജീവന മാർഗം, രാജ്യത്തിന്റെ കയറ്റുമതി വരുമാനം, ഗ്രാമീണ മേഖലയിലെ തൊഴിൽ സൃഷ്ടി ഇവയിലൊക്കെയും ഈ മേഖല നിർണായക സംഭാവനയാണ് നൽകുന്നത്. എന്നാൽ, ഈ വളർച്ചയ്ക്കൊപ്പം തന്നെ വലിയ അപകടസാധ്യതകളും ചെമ്മീൻ കൃഷിയെ പിന്തുടരുന്നുണ്ട്. രോഗബാധകൾ, കാലാവസ്ഥാ ദുരന്തങ്ങൾ, അപ്രതീക്ഷിത വിഷബാധകൾ, അടിസ്ഥാന സൗകര്യങ്ങളിലെ തകരാറുകൾ എന്നിവയ്ക്ക് ഏതൊരു ഘട്ടത്തിലും കർഷകന്റെ മാസങ്ങളോളം നീണ്ട പരിശ്രമവും നിക്ഷേപവും നഷ്ടപ്പെടുത്താൻ കഴിയും. ഈ യാഥാർത്ഥ്യം തിരിച്ചറിഞ്ഞുകൊണ്ടാണ്, അഗ്രിക്കൾച്ചർ ഇൻഷുറൻസ് കമ്പനി ഓഫ് ഇന്ത്യ ലിമിറ്റഡ് (AIC) ചെമ്മീൻ കർഷകരെ വലിയ സാമ്പത്തിക നഷ്ടങ്ങളിൽ നിന്ന് സംരക്ഷിക്കുന്നതിന് ശാസ്ത്രീയമായി രൂപകൽപ്പന ചെയ്ത ഒരു സംഘടിത ചെമ്മീൻ ഇൻഷുറൻസ് പദ്ധതി അവതരിപ്പിച്ചിരിക്കുന്നത്.

അഗ്രിക്കൾച്ചർ ഇൻഷുറൻസ് കമ്പനി ഓഫ് ഇന്ത്യ (AIC), കേന്ദ്ര സർക്കാരിന് കീഴിലുള്ള ഒരു പൊതുമേഖലാ സ്ഥാപനമാണ്. കാർഷിക-കാർഷികേതര മേഖലകളിൽ രാജ്യത്ത് ആകമാനമുള്ള കർഷകർക്ക് അനുയോജ്യമായ ഇൻഷുറൻസ് പരിരക്ഷ നൽകുകയാണ് കമ്പനിയുടെ ലക്ഷ്യം.

ഈ സ്ഥാപനത്തിന്റെ പ്രധാന സംരംഭങ്ങളിലൊന്നായ ചെമ്മീൻ ഇൻഷുറൻസ് പോളിസി, ഇന്ത്യയിലുടനീളമുള്ള ചെമ്മീൻ കർഷകർ നേരിടുന്ന പ്രത്യേക അപകടസാധ്യതകൾ കണക്കിലെടുത്ത് ശാസ്ത്രീയമായി രൂപകൽപ്പന ചെയ്തതാണ്. കൃഷി മേഖലയിലെ അനിശ്ചിതത്വങ്ങൾക്കിടയിൽ, സ്ഥിരതയും സാമ്പത്തിക സുരക്ഷയും ഉറപ്പാക്കുന്ന ഒരു ശക്തമായ പരിരക്ഷാവലയമായി ഈ പദ്ധതി പ്രവർത്തിക്കുന്നു.

ആർക്കൊക്കെ ഇൻഷുറൻസ് എടുക്കാം?

കോസ്റ്റൽ അക്വാകൾച്ചർ അതോറിറ്റി (CAA) യിൽ രജിസ്റ്റർ ചെയ്തതും കുളങ്ങളിൽ ചെമ്മീൻ കൃഷി നടത്തുന്നതുമായ എല്ലാ കർഷകർക്കും ഈ ഇൻഷുറൻസ് പദ്ധതിയിൽ അംഗമാകാം. ഉടമസ്ഥാവകാശമുള്ള കർഷകരും വാടക

കർഷകരും ആവശ്യമായ രജിസ്ട്രേഷൻ രേഖകളും അനുബന്ധ രേഖകളും സമർപ്പിക്കുന്ന പക്ഷം അർഹരായിരിക്കും.

പ്രധാന ചെമ്മീൻ ഇനങ്ങളും ഇൻഷുറൻസ് കാലയളവും

ഓരോ ഇനം ചെമ്മീനിനും അവയുടെ വളർച്ചാ കാലയളവ് അനുസരിച്ചാണ് ഇൻഷുറൻസ് പരിരക്ഷ നൽകുന്നത്.

ചെമ്മീൻ/കൊഞ്ച് ഇനങ്ങൾ	പരമാവധി കവറേജ് കാലയളവ് (Days of Culture)
White leg shrimp (വനാമി ചെമ്മീൻ)	120 ദിവസങ്ങൾ
Black tiger shrimp (കാര ചെമ്മീൻ)	130 ദിവസങ്ങൾ
Scampi (ആറ്റുകൊഞ്ച്)	130 ദിവസങ്ങൾ

ഇൻഷുറൻസ് പ്ലാനുകൾ

ഓരോ ചെമ്മീൻ കർഷകരുടെയും കൃഷിരീതികളും അപകടസാധ്യതകളും വ്യത്യസ്തമാണെന്ന യാഥാർത്ഥ്യം കണക്കിലെടുത്തുകൊണ്ടാണ് AIC ഈ പദ്ധതിയുടെ ഭാഗമായി ഇൻഷുറൻസ് പ്ലാനുകൾ അവതരിപ്പിച്ചിരിക്കുന്നത്. പദ്ധതിയുടെ കീഴിൽ മൂന്ന് വ്യത്യസ്ത ഇൻഷുറൻസ് ഓപ്ഷനുകളാണ് കർഷകർക്ക് ലഭ്യമാകുന്നത്.

PLAN-A: രോഗങ്ങളുമായി ബന്ധമില്ലാത്ത അടിസ്ഥാന അപകടങ്ങൾക്ക് ഈ പ്ലാനിലൂടെ ഇൻഷുറൻസ് പരിരക്ഷ നൽകുന്നു. വേനൽക്കാലത്തെ ചെമ്മീൻ മരണങ്ങൾ, മൂന്നാം കക്ഷികളിൽ നിന്നുള്ള അപ്രതീക്ഷിത വിഷബാധ, കലാപങ്ങളും സമരങ്ങളും, ഭീകരവാദ പ്രവർത്തനങ്ങൾ, ഭൂകമ്പങ്ങളും, സ്ഫോടനങ്ങളും, പ്രകൃതി ദുരന്തങ്ങൾ (ചുഴലിക്കാറ്റ്, വെള്ളപ്പൊക്കം തുടങ്ങിയവ), വാഹനങ്ങളോ മൃഗങ്ങളോ മൂലമുണ്ടാകുന്ന നാശനഷ്ടങ്ങൾ മുതലായവ ഇതിൽ ഉൾപ്പെടുന്നു.

PLAN-B: ചെമ്മീൻ കൃഷിയിൽ ഉൽപ്പാദനത്തെ ഏറ്റവും കൂടുതൽ ബാധിക്കുന്ന ഗുരുതര രോഗങ്ങളെ ലക്ഷ്യമിട്ടാണ് പ്ലാൻ-B രൂപകൽപ്പന ചെയ്തിരിക്കുന്നത്. PLAN-A പരിരക്ഷയോടൊപ്പം, വൈറ്റ് സ്പോട്ട് സിൻഡ്രോം വൈറസ് (WSSV), ഇൻഫെക്ഷ്യസ് ഹൈപോഡെർമൽ ആൻഡ് ഹെമറ്റോപോയറ്റിക് നെക്രോസിസ് വൈറസ് (IHHNV), ഇൻഫെക്ഷ്യസ് മയോനെക്രോസിസ് വൈറസ് (IMNV), ഹെപറ്റോപാൻക്രിയാറ്റിക് മെക്രോസ്പോറിഡിയാസിസ് (HPM), വിബ്രിയോസിസ്, റണ്ണിംഗ് മോർട്ടാലിറ്റി സിൻഡ്രോം (RMS), എൻറോസൈറ്റോസോവൻ ഹെപറ്റോപെനേഷ് (EHP) തുടങ്ങിയ രോഗങ്ങൾ മൂലമുണ്ടാകുന്ന നഷ്ടങ്ങൾക്ക് കൂടി പ്ലാൻ-B ഇൻഷുറൻസ് പരിരക്ഷ

നൽകുന്നു. രോഗബാധ മൂലമുള്ള ക്ലെയിമുകൾ പരിഗണിക്കുന്നതിന്, അംഗീകൃത ലബോറട്ടറികളിൽ നടത്തിയ PCR പരിശോധന നിർബന്ധമായിരിക്കും

PLAN-C: ആവശ്യാനുസരണം തിരഞ്ഞെടുക്കാവുന്ന സമഗ്ര പരിരക്ഷാ ഓപ്ഷനുകൾ ഇതിൽ ഉൾപ്പെടുന്നു

ഇൻഷുറൻസ് തുകയും പ്രീമിയവും (ഹെകൂറിന്)

കൃഷി തുടങ്ങുന്നത് മുതൽ വിളവെടുപ്പ് വരെ കർഷകൻ പ്രതീക്ഷിക്കുന്ന പരമാവധി ചെലവിനെ അടിസ്ഥാനമാക്കിയാണ് ഇൻഷുറൻസ് തുക നിശ്ചയിക്കുന്നത്.

വൈറ്റ് ലെഗ് ചെമ്മീനിനു (വനാമി) ഇൻഷുറൻസ് കമ്പനി നിശ്ചയിച്ചിട്ടുള്ള പരമാവധി ഇൻഷുറൻസ് തുക താഴെ നൽകുന്നു.

ഇൻഷുറൻസ് കാലയളവ് (ദിവസങ്ങൾ)	ഇൻഷുറൻസ് തുക (രൂപയിൽ)
60 DOC	9,90,000
80 DOC	12,60,000
100 DOC	14,40,000
120/130 DOC	18,00,000

മുകളിൽ നൽകിയിട്ടുള്ള ഇൻഷുറൻസ് തുകയിൽ കമ്പനിയുടെ അംഗീകാരത്തോടെ കർഷകന്റെ ആവശ്യാനുസരണം മാറ്റങ്ങൾ വരുത്താവുന്നതാണ്. എന്നാൽ പരമാവധി തുക പതിനെട്ടു ലക്ഷമായി നിജപ്പെടുത്തിയിട്ടുണ്ട്.

പ്രീമിയം നിരക്കുകൾ (GST കൂടാതെ)

തിരഞ്ഞെടുക്കുന്ന പ്ലാനിനും ദിവസങ്ങൾക്കും അനുസരിച്ചുള്ള പ്രീമിയം നിരക്കുകൾ താഴെ പറയും പ്രകാരമാണ്:

ഇൻഷുറൻസ് കാലയളവ്	Plan A (അടിസ്ഥാന പരിരക്ഷ)	Plan B (രോഗ പരിരക്ഷ ഉൾപ്പെടെ)
60 ദിവസങ്ങൾ	3.25%	6.58%
80 ദിവസങ്ങൾ	3.33%	6.75%
100 ദിവസങ്ങൾ	3.45%	6.99%
120/130 ദിവസങ്ങൾ	3.50%	7.09%

ഇതിന് പുറമെ പ്ലാൻ-B യിൽ ഇൻഷുറൻസ് പരിരക്ഷ വ്യത്യസ്ത ദിവസങ്ങളുടെ കോമ്പിനേഷനുകളിൽ ആവശ്യാനുസരണം കർഷകർക്ക് തിരഞ്ഞെടുക്കാവുന്നതാണ്.

നാഷണൽ ഫിഷറീസ് ഡിജിറ്റൽ പ്ലാറ്റ്ഫോം (NFDP)-യിൽ രജിസ്റ്റർ ചെയ്ത കർഷകർക്ക്, അടച്ച പ്രീമിയത്തിന്റെ 40 ശതമാനം വരെ ഒറ്റത്തവണ ഇൻസെന്റീവായി ലഭിക്കും. ഈ ഇൻസെന്റീവ് ഹെക്ടറിന് പരമാവധി Rs.25,000/- എന്ന നിരക്കിൽ, പരമാവധി 4 ഹെക്ടറിനു വരെ അനുവദിക്കുന്നതായിരിക്കും. അതേസമയം, ആകെ ഇൻസെന്റീവ് തുക Rs.1,00,000/- ആയി പരിമിതപ്പെടുത്തിയിരിക്കുന്നു.

നഷ്ടപരിഹാര നിർണ്ണയ രീതി

നഷ്ടം സംഭവിക്കുന്നതായി മനസിലായി 24 മണിക്കൂറിനുള്ളിൽ ഇൻഷുറൻസ് കമ്പനിയെ അറിയിച്ചിരിക്കണം. തുടർന്ന് കമ്പനിയും ബന്ധപ്പെട്ട മറ്റ് ഉദ്യോഗസ്ഥരും പരിശോധനയും സർവേയും നടത്തി നഷ്ടം സ്ഥിരീകരിക്കും. ആവശ്യമായ ഫോട്ടോകൾ, ലബോറട്ടറി റിപ്പോർട്ടുകൾ തുടങ്ങിയവ ലഭിച്ച ശേഷം നഷ്ടപരിഹാരം നിർണ്ണയിക്കുന്നതായിരിക്കും. ഇൻഷുറൻസ് കമ്പനിയുടെ ആവശ്യാനുസരണം കർഷകർ സൂക്ഷിക്കേണ്ട രജിസ്റ്ററുകളുടെ ഡിജിറ്റൽ കോപ്പി കൃത്യമായ ഇടവേളകളിൽ കർഷകർ നൽകേണ്ടതാണ്. 70 ശതമാനമോ അതിലധികമോ നാശനഷ്ടം ഉണ്ടാകാൻ സാധ്യതയുള്ളപ്പോൾ മാത്രമേ ക്ലെയിം പരിഗണിക്കുകയുള്ളു. നഷ്ടം അറിയിച്ച ശേഷം കർഷകന് വിൽക്കാൻ കഴിഞ്ഞ ചെമ്മീനിന്റെ മൂല്യം (Salvage Value) കണക്കാക്കുന്ന നഷ്ടത്തിൽ നിന്നും കുറവ് ചെയ്യുന്നതായിരിക്കും. രോഗം മൂലമുള്ള നഷ്ടങ്ങൾക്ക് പോളിസി ആരംഭിച്ച ആദ്യ ഏഴ് ദിവസത്തെ കാത്തിരിപ്പ് കാലയളവ് (Waiting Period) ഉണ്ടായിരിക്കുന്നതാണ്. എന്നാൽ, രോഗം മൂലമുള്ള നഷ്ടങ്ങൾക്ക് പോളിസി ആരംഭിച്ച ആദ്യ ഏഴ് ദിവസത്തെ കാത്തിരിപ്പ് കാലയളവിൽ ഇൻഷുറൻസ് പരിരക്ഷ ലഭിക്കില്ല. ഈ പദ്ധതി പ്രകാരം ഓരോ ക്ലെയിം തുകയുടെയും 20 ശതമാനം (20% of the claim amount) ഡിഡക്ടിബിൾ (Deductible) എന്ന നിലയിൽ കർഷകൻ തന്നെ വഹിക്കേണ്ടതാണ്.

കർഷകൻ എടുത്തിട്ടുള്ള പരമാവധി ഇൻഷുറൻസ് കാലാവധിയെ അടിസ്ഥാനമാക്കി മുൻകൂട്ടി നിശ്ചയിച്ചിട്ടുള്ള അനുപാതത്തിലായിരിക്കും നഷ്ടപരിഹാരം നിർണയിക്കുന്നത്. ഇതിനായി 0-15 ദിവസം വരെ ഇൻഷുറൻസ് തുകയുടെ നിശ്ചിത ശതമാനം Fixed Cost ആയും 16 - 45 ദിവസം, 46 -60 ദിവസം, 61 -80 ദിവസം, 81 -100 ദിവസം, 101 - 120/130 ദിവസം എന്ന ക്രമത്തിൽ നിശ്ചിത ശതമാനം ദൈനംദിന അനുപാതത്തിൽ Variable Cost ആയി പരിഗണിച്ചുകൊണ്ടുമാണ് ആകെയുള്ള നഷ്ടപരിഹാരം കണക്കാക്കുന്നത്.

ഉദാഹരണം (Claim Calculation Illustration)

ഒരു ഹെക്ടറിൽ 60 ദിവസത്തെ പ്ലാൻ തിരഞ്ഞെടുത്ത ഒരു കർഷകന് 47-ാം ദിവസം നഷ്ടം സംഭവിച്ചാൽ ക്ലെയിം കണക്കാക്കുന്നത് എങ്ങനെയാണെന്ന് താഴെ വിവരിക്കുന്നു.

അടിസ്ഥാന വിവരങ്ങൾ:

- തിരഞ്ഞെടുത്ത പ്ലാൻ: PLAN - B (Comprehensive Cover)
- ഇൻഷുറൻസ് തുക (Sum Insured): Rs.5,50,000
- നഷ്ടം സംഭവിച്ച ദിവസം (DOC): 47-ാം ദിവസം
- സാൽവേജ് മൂല്യം (Salvage Value): 1,000

ക്ലെയിം കണക്കാക്കുന്ന രീതി

ഘട്ടം (Period)	**കണക്കുകൂട്ടൽ (Calculation)**	**തുക (Amount)**
0-15 DOC (Fixed)	5,50,000*36.36%	Rs.1,99,980
16-45 DOC (30 ദിവസം)	5,50,000 *1.21% *30	Rs.1,99,650
46-47 DOC (2 ദിവസം)	5,50,000 *1.82% *2	Rs.20,020
ആകെ നഷ്ടം (Gross Claim)		**Rs.4,19,650**

ആകെ ക്ലെയിം തുക (സാൽവേജിന് മുൻപ്): Rs.4,19,650.00

സാൽവേജ് മൂല്യം കുറച്ച ശേഷം: Rs.4,19,650 - 71,000 = Rs.4,18,650

ഡിഡക്ടിബിൾ (20%) : Rs.83,730.00

അവസാന ക്ലെയിം തുക: Rs.3,34,920 (418650 - 83730)

വിശദ വിവരങ്ങൾക്ക് താഴെ പറയുന്ന നമ്പരുകളിൽ ബന്ധപ്പെടുക

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Topic - 6

വനാമി ചെമ്മീൻ കയറ്റുമതി വിപണന സാദ്ധ്യതകൾ

എം. ആർ. പ്രേമചന്ദ്രഭട്ട്, എം. എസ്. സാജു.
സീഫുഡ് എക്സ്പോർട്ടേഴ്സ് അസോസിയേഷൻ ഓഫ് ഇന്ത്യ,
കേരളാ റീജിയൺ, കൊച്ചി

സുസ്ഥിര ചെമ്മീൻ കൃഷിവികസനം ലക്ഷ്യമാക്കിക്കൊണ്ട് കേരള സർക്കാർ സ്ഥാപനമായ ഏജൻസി ഫോർ ഡെവലപ്മെന്റ് ഓഫ് അക്വാകൾച്ചർ, കേരള- യുടെ നേതൃത്വത്തിലാണ് 'അക്വാമീറ്റ് 2026' എന്ന പരിപാടി സംഘടിപ്പിച്ചിട്ടുള്ളത്. കേരളത്തിൽ വനാമി ചെമ്മീൻകൃഷി പ്രോത്സാഹിപ്പിക്കുന്നതിന് നടപടി സ്വീകരിക്കണമെന്നും അതിനായി നെൽകൃഷി ചെയ്യാതെ കിടക്കുന്ന മുഴുവൻ പാടശേഖരങ്ങളിലും അനുയോജ്യത വിലയിരുത്തി ചെമ്മീൻകൃഷി നടപ്പാക്കുന്നതിന് നടപടി സ്വീകരിക്കണമെന്നും സീഫുഡ് എക്സ്പോർട്ടേഴ്സ് അസോസിയേഷൻ സർക്കാരിനോട് ആവശ്യപ്പെട്ടിട്ടുള്ളതാണ്. ഇത് പ്രകാരം ഇപ്പോൾ ആലപ്പുഴ, എറണാകുളം, തൃശ്ശൂർ, മലപ്പുറം, കണ്ണൂർ ജില്ലകളിൽ സർക്കാർ 2421 ഹെക്ടർ ചെമ്മീൻ കൃഷിക്ക് അനുമതി നൽകി ഉത്തരവായിട്ടുണ്ടെന്നത് ഏറ്റവും സന്തോഷകരമായ കാര്യമാണ്. ചെമ്മീൻ ഉത്പാദന - കയറ്റുമതി മേഖലയുടെ പ്രശ്നങ്ങളെ സർക്കാർ അനുഭാവപൂർവം പരിഗണിച്ചിട്ടുള്ളതിന് ഉത്തമ ഉദാഹരണമായി ഇതിനെ വിലയിരുത്താവുന്നതാണ്. ശാസ്ത്രീയ ചെമ്മീൻ കൃഷി രീതികൾ അവലംബിച്ചാൽ കയറ്റുമതിക്ക് ആവശ്യമായ ഏതാണ്ട് 50,000 ടൺ ചെമ്മീൻ അധികമായി ഉത്പാദിപ്പിക്കാൻ ഇതുമൂലം സാധിക്കുമെന്നത് കേരളത്തെ സംബന്ധിച്ച് ഒരു ചെറിയ കാര്യമല്ല. ഇതിന് സീഫുഡ് എക്സ്പോർട്ടേഴ്സ് അസോസിയേഷൻ സർക്കാരിനോട് നന്ദി അറിയിക്കുന്നു. കൂടാതെ ഈ പ്രവർത്തനങ്ങൾ ഒരു വലിയ ക്യാമ്പയിൻ ആയി മുന്നോട്ട് നയിക്കുന്ന അക്വാമീറ്റ് 2026-ന് എല്ലാവിധമായ ആശംസകളും നേരുന്നു. കേരളത്തിലെ ഇത്രയേറെ കർഷകർ ഇത് ഏറ്റെടുത്തുകൊണ്ട് മുന്നോട്ട് വരുന്നതിലുള്ള സന്തോഷവും ഇവിടെ പങ്കുവെക്കുന്നു.

1. ഇന്ത്യൻ മത്സ്യ ഉത്പന്ന കയറ്റുമതി:

ആഗോള മത്സ്യ ഉത്പാദന രംഗത്ത് ഇന്ത്യ രണ്ടാം സ്ഥാനത്താണ്. മൊത്തം മത്സ്യ ഉത്പാദനത്തിന്റെ 8.92% ഇന്ത്യയിൽ നിന്നാണ്. 2024-25 വർഷത്തിൽ ഇന്ത്യയുടെ മൊത്തം മത്സ്യ ഉത്പാദനം 19.8 മില്യൺ ടൺ ആണ്. ഇത് ലോക മത്സ്യോത്പന്ന വിപണിയിൽ ഇന്ത്യയ്ക്ക് ഒരു പ്രധാന സ്ഥാനം നേടിത്തരുന്നു. ഇതിൽ കടൽ

മത്സ്യോത്പാദനം കാര്യമായ വളർച്ച കാണിക്കാതിരിക്കുകയും എന്നാൽ അക്വാകൾച്ചർ ഉൾപ്പെടുന്ന ഉൾനാടൻ ഉത്പാദനം ക്രമാനുഗതമായി ഉയർന്ന് 75% എന്ന നിരക്കിലേക്ക് എത്തിച്ചേരുന്നതായും കാണുന്നു. ചൈന, ഇന്ത്യ, ഇന്തോനേഷ്യ, വിയറ്റ്നാം തുടങ്ങിയ രാജ്യങ്ങൾ അക്വാകൾച്ചറിൽ മുന്നിട്ട് നിൽക്കുന്നു. ഈ രാജ്യങ്ങളിൽ നിന്നുള്ള കയറ്റുമതിയിൽ കൃഷിയിലൂടെ ഉത്പാദിപ്പിച്ച ഉത്പന്നങ്ങളുടെ പ്രാധാന്യം ഏറിവരുകയാണ്.

മത്സ്യോത്പന്ന കയറ്റുമതിയിൽ ഇന്ത്യ ആറാം സ്ഥാനത്താണ്. ആകെ കയറ്റുമതിയിൽ 4% ആണ് ഇന്ത്യയിൽ നിന്നുള്ളത്. 2024-25 വർഷത്തിൽ 16,98,170 ടൺ മത്സ്യോത്പന്നങ്ങൾ ആണ് ഇന്ത്യ കയറ്റുമതി ചെയ്തത്. 7.453 ബില്യൺ US ഡോളറാണ് ഇന്ത്യയുടെ കയറ്റുമതിമൂല്യം; അതായത് 62,408.45 കോടി രൂപയുടെ വിദേശനാണ്യം ലഭ്യമായി. USA ആണ് പ്രധാന കയറ്റുമതി രാജ്യം; യൂറോപ്യൻ യൂണിയൻ, ചൈന, ജപ്പാൻ തുടങ്ങിയ132 ഓളം രാജ്യങ്ങളിലേക്ക് ഇന്ത്യ കയറ്റുമതി ചെയ്യുന്നു. ഏറ്റവും കൂടുതൽ കയറ്റുമതി ചെയ്യുന്നത് ശീതീകരിച്ച ചെമ്മീൻ ആണ്. അതിൽ ഏറ്റവും പ്രധാന ഇനം *Litopenaeus vannamei* എന്ന വനാമി ചെമ്മീൻ ആണ്. ഇന്ത്യയിൽ ഏറ്റവും അധികം വനാമി കയറ്റുമതി ചെയ്യുന്ന സംസ്ഥാനം ആന്ധ്രാപ്രദേശ് ആണ്. 2024-25 വർഷത്തിൽ സംസ്ഥാനം 3,66,182 ടൺ മത്സ്യകയറ്റുമതിയിലൂടെ 21,245.9 കോടി രൂപ (2.536 ബില്യൺ US ഡോളർ) നേടി. 2020-21 ൽ ആന്ധ്രാപ്രദേശ് സംസ്ഥാനത്തിന്റെ കയറ്റുമതി 2,79,992 ടൺ ആയിരുന്നത് 2024 -2025 ൽ 3,66,182 ടൺ ആയി ഉയർന്നു. ഇത് ഇന്ത്യയുടെ ആകെ കയറ്റുമതി മൂല്യത്തിന്റെ 34% ആണ് എന്നതും ഇത് അക്വാകൾച്ചർ മുഖേന ആണ് ഉത്പാദിപ്പിച്ചിട്ടുള്ളത് എന്നതും എടുത്തുപറയേണ്ടതാണ്.

2. കേരളത്തിന്റെ മത്സ്യോത്പന്ന കയറ്റുമതി:

2020-21 വർഷത്തിൽ കേരളത്തിന്റെ മത്സ്യോത്പന്ന കയറ്റുമതി 1,57,698 ടൺ ആയിരുന്നു. ഇതിന്റെ മൂല്യം 5623.12 കോടി രൂപ അതായത് 0.767 ബില്യൺ US ഡോളർ ആയിരുന്നു എങ്കിൽ, 2024 -25 വർഷത്തിൽ അത് നാമമാത്രമായി ഉയർന്ന് 1,79,660 ടൺ ആയിട്ടുണ്ട്. ഇതിന്റെ മൂല്യം 6941.36 കോടി രൂപ അതായത് 0.829 ബില്യൺ US ഡോളർ ആണ്. ഇത് ഇന്ത്യയുടെ ആകെ കയറ്റുമതി മൂല്യത്തിന്റെ 11.12% ആണ്. മത്സ്യോത്പന്ന കയറ്റുമതി ആരംഭിച്ചതും 2005 വരെ ഒന്നാം സ്ഥാനത്ത് ആയിരുന്നതുമായ സംസ്ഥാനമാണ് കേരളം എന്നത് ഇവിടെ ഏറ്റവും പ്രധാനമാണ്. നിലവിൽ വിദേശനാണ്യ മൂല്യത്തിൽ ആന്ധ്രാപ്രദേശ്, മഹാരാഷ്ട്ര, തമിഴ്നാട് എന്നീ സംസ്ഥാനങ്ങൾ കേരളത്തെ നാലാം സ്ഥാനത്തേക്ക് പിൻതള്ളിയിരിക്കുന്നു. ഇതിന് കാരണം എന്താണെന്നത് ഇവിടെ ഏറ്റവും പ്രസക്തമാണ്.

3. സംസ്ഥാന മത്സ്യോത്പന്ന സംസ്കരണ മേഖലയുടെ കരുത്ത്:

ജലവിഭവ സ്രോതസ്സുകളാൽ അനുഗ്രഹീതമായ സംസ്ഥാനമാണ് കേരളം. 51 പശ്ചിമ ഇന്ത്യൻ മഹാസമുദ്രത്തിന്റെ ഭാഗമായ 600 km കടൽ തീരം സംസ്ഥാനത്തിന് ഉണ്ട്. കൂടാതെ നദികൾ, ജലസംഭരണികൾ, ഓരുജലാശയങ്ങൾ, കായലുകൾ, ചെമ്മീൻ വാറ്റുനിലങ്ങൾ, പാടശേഖരങ്ങൾ എന്നിവ കൊണ്ട് അനുഗ്രഹീതമാണ് കേരളം. പരമ്പരാഗതമായി മത്സ്യം മുഖ്യഭക്ഷ്യ വിഭവമായ കേരളത്തിൽ മത്സ്യബന്ധനവും മത്സ്യകൃഷിയും പടിപടിയായി വികസിച്ചുവന്നു.

ഇന്ത്യയിൽ ഏറ്റവും കൂടുതൽ യൂറോപ്യൻ യൂണിയൻ അംഗീകൃത മത്സ്യസംസ്കരണശാലകൾ പ്രവർത്തിക്കുന്ന സംസ്ഥാനം കേരളമാണ്. 102 യൂണിറ്റുകൾ ആണ് കേരളത്തിൽ ഉള്ളത് (23% യൂണിറ്റുകൾ). ഇത് ഈ മേഖലയിലുള്ള കേരളത്തിന്റെ മൂലധന നിക്ഷേപമാണ് സൂചിപ്പിക്കുന്നത്.

ഏറ്റവും അധികം തൊഴിൽ വൈദഗ്ധ്യം ഉള്ള തൊഴിലാളികൾ ഉള്ള സംസ്ഥാനം കേരളമാണ്. മത്സ്യസംസ്കരണവുമായി ബന്ധപ്പെട്ട സംസ്കരണ ശാലകളിലും പീലിംഗ്ഷെഡുകളിലും ആണ് ഇവർ ജോലി ചെയ്യുന്നത്. സീസണിൽ 850 ൽപരം പീലിംഗ് ഷെഡ്ഡുകൾ കേരളത്തിൽ പ്രവർത്തിക്കുന്നുണ്ട്. പരമ്പരാഗതമായി ഈ തൊഴിലിൽ ഏർപ്പെട്ടിരിക്കുന്ന സ്ത്രീതൊഴിലാളികൾ ആണ് ഇതിൽ ഏറിയ പങ്കും. മാനവ വിഭവശേഷിയിലും കേരളം പ്രഥമസ്ഥാനം അലങ്കരിക്കുന്നു. ഇതര സംസ്ഥാനങ്ങൾ മത്സ്യ സംസ്കരണ രംഗത്ത് കേരളത്തിൽ നിന്നുള്ള മാനവ വിഭവശേഷി പ്രയോജനപ്പെടുത്തിക്കൊണ്ടാണ് മുന്നോട്ടു വന്നിട്ടുള്ളത്.

4. മത്സ്യോത്പന്ന സംസ്കരണ മേഖല അഭിമുഖീകരിക്കുന്ന പ്രശ്നങ്ങൾ:

ചെമ്മീൻ ഉത്പന്നങ്ങൾ ആണ് കയറ്റുമതിയിൽ ഏറ്റവും പ്രാധാന്യം ഉള്ളത്. വിദേശ മാർക്കറ്റിൽ ഇന്ത്യയിൽ നിന്നുള്ള ഉത്പന്നങ്ങളുടെ മൂല്യത്തിന്റെ 70 ശതമാനവും അളവിന്റെ 40 ശതമാനവും സംഭാവന നൽകുന്നത് ചെമ്മീൻ ആണ്. കടൽ മത്സ്യബന്ധനത്തിൽ നിന്നുള്ള ഉത്പാദനം പ്രധാനമായും ചെമ്മീൻ ഉത്പാദനം കുറഞ്ഞു വരുന്നതും അക്വാകൾച്ചറിലൂടെ ചെമ്മീൻ ഉത്പാദനം വർദ്ധിക്കാതിരിക്കുന്നതും സംസ്കരണത്തിനുള്ള അസംസ്കൃത വസ്തുവായ ചെമ്മീനിന്റെ ലഭ്യതയെ പ്രതികൂലമായി ബാധിക്കുന്നു. സ്ഥാപിത ഉത്പാദന ശേഷിയുടെ 30% മാത്രമാണ് നിലവിൽ സംസ്കരണശാലകൾ ഉപയോഗപ്പെടുത്തുന്നത്. ഇത് ഈ മേഖലയിൽ സംസ്ഥാനത്തിന്റെ മുന്നേറ്റത്തിന് വിഘാതമാണ്.

കേരളത്തിന്റെ തീരദേശ ഗ്രാമപ്രദേശങ്ങളിലെ ഒരു പ്രധാന പരമ്പരാഗത തൊഴിൽ മേഖലയാണ് മത്സ്യസംസ്കരണം. പീലിംങ്ങ് ഷെഡ്ഡുകളിലും സംസ്കരണ

ഫാക്ടറികളിലുമായി ഏതാണ്ട് 2 ലക്ഷത്തോളം വരുന്ന തൊഴിലാളികൾ ഉപജീവനം നയിക്കുന്നു. ഇതിൽ ഏറിയപങ്കും വനിതാ തൊഴിലാളികൾ ആണ്. ഇവർ ആകട്ടെ തൊഴിലിൽ ഏറെ വൈദഗ്ദ്ധ്യം ഉള്ളവരാണ്. തൊഴിൽ വൈദഗ്ദ്ധ്യം ഉള്ള തൊഴിലാളികളെ നിലനിർത്തുന്നതിനായി സംസ്കരണശാലകൾ മറ്റു സംസ്ഥാനങ്ങൾ ഉത്പാദിപ്പിക്കുന്ന ചെമ്മീൻ ഇവിടെ കൊണ്ടുവന്ന് സംസ്കരിച്ചു കയറ്റുമതി ചെയ്യുകയാണ് ചെയ്തു പോരുന്നത്. ഇതിനായി കിലോഗ്രാമിന് ഏതാണ്ട് 30 രൂപയോളം അധികമായി ഗതാഗത ചെലവ് ആകുന്നു. ഇക്കാരണത്താൽ സംസ്കരണശാലകൾക്ക് സംസ്ഥാനത്ത് സുസ്ഥിരമായി പ്രവൃത്തിക്കുന്നതിന് സാധിക്കാത്ത അവസ്ഥ നിലനിൽക്കുന്നു. ചില സംസ്കരണ ശാലകൾ അന്യസംസ്ഥാനത്തേക്ക് ഇതിനകം മാറ്റി സ്ഥാപിക്കപ്പെട്ടിട്ടുണ്ട്. മറ്റുചിലത് മാറുന്നതിന് തയ്യാറെടുക്കുകയാണ്. ഇത് സാമ്പത്തിക – തൊഴിൽ രംഗങ്ങളിൽ കഠിനമായ ആഘാതം സൃഷ്ടിച്ചേക്കാം.

5. മത്സ്യോത്പന്ന സംസ്കരണ മേഖലയിലെ സാദ്ധ്യതകൾ:

മേൽ സൂചിപ്പിച്ച കാര്യങ്ങളിൽ നിന്ന് ഒരു കാര്യം വ്യക്തമാണ്. വാണിജ്യാടിസ്ഥാനത്തിലുള്ള വനാമി ചെമ്മീൻ കൃഷിക്ക് സംസ്കരണ കയറ്റുമതി വ്യവസായം അനിവാര്യമാണ് എന്നത് പോലെ മത്സ്യ സംസ്കരണ വ്യവസായത്തിന്റെ നിലനിൽപ്പിന് വനാമി ചെമ്മീൻ കൃഷിയും അനിവാര്യമാണ്. വനാമി ചെമ്മീൻ കൃഷി വലിയ തോതിൽ വികസിപ്പിക്കുന്നത്, ഒരു ഭക്ഷ്യവിഭവം എന്ന നിലക്ക് മാത്രമല്ല ഒരു ക്യാഷ്ക്രോപ് അഥവാ നാണ്യവിള എന്ന നിലയിൽ ഒട്ടേറെ തൊഴിലും വരുമാനവും നൽകുന്ന ഒന്നായി മാറുന്നതാണ്. അതിനായി മത്സ്യസംസ്കരണ വ്യവസായത്തെ പ്രയോജനപ്പെടുത്താനാകും. അതോടൊപ്പം ഈ വ്യവസായത്തിന്റെ അസംസ്കൃത വസ്തുവിന്റെ ദൗർലഭ്യത്തിന് പ്രാദേശികമായി പരിഹാരവുമാകും. സംസ്കരണ ശാലകളുടെ സ്ഥാപിത ഉത്പാദനശേഷി പ്രയോജനപ്പെടുത്താമെന്നതിനാൽ അധികമായി മൂലധന ചെലവുകൾ ഉണ്ടാവുന്നുമില്ല. കയറ്റുമതി വിപണി ലക്ഷ്യമിടുന്നത് കൊണ്ട് രാജ്യത്തിന്റെ വിദേശനാണ്യശേഖരവും മെച്ചപ്പെടുന്നു.

6. മത്സ്യോത്പന്ന സംസ്കരണ മേഖല നേരിടുന്ന ഭീഷണികൾ:

വിദേശവിപണി ലക്ഷ്യമിടുന്ന മത്സ്യ സംസ്കരണത്തിൽ ഉത്പന്നത്തിന് വിദേശ രാജ്യങ്ങൾ നിഷ്കർഷിക്കുന്ന ഗുണമേന്മാമാനദണ്ഡങ്ങൾ പാലിച്ചിരിക്കണം. അക്വാകൾച്ചറിലൂടെ വിദേശ വിപണി ലക്ഷ്യമിടുമ്പോൾ ഫാമുകളുടെ CAA രജിസ്ട്രേഷൻ, കൃഷി ചെയ്യുന്നതിനുള്ള ലൈസൻസ്, കൃഷി രീതിയുടെ സാങ്കേതിക മികവ്, ട്രേസബിലിറ്റി മാനദണ്ഡങ്ങൾ എന്നിവയെല്ലാം പരമ പ്രധാനമാണ്. ഉത്പന്നത്തിന്റെ ഗുണമേന്മ കയറ്റുമതി ചെയ്യാൻ ഉദ്ദേശിക്കുന്ന രാജ്യം നിഷ്കർഷിക്കുന്ന മാനദണ്ഡങ്ങൾക്ക് വിധേയമായിരിക്കണം. ഇതനുസരിച്ച് കൃഷി

നടത്തിയില്ലായെങ്കിൽ പ്രസ്തുത രാജ്യം ഉത്പന്നം തിരിച്ചയക്കുകയും അത് വലിയ നഷ്ടത്തിനു കാരണമാകുകയും ചെയ്യും. ഇക്കാരണത്താൽ കൃഷിയിൽ ഏർപ്പെടുന്നമുഴുവൻ കർഷകരും ചെമ്മീൻകൃഷിയിലെ 'ഗുഡ് മാനേജ്മെന്റ് പ്രാക്ടീസസ്' നടപ്പാക്കുകയും ഗുണമേന്മാമാനദണ്ഡങ്ങൾ പാലിക്കുകയും വേണം.

7. അക്വാകൾച്ചറിൽ വനാമി ചെമ്മീനിന്റെ പ്രാധാന്യം:

വിപണി ലക്ഷ്യം വച്ചുള്ള അക്വാകൾച്ചർ സംരംഭങ്ങൾ ലാഭകരമായി മാറുന്നതിനു തെരഞ്ഞെടുക്കുന്ന ഇനം വിപണിക്ക് യോജിച്ചത് ആയിരിക്കണം. ആഭ്യന്തര വിപണിയിൽ ചില സാഹചര്യങ്ങളിൽ നല്ല വില ലഭിക്കുമെങ്കിലും വലിയ രീതിയിലുള്ള ഉത്പാദനത്തിന് പരിമിതികൾ ഉണ്ട്. യൂണിറ്റ് വിസ്തൃതിയിൽ നിന്ന് പരമാവധി ഉത്പാദനവും ആയതിനു നല്ല വിപണിയും, വിലയും ഉറപ്പാക്കുന്ന സുസ്ഥിരമായ ഒരു സംരംഭമാണ് വനാമികൃഷി. കേരളത്തിൽ കൃഷിയിൽ ഏർപ്പെട്ടിട്ടുള്ളവരുടെ അനുഭവങ്ങൾ ഇത് സാക്ഷ്യപ്പെടുത്തുന്നുണ്ട്. ആന്ധ്രാപ്രദേശ്, തമിഴ്നാട് തുടങ്ങിയ സംസ്ഥാനങ്ങളിലെ ഊർജസ്വലരായ കർഷകർ വനാമി കൃഷിയിൽ വിസ്മയങ്ങൾ തീർത്തവരാണ്. ഈ സംസ്ഥാനങ്ങളുടെ കയറ്റുമതി സ്ഥിതിവിവരക്കണക്കുകൾ ഇതുതന്നെയാണ് കാണിക്കുന്നത്.

8. കേരളത്തിന്റെ വനാമി ചെമ്മീൻകൃഷി സാദ്ധ്യതകൾ:

കേരളത്തിലെ 102 ഓളം വരുന്ന സംസ്കരണ ശാലകളിലേക്ക് ആന്ധ്രാപ്രദേശ്, തമിഴ്നാട് തുടങ്ങിയ സംസ്ഥാനങ്ങളിൽ നിന്നായി പ്രതിദിനം ഏതാണ്ട് 200 ടൺ വനാമി ചെമ്മീൻ എത്തുന്നുണ്ട്. കേരളത്തിന് 50,000 ടൺ വനാമി ചെമ്മീൻ കയറ്റുമതിക്കായി ആവശ്യമുണ്ട്. അത് കേരളത്തിൽ തന്നെ ഉത്പാദിപ്പിക്കുന്നതിന് ആവശ്യമായ പ്രായോഗികമായ ആസൂത്രണമാണ് ആവശ്യം. ഇതിനാവശ്യമായ ഭരണപരവും സാമ്പത്തികവും സാങ്കേതികവുമായ സഹായവും കർഷകർക്ക് ലഭ്യമാവണം.

- കൃഷി ചെയ്യാതെ കിടക്കുന്ന പാടശേഖരങ്ങൾ ഉൾപ്പെടെയുള്ള അനുയോജ്യമായ മുഴുവൻ സ്ഥലത്തും വനാമി ചെമ്മീൻകൃഷി വ്യാപിപ്പിക്കുന്നതിന് നടപടികൾ സ്വീകരിക്കണം.

- വനാമി ശാസ്ത്രീയമായി കൃഷി ചെയ്യുന്നതിന് ഏക്കറിന് 6-7 ലക്ഷം രൂപ ചെലവ് വരുന്നുണ്ട്. ഇതിനായുള്ള ബാങ്ക് ലോൺ പദ്ധതിയിൽ ഉൾപ്പെടുത്തണം.

- ബാങ്ക് ലോൺ തിരിച്ചടവ് ഉറപ്പാക്കുന്നതിന് കർഷകർക്ക് കുറഞ്ഞത് 5 വർഷത്തെ ലീസ് വ്യവസ്ഥകളിൽ സ്ഥലം ലഭ്യമാവണം.

- ചെമ്മീൻകൃഷി തണ്ണീർത്തട സംരക്ഷണം ഉറപ്പാക്കുന്ന സാഹചര്യത്തിൽ ചെമ്മീൻകൃഷി പ്രോത്സാഹിപ്പിക്കുന്നതിന് ബന്ധപ്പെട്ട നിയമങ്ങളിൽ ആവശ്യമായ ഭേദഗതികൾ കൊണ്ടുവരണം.

- ചെമ്മീൻകൃഷിക്ക് ആവശ്യമായ ഗുണമേന്മയുള്ള സീഡ്, ഫീഡ്, അനുബന്ധ സാമഗ്രികൾ എന്നിവ ഹോൾ സെയിൽ റേറ്റിൽ കർഷകർക്ക് എത്തിക്കുന്നതിന് നടപടികൾ ഉണ്ടാവണം.

- കൃഷി മാനദണ്ഡങ്ങൾ പ്രകാരം ആണ് എന്ന് ഉറപ്പാക്കുന്നതിനും ഉത്പന്നം സെർട്ടിഫിക്കേഷൻ നടത്തുന്നതിനും ADAK നടപടികൾ സ്വീകരിക്കണം.

9. പ്രതീക്ഷിക്കുന്ന ഗുണഫലങ്ങൾ:

- കയറ്റുമതി ലക്ഷ്യം വച്ചുകൊണ്ടുള്ള വാണിജ്യാടിസ്ഥാനത്തിലുള്ള വനാമി ചെമ്മീൻകൃഷി കേരളത്തിന്റെ സാമ്പത്തികമായ കുതിച്ചുചാട്ടത്തിന് കാരണമാകും.

- മത്സ്യ സംസ്കരണ മേഖലയ്ക്ക് പുതുജീവൻ നൽകുന്ന നാഴികക്കല്ലായി ഇത് മാറും. പരമ്പരാഗത പീലിംഗ് തൊഴിലാളികൾക്ക് തൊഴിലും കൂടുതൽ വരുമാനവും ഉണ്ടാകും.

- അന്യസംസ്ഥാനങ്ങളിൽ നിന്ന് പിൻതള്ളുന്ന ചെമ്മീനിന് പകരം സംസ്ഥാനത്തുത്പാദിപ്പിക്കുന്ന ഗുണനിലവാരമുള്ള ചെമ്മീൻ സംസ്കരണത്തിന് ലഭിക്കുന്നതിനാൽ ഇവിടെ നിന്നുള്ള കയറ്റുമതി വ്യാപിപ്പിക്കുന്നതിന് സാധിക്കുന്നു.

- ചെമ്മീൻ കൃഷിക്ക് വേണ്ടിയുള്ള സീഡ്, ഫീഡ്, അനുബന്ധ വസ്തുക്കൾ, എന്നിവയുമായി ബന്ധപ്പെട്ട നിരവധി വ്യവസായങ്ങൾ വികസിക്കുന്നു.

- അഭ്യസ്തവിദ്യരായ യുവജനങ്ങൾ, കർഷകർ, തൊഴിലാളികൾ എന്നിവർക്ക് കൂടുതൽ തൊഴിലവസരങ്ങൾ വന്നുചേരും.

- തരിശായി കിടക്കുന്ന വെള്ളക്കെട്ടുകളും കൃഷിയിടങ്ങളും പരിസ്ഥിതി സംരക്ഷിച്ചുകൊണ്ട് ഗുണമേന്മയുള്ള ഭക്ഷ്യോത്പാദന പ്രക്രിയയ്ക്ക് ഉപയോഗപെടുത്താനും അതുവഴി ജീവിത നിലവാരം മെച്ചപ്പെടുത്താനുമാകും.

ഏതൊരു കൃഷിയും ഏറ്റെടുക്കുമ്പോൾ കർഷകർ ആദ്യം ചിന്തിക്കുന്നത് ഉത്പന്നത്തിന്റെ വിപണിയാണ്. വനാമി ചെമ്മീൻകൃഷി സംബന്ധിച്ചിടത്തോളം അതിന്റെ മൂല്യവും വിപണിയും ഉറപ്പാണ്. കേരളത്തിന്റെ പരിസ്ഥിതിക്കും സാഹചര്യത്തിനും അനുയോജ്യമായ ഒരിനമാണ് വനാമി ചെമ്മീൻ. നല്ല മാർക്കറ്റ് ഡിമാൻഡ് ഉള്ളതിനാൽ, സാദ്ധ്യമായ ഇടങ്ങളിൽ പരമ്പരാഗത ചെമ്മീൻ കൃഷി സംസ്കാരത്തിൽ നിന്ന് മാറി ഈ കൃഷിയെ ഏറ്റെടുക്കുകയും അതിനാവശ്യമായ സർക്കാർ സഹായങ്ങൾ ലഭ്യമാവുകയും ചെയ്താൽ വനാമി ചെമ്മീൻ കൃഷിക്ക് വലിയ സാധ്യതകളാണ് മുന്നിലുള്ളത്.

Topic - 7

പൊക്കാളി പാടങ്ങളിലെ ചെമ്മീൻകൃഷി നേരിടുന്ന പ്രധാന വെല്ലുവിളികൾ

കെ.എക്സ്. സെബാസ്റ്റ്യൻ, KAFF

1. പരമ്പരാഗത പൊക്കാളി കൃഷി:

കേരളത്തിന്റെ തീരപ്രദേശങ്ങളിലായി നിലനിൽക്കുന്ന പരമ്പരാഗത സമന്വിത കൃഷിസമ്പ്രദായമാണ് പൊക്കാളി. ഉപ്പുതാരാവസ്ഥയുള്ള താഴ്ന്ന പ്രദേശങ്ങളിൽ മഴക്കാലത്ത് നെൽകൃഷിയും, വേനൽക്കാലത്ത് ചെമ്മീൻ/മത്സ്യകൃഷിയും നടത്തുന്ന ഈ സമ്പ്രദായം ലോകത്തിലെ അപൂർവ ജൈവകൃഷി മാതൃകകളിൽ ഒന്നായി കണക്കാക്കപ്പെടുന്നു. പരമ്പരാഗതമായി കൃഷി ചെയ്തുവരുന്ന പൊക്കാളി നെല്ല് അതിന്റെ സവിശേഷമായ രുചിക്കും ഔഷധ ഗുണങ്ങൾക്കും പേരുകേട്ടതാണ്. പ്രത്യേകിച്ച്, ഉപ്പിനെ പ്രതിരോധിക്കുന്ന ഏറ്റവും മികച്ച നെല്ലിനങ്ങളിൽ ഒന്നാണിത്. ഉയർന്ന ഉപ്പുരസമുള്ള സാഹചര്യങ്ങളിൽ വളരാൻ കഴിവുള്ള ഈ നെല്ലിനങ്ങൾ കൃഷി ചെയ്ത് വിളവെടുപ്പിന് ശേഷം പൊക്കാളി പാടങ്ങളിലേക്ക് പരമ്പരാഗത ചെമ്മീൻകയറ്റം നടക്കുകയും അവ അവിടെ വളരുകയും ചെയ്യുന്നു. ഇതാണ് പ്രാദേശികമായി 'ചെമ്മീൻകെട്ട്' എന്നറിയപ്പെടുന്നത്. പൊക്കാളി പാടശേഖരങ്ങൾ പരിസ്ഥിതി സംരക്ഷണത്തിനും ഗ്രാമീണ ജീവിതോപാധിക്കും നിർണായകമാണ്. സുസ്ഥിര കൃഷിയുടെ ഒരു പ്രധാന ഉദാഹരണമാണ് പൊക്കാളി കൃഷി, ഇവിടെ നെല്ലും ചെമ്മീൻകൃഷിയും പരസ്പരം പൂരകമായി ആവാസവ്യവസ്ഥയുടെ സ്ഥിരതയും ഉൽപ്പാദനക്ഷമതയും നിലനിർത്തുന്നു. ഈ സമന്വിത കൃഷി രീതിയിലൂടെ രാസവളങ്ങളും കീടനാശിനികളും ഒഴിവാക്കുകയും മണ്ണിന്റെ ജൈവഘടന നിലനിർത്തുകയും, ജൈവ വൈവിധ്യം സംരക്ഷിക്കുകയും ചെയ്യുന്നു. ഈ പരമ്പരാഗത രീതി ഇപ്പോൾ പാരിസ്ഥിതിക, സാമൂഹിക-സാമ്പത്തിക, നരവംശ വെല്ലുവിളികൾ നേരിടുന്നു.

ജൂൺ മുതൽ ഒക്ടോബർ വരെയുള്ള മഴക്കാലത്ത് വെള്ളത്തിലെ ഉപ്പുരസം കുറയുമ്പോൾ പൊക്കാളി നെൽകൃഷി നടത്തുന്നു. നവംബർ മുതൽ ഏപ്രിൽ വരെ ഉപ്പുവെള്ളം കയറുന്ന സമയത്ത് ചെമ്മീൻ കൃഷി ചെയ്യുന്നു. നെല്ല് കൊയ്ത ശേഷം പാടത്ത് അവശേഷിക്കുന്ന കച്ചിലും, കച്ചിൽകടയും വെള്ളത്തിൽ കിടന്ന് അഴുകി ചെമ്മീനുകൾക്ക് നല്ല ജൈവത്തീറ്റയായി മാറുന്നു. ചെമ്മീനുകളുടെ വിസർജ്യവും അവയുടെ പടംപൊഴിച്ച അവശിഷ്ടങ്ങളും അടുത്ത നെൽകൃഷിക്ക് ആവശ്യമായ പോഷകസമൃദ്ധമായ വളമായി മാറുന്നു. വേലിയേറ്റ സമയത്ത് സ്ലൂയിസ് ഗേറ്റുകൾ തുറന്ന് കായലിൽ നിന്നുള്ള ചെമ്മീൻ കുഞ്ഞുങ്ങളെ പാടത്തേക്ക് പ്രവേശിപ്പിക്കുന്നു. വേലിയിറക്ക സമയത്ത് വെള്ളം പുറത്തേക്ക് പോകുമ്പോൾ വലകൾ ഉപയോഗിച്ച്

ചെമ്മീനുകളെ തടഞ്ഞുനിർത്തുന്നു. ഇതിന് പുറമെ നിന്നുള്ള വളങ്ങളോ തീറ്റയോ ആവശ്യമില്ലാത്തതിനാൽ ഉൽപ്പാദനച്ചെലവ് വളരെ കുറവാണ്. ഭൂമിശാസ്ത്രപരമായ സവിശേഷത മൂലം പൊക്കാളി നെല്ലിന് ഭൗമസൂചിക പദവി ലഭിച്ചിട്ടുണ്ട്. ഈ സുപ്രധാന കാർഷിക ആവാസവ്യവസ്ഥയെ സംരക്ഷിക്കേണ്ടതിന്റെ അടിയന്തര ആവശ്യകത തിരിച്ചറിഞ്ഞുകൊണ്ട്, പൊക്കാളി കൃഷി നേരിടുന്ന വെല്ലുവിളികൾ വിശകലനം ചെയ്യുകയും അതിന്റെ സംരക്ഷണത്തിനായി തിരുത്തൽ നടപടികൾ ശുപാർശ ചെയ്യുകയും ചെയ്യുക എന്നതാണ് ഇപ്പോഴത്തെ ആവശ്യം. ഈ ആശങ്കകൾ പരിഹരിക്കുന്നതിലൂടെ അതുല്യവും അമൂല്യവുമായ ഈ കാർഷിക പൈതൃകം സംരക്ഷിക്കുന്നതിന് കഴിയണം. കേരളത്തിലെ കർഷകർക്ക് മാത്രമായി കൃഷി, വിതരണ അവകാശങ്ങളും നേടിയിട്ടുണ്ടെന്നത്, അതിന്റെ മികവിന് അനുയോജ്യമായ അംഗീകാരമായി വേറിട്ടുനിൽക്കുന്നു. 2008-2009 വർഷത്തിൽ തമിഴ്നാട്ടിലെ ചെന്നൈയിലുള്ള ജിയോഗ്രാഫിക്കൽ ഇൻഡിക്കേഷൻസ് രജിസ്ട്രി ഓഫീസ് പൊക്കാളി അരിക്ക് രജിസ്റ്റേർഡ് ജിയോഗ്രാഫിക്കൽ ഇൻഡിക്കേഷൻ (GI) പദവി നൽകി.

എറണാകുളം, ആലപ്പുഴ, തൃശ്ശൂർ ജില്ലകളിലെ തീരദേശ പ്രദേശങ്ങളിലാണ് ഈ കൃഷി പ്രധാനമായും കണ്ടുവരുന്നത്. ഓരുകളിലൂടെ വേലിയേറ്റ സമയത്ത് ഉപ്പുവെള്ളം കയറ്റിയും ഇറക്കിയും ജലത്തിന്റെ ഗുണനിലവാരം നിയന്ത്രിക്കുന്നു. പാടത്തിലെ സ്വാഭാവിക ഭക്ഷണമാണ് ഉപയോഗിക്കുന്നത്. പരമ്പരാഗത രീതിയിൽ ലാഭം കുറവായതിനാൽ സ്വാഭാവികമായി വരുന്ന ചെമ്മീൻ കുഞ്ഞുങ്ങൾക്ക് പുറമെ ഗുണമേന്മയും രോഗപ്രതിരോധശേഷിയുമുള്ള ചെമ്മീൻ വിത്തുകൾ കൂടി നിക്ഷേപിക്കുന്നത് വിളവ് വർദ്ധിപ്പിക്കാൻ സഹായിക്കുന്നു. പൊക്കാളി പാടത്തിലുൽപ്പാദിപ്പിക്കുന്ന ചെമ്മീന്റെ വിപണന സാധ്യതകൾ വേണ്ട രീതിയിൽ പ്രയോജനപ്പെടുത്തുന്നതിന് സാധിക്കേണ്ടതുണ്ട്.

2. നേരിടുന്ന വെല്ലുവിളികൾ:

2.1 ഒരു നെല്ലും ഒരു ചെമ്മീനും:

ആലപ്പുഴ, എറണാകുളം, തൃശ്ശൂർ ജില്ലകളിലായി 7719.34 ഹെക്ടർ പൊക്കാളി പ്രദേശങ്ങൾ പരമ്പരാഗതമായി ചെമ്മീൻകൃഷി പ്രവർത്തനങ്ങളിൽ ഏർപ്പെട്ടുവന്നിരുന്നവയാണ്. നെൽകൃഷി യന്ത്രവത്ക്കരണം പ്രായോഗികമായി ഏർപ്പെടുത്തുന്നതിന് കഴിയാത്തതിനാൽ, ഇതിൽ 90 ശതമാനത്തിലധികം പ്രദേശങ്ങളിലും നെൽകൃഷി ലാഭകരമല്ലാതായി തീർന്നിരിക്കുന്നു. നെൽകൃഷിക്കായി സബ്സിഡി ലഭിച്ചാൽ പോലും നിലമൊരുക്കുന്നതിനുള്ള തുക പോലും കർഷകർക്ക് വിളവെടുക്കുമ്പോൾ ലഭിക്കാറില്ല എന്നത് ഒരു ഭാഗത്ത് നിലനിൽക്കുമ്പോൾ തന്നെ പൊക്കാളി പാടങ്ങളിൽ കൊയ്യുന്നതിന് തൊഴിലാളികളെ ലഭിക്കുന്നതിനും

വളരെയധികം ബുദ്ധിമുട്ടനുഭവപ്പെടുന്നു. ഒരു വിള നെൽകൃഷി ചെയ്താൽ മാത്രമെ ചെമ്മീൻകൃഷി ചെയ്യുന്നതിനുള്ള ലൈസൻസ് ലഭ്യമാകൂ എന്ന നയം കാരണം പൊക്കാളി പാടങ്ങളിൽ 90 ശതമാനത്തിലധികം നിലവിൽ നെൽകൃഷിക്കോ ചെമ്മീൻകൃഷിക്കോ ഉപയുക്തമാക്കാതെ തരിശിടേണ്ടി വന്നിരിക്കുകയാണ്. നെൽകൃഷി പ്രായോഗികമല്ലാതെ വർഷങ്ങളായി തരിശിട്ടിരിക്കുന്ന പൊക്കാളി പാടങ്ങൾ അക്വാകൾച്ചർ മേഖലകളായി പ്രഖ്യാപിച്ച് ഒരു വർഷത്തിൽ തന്നെ രണ്ട് വിള ചെമ്മീൻകൃഷി ഏർപ്പെടുത്തുന്നതിനുള്ള നടപടികൾ അടിയന്തരമായി സ്വീകരിക്കേണ്ടതുണ്ട്. ഇതിനായി നെൽകൃഷിക്കനുയോജ്യമല്ലാത്ത പ്രദേശങ്ങളെ കൃഷി വകുപ്പിന്റെ ഡാറ്റാ ഷീറ്റിൽ നിന്നും ഒഴിവാക്കേണ്ടതുണ്ട്.

2.2 ലൈസൻസിംഗ് പരിഷ്കരണം:

നിലവിൽ "ഒരു നെല്ലും, ഒരു ചെമ്മീനും/മീനും" പദ്ധതിക്ക് 5 മാസ ലൈസൻസ് കാലയളവ് മാത്രമാണ് അനുവദിക്കുന്നത് (നവംബർ 15 – ഏപ്രിൽ 15). ചെമ്മീൻ പൂർണ്ണമായ വളർച്ച കൈവരിക്കുന്നതിന് സാധാരണയായി 180 ദിവസങ്ങൾ വരെ ആവശ്യമാണ്. 5 മാസം (ഏകദേശം 150 ദിവസം) എന്ന നിലവിലെ കാലയളവ് പല സാഹചര്യങ്ങളിലും മതിയായ വളർച്ച ലഭിക്കുന്നതിന് പര്യാപ്തമല്ല. കാലാവസ്ഥാ വ്യതിയാനം മൂലം ഉപ്പുതാരാവസ്ഥയിൽ മാറ്റം, മഴവെള്ള ലഭ്യതയിൽ വ്യതിയാനം, ജലതാപനിലയിലെ ഉയർച്ച, എന്നിവയെല്ലാം ഉൽപാദനത്തെ ബാധിക്കുന്നു. പരമ്പരാഗതമായി പൊക്കാളി സമ്പ്രദായം 6 മാസം നെൽകൃഷി, 6 മാസം ചെമ്മീൻ എന്ന ചക്രത്തിലാണ് നടന്നു വന്നിരുന്നത്. അതിനാൽ ചെമ്മീൻകൃഷി ലൈസൻസ് കാലയളവ് 6 മാസമായി (നവംബർ 15 – മെയ് 15) ഉയർത്തുന്നത് പൂർണ്ണവളർച്ച കൈവരിക്കാനും, ഉൽപാദനക്ഷമത വർദ്ധിപ്പിക്കാനും, കർഷക വരുമാനം ഉയർത്താനും സഹായിക്കും.

2.3 'കെട്ടുകലക്കൽ' സമ്പ്രദായത്തിന്റെ ദോഷഫലങ്ങൾ:

നിലവിലെ ഇൻലാന്റ് ഫിഷറീസ് ആന്റ് അക്വാകൾച്ചർ നിയമം അനുസരിച്ച് കാലയലുകളിൽ നിന്ന് ചെമ്മീൻ കയറ്റുന്ന പാടങ്ങൾ ഒഴികെയുള്ളവയെ വിഷുവിന് ശേഷമുള്ള കെട്ടുകലക്കലിൽ നിന്ന് ഒഴിവാക്കിയിട്ടുണ്ട്. അതുകൊണ്ടുതന്നെ ശാസ്ത്രീയ ചെമ്മീൻ കൃഷിയിൽ ഏർപ്പെടുന്ന ഫാമുകളിൽ കെട്ടുകലക്കി മീൻ പിടിക്കുന്നത് നിയമവിരുദ്ധവും സ്വകാര്യ വ്യക്തിയുടെ സ്വത്തിന്മേലുള്ള കടന്നുകയറ്റവുമാണ്. എന്നിരുന്നാലും മത്സ്യതൊഴിലാളികൾ എന്ന് വ്യാജേന ഒരു വിഭാഗം ആൾക്കാർ ശാസ്ത്രീയ ചെമ്മീൻ കൃഷിയിടങ്ങൾ ബലമായി കൈയ്യേറി ചെമ്മീൻ കൊള്ളയടിക്കുന്നത് പലപ്പോഴും ക്രമസമാധാനപ്രശ്നങ്ങൾക്ക് കാരണമാകാറുണ്ട്. ഇത്തരത്തിലുള്ള സമ്മർദ്ദങ്ങൾക്ക് വിധേയരായ കർഷകർക്ക് ആവശ്യമായ നിയമ പരിരക്ഷ പലപ്പോഴും ലഭിക്കാറില്ല. സ്വന്തം കൃഷി-മുതൽ

സുരക്ഷിതമായി പിടിച്ചെടുത്ത് വിപണനം ചെയ്യുന്നതിന് കർഷകർക്ക് സാധിച്ചാൽ മാത്രമെ ചെമ്മീൻകൃഷി വികസനം എന്ന സ്വപ്നം നമ്മുടെ നാട്ടിൽ സാക്ഷാത്കരിക്കുകയുള്ളൂ. കൂടാതെ "കെട്ടുകലക്കൽ" എന്ന സമ്പ്രദായത്തിൽ പാടത്തിന്റെ അടിത്തട്ട് ഇളക്കി ചെളി കലക്കുന്നത്, വെള്ളത്തിൽ ലയിച്ച ഓക്സിജന്റെ അളവ് കുറയുന്നതിനും, ചെറുമത്സ്യങ്ങൾ കൂട്ടത്തോടെ നശിക്കുന്നതിനും കാരണമാകുന്നു. ജൈവവൈവിധ്യത്തെ നിലനിർത്തുന്ന പ്ലവകങ്ങൾ നശിക്കുന്നു, ഭക്ഷ്യശൃംഖല തകരുന്നു. ഇതിന്റെ ദീർഘകാല പ്രത്യാഘാതങ്ങൾ മത്സ്യസമ്പത്ത് കുറയുക, മണ്ണിന്റെ ജൈവഘടന തകരുക, ജൈവ സർട്ടിഫിക്കേഷൻ നഷ്ടപ്പെടുക എന്നിവയാണ്. അതുകൊണ്ട് കെട്ടുകലക്കൽ സമ്പ്രദായം നിരോധിക്കേണ്ടതാണ്.

2.4 സർവ്വേ റിപ്പോർട്ടിന്റെ ആധികാരികത:

ഫിഷറീസ് വകുപ്പിന്റെയും, കൃഷി വകുപ്പിന്റെയും സംയുക്ത ശാസ്ത്രീയ വിലയിരുത്തൽ സർവേ റിപ്പോർട്ടിൽ എറണാകുളം ജില്ലയിൽ 302 ഹെക്ടർ ചെമ്മീൻ കൃഷിക്കും 3647 ഹെക്ടർ ഒരു നെല്ലും ഒരു ചെമ്മീനും കൃഷിക്ക് അനുയോജ്യമാണെന്ന് പറയുന്നു. എറണാകുളം ജില്ലയിൽ ഒരു നെല്ലും, ഒരു ചെമ്മീനും കൃഷി നടത്തി വന്നിരുന്ന 90 ശതമാനത്തിലധികം പാടങ്ങളും നെൽകൃഷിക്ക് അനുയോജ്യമല്ലാതായി തീർന്നതുവഴി നെൽകൃഷിയും, നെൽകൃഷി ചെയ്യാത്തതിനാൽ ലൈസൻസ് ലഭിക്കാതെ ചെമ്മീൻകൃഷിയും നടപ്പിലാക്കാൻ കഴിയാത്ത സാഹചര്യം നിലവിലുള്ളപ്പോൾ, 10 ശതമാനത്തിൽ താഴെ പാടങ്ങൾ മാത്രമാണ് നെൽകൃഷിക്ക് അനുയോജ്യമല്ലായെന്ന് കൃഷിവകുപ്പിന്റെയും, ഫിഷറീസ് വകുപ്പിന്റെയും സംയുക്ത സർവ്വേയിലൂടെ കണ്ടെത്തിയിരിക്കുന്നത്. അതുകൊണ്ട് തന്നെ പ്രസ്തുത സർവ്വെ യാഥാർത്ഥ്യവുമായി പൊരുത്തപ്പെടുന്നതല്ല. കർഷക പ്രതിനിധികളെക്കൂടി ഉൾപ്പെടുത്തിക്കൊണ്ട് പുനർ സർവ്വെ എറണാകുളം ജില്ലയിൽ നടത്തുവാൻ സർക്കാർ തയ്യാറാകേണ്ടത്. കൂടാതെ, ഗ്രാമ/പഞ്ചായത്ത് അടിസ്ഥാനത്തിലുള്ള സ്ഥലവിവരങ്ങൾ, സർവേ നമ്പർ പട്ടിക, ജലഗുണനിലവാര ഡാറ്റ, മണ്ണിലെ ഉപ്പുതാരാവസ്ഥയുടെ ശാസ്ത്രീയ അളവുകൾ, കാലാവസ്ഥാ വ്യതിയാന സ്വാധീന പഠനം തുടങ്ങിയ കാര്യങ്ങളിൽ കൂടി വ്യക്തത വരുത്തണം. GPS മാപ്പിംഗ്, പൊതുജനപ്രവേശന പോർട്ടൽ, സർവേ മാനദണ്ഡങ്ങളുടെ പ്രസിദ്ധീകരണം തുടങ്ങിയവയും അനിവാര്യമാണ്. ഇതിനെല്ലാം തന്നെ വ്യക്തത ലഭിക്കുമ്പോഴേ കർഷകർ ആത്മവിശ്വാസത്തോടെ വനാമി ചെമ്മീൻ കൃഷിയ്ക്കായി മുതൽ മുടക്കുകയുള്ളൂ.

3. വനാമി കൃഷി സാധ്യതകൾ:

കൊല്ലം, ആലപ്പുഴ, എറണാകുളം, തൃശ്ശൂർ, കണ്ണൂർ തുടങ്ങിയ ജില്ലകളിൽ വനാമി ചെമ്മീൻ അക്വാ ക്ലസ്റ്ററുകളും, അക്വാ പാർക്കുകളും വികസിപ്പിച്ച് പൊതു അടിസ്ഥാന

സൗകര്യങ്ങൾ ഏർപ്പെടുത്തുന്നത്, കൃഷിചെലവ് കുറയ്ക്കുന്നതിന് സഹായകമാകുന്നതാണ്. ഇതിനായി വനാമി ചെമ്മീൻ ഹാച്ചറികൾ, ചെമ്മീൻ തീറ്റ യൂണിറ്റ്, അക്വാട്ടിക് അനിമൽ ഹെൽത്ത് ലാബുകൾ, കോൾഡ് ചെയിൻ ലോജിസ്റ്റിക്സ്, മാർക്കറ്റിംഗ് തുടങ്ങിയ സംരഭങ്ങൾ സ്വകാര്യ-പൊതുമേഖലകളിൽ വികസിപ്പിക്കണം. ബയോഫ്ലോക്ക്, ആർ.എ.എസ് (റീസർക്കുലേറ്റിംഗ് അക്വാകൾച്ചർ സിസ്റ്റംസ്), ഐ.ഒ.ടി. അടിസ്ഥാനമാക്കിയുള്ള നിരീക്ഷണം എന്നിവയുടെ ഉപയോഗം ഉൽപാദനക്ഷമത വർദ്ധിപ്പിക്കാൻ സഹായിക്കുന്നതാണ്.

പദ്ധതികളിൽ ഗുണഭോക്തൃ വിഹിതം എത്ര ശതമാനമാണെന്ന് വ്യക്തത വേണം. ശാസ്ത്രീയ സാമ്പത്തിക വിശകലനത്തിൽ തുടക്ക നിക്ഷേപം കൂടുതലാണെങ്കിൽ ചെറുകർഷകർ പിന്മാറുന്നതായാണ് കാണുന്നത്. ബാങ്ക് വായ്പ/സബ്സിഡി ഇല്ലെങ്കിൽ പദ്ധതി വ്യാപിപ്പിക്കാൻ കഴിയില്ല, അതിനാൽ പലിശ സബ്സിഡി, ഇൻഷുറൻസ് പരിരക്ഷ, സഹകരണ ബാങ്ക് പിന്തുണ എന്നിവ അനിവാര്യമാണ്.

4. സംഗ്രഹം:

പൊക്കാളി സമ്പ്രദായം വെറും കൃഷിരീതിയല്ല, അത് ഒരു പരിസ്ഥിതി-സാംസ്കാരിക പൈതൃകമാണ്. ലൈസൻസ് കാലയളവ് 6 മാസമാക്കേണ്ടത് ശാസ്ത്രീയമായി യുക്തിസഹമാണ്, മേഖലയിൽ ധനസഹായ സംവിധാനം ശക്തിപ്പെടുത്തുകയും, പരിസ്ഥിതി വിരുദ്ധ രീതികൾ നിയന്ത്രിക്കുകയും വേണം. പാടശേഖരങ്ങളിൽ ചെമ്മീൻ കൃഷിയ്ക്കായി കൂടുതൽ ഉയരത്തിൽ ജലം, കെട്ടിനിർത്തുമ്പോൾ അവയുടെ വരമ്പുകളിൽ താമസിക്കുന്ന തൊഴിലാളികളുടെ വീടുകളിലേയ്ക്ക് വെള്ളം കയറുന്നത് പലപ്പോഴും ഒരു തർക്ക വിഷയമാകാറുണ്ട്. ചെമ്മീൻ ഫാമുകളുടെ ബണ്ടുകൾക്ക് ഉയരവും, കുളങ്ങളുടെ ആഴവും, വർദ്ധിപ്പിച്ചുകൊണ്ടോ, ഇങ്ങനെ വൈഷമ്യം നേരിടുന്നവരെ അവർക്കുകൂടി സ്വീകാര്യമാകുന്ന രീതിയിൽ മാറ്റി താമസിപ്പിക്കുന്നതിന് നടപടികൾ സ്വീകരിച്ചോ ഇത് പരിഹരിക്കപ്പെടേണ്ടതാണ്.

പൊക്കാളി പാടശേഖരങ്ങളിൽ സമന്വിത മത്സ്യ-നെൽകൃഷി ദീർഘകാല സ്ഥിരത ഉറപ്പാക്കണമെങ്കിൽ സർവേ ഡാറ്റ പരസ്യമാക്കുകയും, വനാമി കൃഷി ലൈസൻസിംഗ് മാർഗ്ഗനിർദ്ദേശങ്ങൾ ലളിതമാക്കുകയും, ചെമ്മീൻകൃഷി ലൈസൻസ് കാലയളവ് 6 മാസമാക്കുകയും, ധനസഹായ സംവിധാനം ശക്തിപ്പെടുത്തുകയും, "കെട്ടുകലക്കൽ" നിരോധിക്കുകയും വേണം. ഈ ശുപാർശകൾ നടപ്പിലാക്കിയാൽ പരിസ്ഥിതിയെയും കർഷക ജീവിതോപാധിയെയും ഒരുപോലെ സംരക്ഷിക്കാനാകും.

Topic - 8

ROLE OF COASTAL AQUACULTURE AUTHORITY (CAA) IN COASTAL AQUACULTURE

(A report based on presentation)

The Coastal Aquaculture Authority (CAA) was established under the Coastal Aquaculture Authority Act, 2005 (Act No. 24 of 2005), enacted by the Parliament of India. The Authority is entrusted with the responsibility of regulating and overseeing coastal aquaculture activities to ensure that such practices do not cause any detriment to the coastal environment. It promotes responsible coastal aquaculture in compliance with statutory provisions and safeguards the livelihood of various sections of people living in coastal areas.

The core functions of the Coastal Aquaculture Authority (CAA) include the registration of coastal aquaculture farms across all coastal areas of the country, as well as the registration of coastal aquaculture seed production and live feed units. The Authority is responsible for issuing Certificates of Compliance for antibiotic-free aquaculture inputs and conducting technical monitoring of Aquaculture Quality Frameworks (AQF), along with the empanelment of overseas suppliers. Additionally, the CAA organizes outreach activities and extension programmes to promote awareness, compliance and sustainable aquaculture practices.

The CAA Act was amended through the Coastal Aquaculture Authority (Amendment) Act, 2023, which was enacted on 14th August 2023. The salient features of the amendment include expanded coverage of all verticals and activities of coastal aquaculture, including hatcheries, mariculture practices and aquaculture inputs. The Act provides for the regulation of the number, species and methods of coastal aquaculture through planning and execution, including aqua zonation and mapping to ensure environmental sustainability. It permits the establishment of hatcheries, Broodstock Multiplication Centres (BMCs) and Nucleus Breeding Centres (NBCs) within the No-Development Zone (NDZ) in alignment with CRZ Notifications and introduces the decriminalisation of the principal Act. The amendment also regulates the use of antibiotics and pharmacologically active

substances in coastal aquaculture and authorises State and Central Government officers for effective implementation. It facilitates stakeholders by promoting ease of doing business, including provisions for issuance of duplicate certificates, transfer of ownership, condoning delays in renewal applications and enabling online processing of certificates. Additionally, it grants protection to coastal aquaculture under CRZ Notifications. These measures aim to harness the full potential of coastal aquaculture in harmony with the coastal environment, promote expansion, development and diversification, encourage investment in quality broodstock and seed production, reduce regulatory compliance burdens, ensure food safety and quality of seafood exports, and support farmers and stakeholders in continuing their activities in a fair and enabling environment.

The Coastal Aquaculture Authority Rules, 2024 introduce several significant reforms to streamline and strengthen the regulation of coastal aquaculture. The Rules provide for the constitution of State and District Level Committees (SDLCs/DLCs), while dissolving SLCs to simplify the farm registration process. They prescribe standards for aquaculture inputs, including certification requirements and a list of banned substances. The renewal process for farms has been simplified, with provisions for condoning delays and enabling applications to be submitted directly to the CAA. The Rules also incorporate the Polluter Pays Principle to regulate coastal pollution, mandating that polluters compensate for environmental loss. Additionally, they promote ease of doing business through online processes, issuance of duplicate certificates and transfer of ownership certificates, thereby creating a more transparent, efficient and farmer-friendly regulatory framework.

The Coastal Aquaculture Authority has notified a series of guidelines to regulate and strengthen coastal aquaculture practices. These include the Guidelines for Regulating Coastal Aquaculture (S.O. 1496(E) dated 20.03.2024); the Guidelines for Regulating Hatcheries and Farms for Seed Production and Culture of Specific Pathogen Free *Litopenaeus vannamei* (S.O. 1457(E) dated 15.03.2024); and the Guidelines for Seed Production and Culture of Specific Pathogen Free *Penaeus monodon* (S.O. 1429(E) dated 15.03.2024). Additionally, the Authority has issued Guidelines for Solid Waste Management in Coastal Aquaculture Units or Activities (S.O. 1458(E) dated 15.03.2024), Guidelines for Certificate of Compliance for

Aquaculture Inputs (S.O. 1456(E) dated 15.03.2024), and Guidelines for Health Monitoring, Disease Surveillance, and SPF Certification of Coastal Aquaculture Units and Stocks in India (S.O. 1479(E) dated 15.03.2024). These notifications collectively aim to ensure sustainable, safe and well-regulated aquaculture development in the country.

The Coastal Aquaculture Authority has further notified additional guidelines to regulate diverse sectors of aquaculture in India. These include the Guidelines for the Establishment and Operation of Nucleus Breeding Centres (NBCs) and Broodstock Multiplication Centres (BMCs) in India (S.O. 1459(E) dated 15.03.2024). In 2025, the Authority issued the Hatcheries and Farms for Seed Production and Culture of Marine Finfishes Guidelines (S.O. 2897(E) dated 26.06.2025); the Hatcheries and Farms for Seed Production and Culture of Indigenous Shrimp in Marine and Brackishwater Guidelines (S.O. 2903(E) dated 26.06.2025); and the Hatcheries and Rearing Units for Marine or Brackishwater Ornamental Organisms Guidelines (S.O. 2904(E) dated 26.06.2025). Additionally, the Guidelines for Regulating Seaweed Seedling Production and Farming in Marine and Brackishwater (S.O. 3458(E) dated 24.07.2025) and the Guidelines for Regulating Cage and Pen Culture of Marine/Brackishwater Aquaculture Species (S.O. 3462(E) dated 24.07.2025) were notified. These measures collectively aim to promote diversification, sustainability and scientific management of coastal aquaculture activities across the country.

The Coastal Aquaculture Authority notified additional guidelines in 2025 to strengthen regulation and sustainability in the sector, including the Seed Production and Farming of Bivalves in Marine and Brackish Water Guidelines, 2025 (S.O. 3464(E) dated 24.07.2025); the Guidelines for Notifying the Aqua Zones and Aqua Mapping, 2025 (S.O. 3463(E) dated 24.07.2025); the Assessment of Cost for the Damage to the Environment and Cost of Demolition and Utilisation of the Environment Monitoring Fund Guidelines, 2025 (S.O. 3461(E) dated 24.07.2025); the Hatcheries and Farms for Seed Production and Culture of Crab Guidelines, 2025 (S.O. 2984(E) dated 26.06.2025); the Guidelines for Regulating Live Feed Culture Units and Management in Coastal Aquaculture, 2025 (S.O. 3982(E) dated 29.08.2025); and the Bio-floc, Re-circulatory Aquaculture Systems (RAS) and Nursery-based Aqua Farming Systems Guidelines, 2025 (S.O. 3983(E) dated

29.08.2025), thereby expanding regulatory coverage across diverse aquaculture practices and ensuring environmental protection and sustainable development.

The registration of coastal aquaculture farms by the Coastal Aquaculture Authority (CAA) at the Sub Divisional Level is carried out through the Sub Divisional Level Committee (SDLC), which is chaired by the Revenue Divisional Officer/Sub Collector. The committee comprises members including the Tahsildar or Mandal Revenue Officer within the subdivision (Revenue Department), the Sub Divisional Agricultural Officer or equivalent (Agriculture Department), the Assistant Conservator of Forest or equivalent (Forest Department), the Sub Divisional Officer of Irrigation/Water Resources (Irrigation/Water Resources Department) and the Block Development Officer (Panchayat Raj Department). The Assistant Director of Fisheries or equivalent serves as the Member Convener, representing the Fisheries Department, thereby ensuring a coordinated, multi-departmental approach in the registration and regulation of coastal aquaculture farms.

The registration of coastal aquaculture farms at the district level is carried out through the District Level Committee (DLC), which is chaired by the District Collector or Additional/Joint Collector. The committee comprises the Revenue Divisional/Sub Collector (Revenue Department), CEO of Zila Parishad or equivalent (Panchayat Raj Department), District Head of Agriculture Department (Agriculture Department), Divisional Forest Officer or equivalent (Forest Department), District Head of Irrigation/Water Resources (Irrigation/Water Resources Department), a representative from MPEDA and any other Government officer co-opted by the Chairman, while the District Head of Fisheries serves as the Member Convener representing the Fisheries Department. This nine-member committee is constituted with a diverse departmental representation to ensure that all mandatory guidelines are strictly adhered to, and any recommendation of the committee requires a quorum of two-thirds of the members, including the Chairperson and the Member Convener.

The Mandatory requirements for coastal aquaculture farms, as outlined in Para No. 11 of the CAA Guidelines, are designed to prevent groundwater salinization and protect heritage and ecologically sensitive areas through the precautionary principle of Environmental law. These regulations mandate specific buffer zones between farms and nearby landmarks, requiring a distance of 50 to 100 m from agricultural

land, 100 m from drinking water sources or populations under 500, 300 m for populations over 500, and a substantial 2 km gap from major towns or heritage areas. Additionally, the guidelines strictly prohibit farming in mangroves and ecologically sensitive zones, while regulating farm density by reducing the required distance between individual farms from 20 m to 3 m. For land utilization, the Water Spread Area (WSA) is capped at 80% for farms up to 2 ha and restricted to 60% for those exceeding 2 ha to ensure sustainable environmental management.

According to the guidelines on the Certification of aquaculture input, the Coastal Aquaculture Authority (CAA) has certified 9,321 inputs across 10 categories to ensure they are antibiotic-free. Under Section 11(1)(db) and Rule 18, all aquaculture inputs must receive CAA certification, and no product can be legally available in the market or used by farmers and hatchery operators without it. The distribution of these certified inputs is led by Feed Additives (43%), followed by Probiotics (24%) and Chemicals (14%), with smaller percentages for disinfectants, mineral mixtures, larval and adult feed and immunostimulants. To enforce these standards, District Level Task Force Teams—comprising officers from Fisheries, MPEDA, FSSAI, CAA and law enforcement—are mandated to conduct frequent inspections of aqua shops, report non-certified products and penalize the sale of spurious inputs. Furthermore, the DCA is responsible for collecting and analyzing samples for antibiotic residues, with positive tests leading to penalties under Section 14 of the CAA Act, 2025.

The antibiotics and other pharmacologically active substances banned for use in aquaculture by the Coastal Aquaculture Authority, Chennai include Chloramphenicol; Nitrofurans such as Furaltadone, Furazolidone, Furylfuramide, Nifuratel, Nifuroxime, Nifurprazine, Nitrofurantoin, and Nitrofurazone; Neomycin; Nalidixic acid; Sulphamethoxazole; Aristolochia species and their preparations; Chloroform; Chlorpromazine; Colchicine; Dapsone; Dimetridazole; Metronidazole; Ronidazole; Ipronidazole; other nitroimidazoles; Clenbuterol; Diethylstilbestrol (DES); sulfonamide drugs (except approved Sulfadimethoxine, Sulfamonomethoxine, and Sulfaethoxypyridazine); Fluoroquinolones; and Glycopeptides.

A Technical Committee of the CAA monitors AQF activities to ensure the seamless import of SPF broodstock and PPL. The CAA shortlists overseas suppliers for the supply of SPF broodstocks and PPL to India based on recommendations from the Technical Evaluation Committee, which includes members from CAA, ICAR-CIBA, MPEDA, NFDB and NBFGR. Based on assessments of the genetic base, SPF status and bio-security facilities established at the suppliers' facilities, the Committee recommends suppliers for empanelment. So far, the Authority has empanelled fourteen overseas suppliers to provide SPF stock of *P. vannamei* and two overseas suppliers to supply SPF *P. monodon* to Indian hatcheries.

In traceability, the CAA registers farms and hatcheries and has developed an online application system for fast-track registration and certificate issuance. Under food safety, pharmacologically active substances and antimicrobial agents are prohibited, aquaculture input certification is mandatory, Certificates of Compliance (COC) are issued for antibiotic-free inputs and inspections of aquaculture shops are monitored by Task Force Teams. For sustainability, guidelines have been notified for aqua-zonation and aqua-mapping and a national-level workshop has been proposed to sensitise all coastal States and Union Territories. In environmental monitoring, water samples from farms and hatcheries are collected and tested, the Polluter Pays Principle is adopted for environmental violations, guidelines have been issued and authorities are empowered to order removal or demolition of pollution-causing units. Diversification is promoted through guidelines supporting diversified species such as finfish, crab, bivalves, ornamental fishes and indigenous shrimps. In innovation technologies, guidelines have been issued for practices like Bio-floc, RAS, pen culture and nursery-based management and such innovative practices are being registered.

In mariculture, activities including seaweed culture, cage culture and pen culture are permitted within creeks, rivers and backwaters in CRZ areas under CAA regulation. For NBCs/BMCs establishment, hatcheries, BMCs and NBCs are permitted within the NDZ in CRZ areas, with guidelines notified to encourage private sector establishment. To improve ease of doing business, online registration and renewal processes for farms and hatcheries and certification of inputs have been introduced, operationalised from March 2020 onward, with provisions for ownership

transfer and duplicate certificates and principal act decriminalisation with protection granted under CRZ notification. Finally, outreach activities are conducted vigorously with support from ICAR, MPEDA and various State and Central institutions to engage stakeholders, officers, academicians and technician

The way forward for coastal aquaculture emphasizes comprehensive regulatory enforcement, sustainability and sectoral growth. All States and Union Territories, through SDLCS/DLCs, must ensure 100% registration and renewal of coastal aquaculture farms. Notification of aquaculture zones and aqua-mapping should be taken up as a top priority to support long-term sustainability. Regular monitoring of aquaculture units by authorized officers in all coastal States and UTs is essential, along with integration of CAA data with MPEDA data for exported species on a digital platform. Strict enforcement of the prohibition on antibiotic usage must continue through Task Force Teams, ensuring that only CAA-certified inputs are available in the market and 100% screening of farmed shrimp for antibiotic residues should be implemented for both domestic and international markets. The Government should promote diversification in coastal aquaculture with strong forward and backward linkages and encourage mariculture activities for community-based organizations, particularly women's groups, to support livelihoods. Quality regulation must be strengthened in seed, feed, broodstock and healthcare products, alongside financial support for establishing BMCs and NBCs to develop GI broodstock for indigenous species. Finally, efforts should focus on certification and branding of aquaculture produce, promoting value-added products, strengthening the domestic market and exploring new international markets.

Topic - 9

ROLE OF GOVERNMENT OF INDIA AND NFDB IN PROMOTING SHRIMP FARMING

(A report based on presentation)

The National Fisheries Development Board (NFDB) is an autonomous organization under the Government of India, established in 2006 to modernize and expand the country's fisheries sector. The Board acts as a central hub for coordinating fisheries activities across various States and Union Territories in the country. Its primary mission is to enhance fish production through "Blue Revolution" initiatives, which include intensive aquaculture.

1. The Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana:

The Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana (PM-MKSSY) is a significant Central Sector sub-scheme launched with a total outlay of ₹6,000 crore, to be implemented over four years (FY 2023–24 to FY 2026–27). This scheme is specifically designed to formalize the largely unorganized fisheries sector and support micro and small enterprises that form the backbone of the industry. By shifting from traditional subsidies to performance-based incentives, PM-MKSSY aims to enhance financial inclusion and provide a safety net for those who have historically lacked access to formal business support.

Under its second and third focus areas, PM-MKSSY addresses risk and efficiency by incentivizing the adoption of aquaculture insurance and improving value chain safety. It offers one-time financial incentives to help farmers purchase insurance for their crops and provides performance grants to micro-enterprises that create jobs and improve the quality and safety of fish products.

2. National Fisheries Digital Platform:

The National Fisheries Digital Platform (NFDP) is designed as a modular "one-stop" system. While it supports the broader Pradhan Mantri Matsya Kisan Samridhi

Sah-Yojana (PM-MKSSY), the platform itself is divided into specific functional modules (sub-components) with which users interact.

The NFDP serves as the operational backbone of the PM-MKSSY scheme, functioning through several integrated sub-components that digitize the entire fisheries value chain. The first and most critical component is the Registration and National Registry Module, which provides a unique, work-based digital identity. This module is essential for the formalization of the sector, as it creates a verified national database that allows the Government to track beneficiaries and ensures that only legitimate stakeholders can access assistance and subsidies.

Complementing this is the Credit Facilitation and Institutional Finance Module, which is specifically designed to bridge the gap between small-scale farmers and formal banking institutions. This component allows users to apply for working capital and institutional loans directly through the portal, with a system that forwards applications to banks and tracks the disbursement process. By providing a transparent digital record of a farmer's activities and identity, this module makes it significantly easier for financial institutions to evaluate creditworthiness, thereby reducing dependence on high-interest informal lending.

Another vital sub-component is the Aquaculture Insurance and Risk Mitigation Module, which manages the end-to-end process of protecting farmers against crop loss. This module facilitates the distribution of the 40% to 50% premium subsidies offered under PM-MKSSY, allowing farmers to browse approved insurance products and submit claims digitally.

3. The one-time incentive for aquaculture insurance:

The one-time incentive for aquaculture insurance is a flagship initiative under Component 1B of the PM-MKSSY scheme, designed to encourage risk management among fish farmers. This incentive specifically targets small and marginal farmers with a farm size of up to 4 hectares of Water Spread Area. It is applicable for only one crop cycle to help farmers develop the habit of insuring their produce against natural disasters or disease outbreaks. Unlike traditional subsidies that may be paid in installments, this incentive is disbursed in a single payment directly to the farmer,

rather than to the insurance company, to ensure that the farmer receives direct financial relief.

The application process begins with mandatory registration on the NFDP. Once a farmer has obtained a digital identity and linked a verified bank account to the portal, they must purchase a recognized aquaculture insurance policy from a participating insurance provider. After paying the full premium and securing the policy, the farmer logs back into the NFDP portal to submit a claim for the incentive. This digital application requires uploading the insurance policy document and proof of premium payment.

Once the application is validated, the incentive amount is released via Direct Benefit Transfer (DBT) into the farmer's Aadhaar-linked bank account. This transparent and paperless process ensures that there are no middlemen and that the funds reach the farmer directly. By integrating the insurance purchase with the digital platform, the NFDB ensures that farmers are protected from "summer kill," floods or viral diseases that often lead to total crop failure, thereby stabilizing their income in future seasons.

Registering an "offline" policy - specifically, a policy purchased directly from an insurance company rather than through the NFDP portal, is a common procedure for farmers who have already secured coverage. To do this, the farmer must first ensure that they are a registered user on the NFDP portal with a completed profile and a verified bank account. Once logged in, the farmer navigates to the "Aquaculture Insurance" section and selects the option to apply for the one-time incentive. Instead of selecting a new policy to purchase, the farmer chooses the workflow for registering an existing or offline policy by entering the specific details of the policy already purchased.

During this process, the platform prompts the farmer to provide key information from the physical policy document, such as the policy number, name of the insurance company, date of issue and total premium paid. The farmer must also specify the Water Spread Area or the volume of the culture unit (such as RAS or Biofloc tanks) covered by the insurance. Accuracy at this stage is vital, as the system uses these

details to calculate the eligible incentive amount, which is capped based on the size of the farm or the cubic volume of intensive culture units.

After entering the data, the farmer is required to upload a clear, scanned copy of the insurance policy schedule and the premium payment receipt as proof of the transaction. These documents should be in PDF or JPEG format and must be legible to avoid rejection during verification. Additionally, the farmer may need to submit a self-declaration confirming that the details provided are accurate and that they have not claimed a similar incentive for the same crop elsewhere. This digital reporting of an offline policy triggers the Government's verification workflow.

Once the documents are uploaded and the application is submitted, it undergoes a multi-level verification process. This typically involves a system-based check followed by field-level validation. Officials verify that the policy is active and corresponds to the actual farming activity on the ground. Once approved, the one-time incentive (40% for General category and 50% for SC/ST/Women beneficiaries) is credited directly to the farmer's Aadhaar-linked bank account via DBT, thereby completing the formalization of the insurance coverage in the national database.

Topic - 10

CREDIT POSSIBILITIES FOR SHRIMP FARMING AND FIDF LINKAGES

(A report based on presentation)

The National Bank for Agriculture and Rural Development (NABARD) is India's apex development financial institution, was formed to provide focused attention to the credit needs of the agriculture sector, small-scale industries and cottage industries. Unlike commercial banks, NABARD primarily operates as a refinancing agency, meaning it provides funds to other financial institutions (such as Cooperative Banks and Regional Rural Banks) rather than lending directly to individuals. NABARD operates as a refinancing institution by providing low-cost funds to cooperative and regional rural banks instead of lending directly to individual farmers. These loans are categorized into short-term credit for immediate crop production and long-term credit for the creation of permanent assets.

The short-term loan for working capital is primarily delivered through the Kisan Credit Card (KCC). It is meant to cover the recurring costs of running a fish farm, such as purchasing seed, feed, organic and inorganic fertilizers, fuel and ice for preservation and payments for labour or electricity. For small-scale fishers, the limit is typically up to ₹2 lakh without collateral. The interest rate is usually 7%, but if repayment is made on time, the Government provides an interest subvention and a prompt repayment incentive, reducing the effective rate to 4%. Repayment is generally linked to the harvest cycle.

Long-term loans (investment credit or term loans) are used for capital-intensive projects aimed at expanding businesses or modernizing equipment. These are often supported by the Fisheries and Aquaculture Infrastructure Development Fund (FIDF). They cover activities such as the construction of new ponds, desilting of existing ponds, setting up hatcheries, establishing quarantine centres in inland areas, and building cold storage units. The loan amount can cover up to 80% of the cost of the Detailed Project Report (DPR) and the repayment period usually ranges from 5 to 12 years.

Kisan Credit Card:

The Kisan Credit Card (KCC) is a revolving credit facility designed to provide farmers with a single-window system for timely and affordable access to funds for both crop production and allied activities. As of 2026, the scheme has been modernized to include a six-year validity period and integration with digital tools such as UPI and e-Rupee (CBDC), enabling farmers to make real-time payments for inputs like seeds, fertilizers and testing *etc.*

The loan is notable for its highly subsidized interest rates, which are typically capped at 7% for amounts up to ₹3 lakh and may be reduced to an effective rate of 4% for prompt repayment. Recent policy updates have expanded these benefits by offering collateral-free limits of up to ₹2 lakh for fisheries, ensuring that small-scale producers can access working capital without pledging land or assets.

Flexibility is a core feature of the KCC, as the credit limit is dynamic. It increases by 10% annually to account for inflation and is linked directly to the "Scale of Finance" (SoF) for specific crops in the farmer's district. The Scale of Finance for shrimp farming represents the maximum amount of working capital that a bank can lend per unit area (usually per hectare). This value is determined annually by the District Level Technical Committee (DLTC) and varies by State and intensity of farming. In Kerala, the Scale of Finance for shrimp farming ranges between ₹1.2 lakh and ₹4.0 lakh per hectare.

A KCC loan for Vannamei shrimp farming is structured into specific sub-components to address the high-intensity nature of the activity, primarily focusing on recurring operational costs. The largest component is feed cost, which often accounts for 50–60% of the total loan, followed by the procurement of SPF seed and energy expenses for continuous aeration and water pumping. Other important components included in the Scale of Finance are expenses for water treatment (lime and probiotics), specialized labour for pond management, harvesting charges and testing kits.

To apply for a KCC, the documentation process has been streamlined and focuses on three main categories: identity, land, and operational proof. For personal identification, applicants must provide basic KYC documents such as an Aadhaar

card (preferably linked to a mobile number for e-KYC), PAN card and recent photographs. For farming-related verification, the bank requires land ownership records (such as Patta, Chitta, or 7/12 extract) or a registered lease agreement in the case of tenant farmers, along with a declaration of the specific crops or aquaculture species to be cultivated. For specialized activities such as Vannamei shrimp farming, a valid license from the CAA or the State Fisheries Department must also be submitted.

Fisheries and Aquaculture Infrastructure Development Fund:

The Fisheries and Aquaculture Infrastructure Development Fund (FIDF) is a specialized financing mechanism established by the Government of India, with NABARD serving as a key Nodal Loaning Entity (NLE). Launched with a total corpus of ₹7,522.48 crore, the fund has been extended through March 31, 2026, to ensure that both public and private stakeholders have adequate capital to modernize India's fisheries sector.

NABARD's primary role under this framework is to provide concessional finance for major infrastructure projects, particularly those implemented by State Governments and Union Territories. For public-sector projects, NABARD facilitates loans after a tripartite Memorandum of Agreement (MoA) is signed between the Central Government, the concerned State Government and NABARD.

The financial terms of the FIDF are attractive, offering loans of up to 80% of the total project cost. The Government provides an interest subvention of up to 3% per annum, ensuring that the effective interest rate for the borrower is maintained at a minimum of 5%. This concessional rate significantly benefits capital-intensive infrastructure projects.

For private entrepreneurs and cooperatives, the fund supports a wide range of activities, including advanced inland fisheries infrastructure. Smaller private projects, such as hatcheries, fish feed mills and disease diagnostic laboratoriesare also eligible. These loans facilitate the transition from traditional methods to high-technology, intensive aquaculture systems such as Recirculatory Aquaculture Systems (RAS) and Biofloc technology.

A key feature of the FIDF is its favourable repayment structure, designed to match the long-term nature of infrastructure investments. Loans typically have a tenure of up to 12 years, including a two-year moratorium on principal repayment. This grace period enables aquaculture businesses to become fully operational and generate revenue before beginning substantial loan repayments.

During the 2023–2026 extension period, a Credit Guarantee Scheme was introduced to further reduce sectoral risk. This initiative aims to encourage banks to lend more freely to individual farmers, startups and cooperatives that may lack adequate collateral.

The FIDF operates through a structured lending model in which NABARD, the National Cooperative Development Corporation (NCDC), and Scheduled Commercial Banks function as the primary credit delivery institutions. NABARD focuses on financing large-scale public infrastructure projects for State Governments and Union Territories. For individual entrepreneurs, private companies and startups, Scheduled Commercial Banks act as the lending entities, using their own resources to finance investments in modern technology, aquatic animal health quarantine centres, aquatic animal health laboratories and cold chain logistics.

To apply for FIDF assistance in 2026, applicants must use the National Fisheries Digital Platform (NFDP) or the official FIDF portal, which serves as a single-window digital interface. The process begins with registration as a new user by selecting the appropriate entity type (individual entrepreneur, cooperative or State Government) and uploading a Detailed Project Report (DPR) containing technical specifications, cost estimates, land detailsand layout drawings.

Once submitted, the proposal is scrutinized by the National Fisheries Development Board (NFDB) and placed before the Central Approval and Monitoring Committee (CAMC). After receiving in-principle approval, the applicant may approach the designated Nodal Loaning Entity - NABARD (for State projects), NCDC (for cooperatives) or Scheduled Commercial Banks (for individuals) to complete the final loan sanction and disbursement process.

Topic - 11

RECOMMENDATIONS OF AQUA MEET 2026

1. **Legislative Support under the Land Ceiling Act:** Legislative modifications or suitable exemptions from the Land Ceiling Act are required to facilitate large-scale aquaculture development. This is particularly critical for the development of *Pokkali* fields, where existing provisions restrict investment and hinder the adoption of modern, sustainable aquaculture practices.
2. **Exemption from Agricultural Land Leasing Policy:** Land earmarked for aquaculture development shall be exempted from the existing agricultural land leasing policy, in order to encourage investment, facilitate long-term planning and promote the sustainable expansion of aquaculture activities.
3. **Notification of Wetlands for Shrimp Farming:** Suitable wetlands shall be formally notified and categorized specifically for Vannamei shrimp farming to eliminate legal and technical ambiguities for land and property owners, and to ensure clear regulatory guidance for sustainable development.
4. **Strict Enforcement by State Pollution Control Board:** The State Pollution Control Board shall take stringent action against industrial units that discharge effluents into open water bodies without proper treatment, in order to protect aquatic ecosystems and safeguard sustainable aquaculture and fisheries resources.
5. **Strict Enforcement of KIFA Act and Aquaculture Regulations:** Ensure strict implementation of all regulatory frameworks to guarantee compliance with approved farming standards, proper seed certification, safe waste disposal and controlled water usage. The Kerala Inland Fisheries and Aquaculture (KIFA) Act shall be strictly enforced by fisheries officials to protect the interests of local farmers and maintain ecological balance. Practices such as supplementary seeding in prawn filtration fields, discharge of untreated effluents from aquaculture ponds into open water bodies and "*Kettukalakkal*" in aquaculture ponds shall be strictly prohibited and effectively monitored to prevent environmental degradation and unfair farming practices.

6. **Coordination and Rationalization of CAA Regulations:** The Coastal Aquaculture Authority (CAA), Fisheries Department and ADAK shall work in close coordination to simplify the licensing process and achieve 100% registration of all coastal aquaculture farms. The issue of obtaining CAA registration in Ernakulam district shall be resolved on priority to ensure smooth and timely registration of all eligible farmers and units. Further, certain guidelines issued by the Coastal Aquaculture Authority, such as their applicability beyond the CRZ area and the prescribed minimum distance from human settlements and other locations, appear to override the jurisdiction of the State and are difficult to implement under Kerala's unique geographical and demographic conditions. These concerns shall be formally represented before the Government of India for suitable relaxation, clarification or modification to make the regulations more practical and region-specific.
7. **Strict Enforcement of Environmental Regulations:** Ensure strict enforcement of all environmental regulations, mandating that every aquaculture farm complies with prescribed effluent treatment and disposal norms. Proper treatment of wastewater and sludge before discharge shall be made compulsory to prevent pollution of open water bodies, protect ecosystems and promote environmentally sustainable aquaculture practices.
8. **Local Production of Nauplii and Strengthening Hatchery Infrastructure:** Kerala shall establish local Vannamei nauplii production facilities to ensure a consistent supply of Specific Pathogen Free (SPF) seeds, reduce dependency on external sources and improve seed quality control. Further, State-supported hatcheries shall be established and existing quality certification systems shall be strengthened to guarantee the regular availability of healthy, disease-free and high-quality seed for sustainable aquaculture development.
9. **Establishment of State-Run Feed Mills and Feed Quality Regulation:** State-run feed mills shall be established to supply quality aquaculture feed at affordable prices, thereby reducing dependency on costly private feed manufacturers. In addition, a robust feed quality checking and certification mechanism shall be implemented to ensure nutritional standards, prevent adulteration and help farmers manage and reduce operational costs effectively.

10. **Introduction of WSSV-Resistant Vannamei Strains:** The Government shall take initiative to procure White Spot Syndrome Virus (WSSV)–resistant Vannamei shrimp strains from Ecuador, as these strains are considered highly suitable for Kerala's environmental conditions and can significantly enhance disease resistance, productivity and sustainability of Vannamei farming in the State.
11. **Strengthening Disease Diagnostic Infrastructure:** State facilities shall prioritize the upgradation and establishment of advanced PCR laboratories to ensure that test results are made available within 24 hours. In addition, field-level rapid diagnostic kits shall be distributed to enable early detection of diseases, prompt response, and effective disease management in aquaculture farms.
12. **Technical Support & Capacity Building:** To reduce reliance on expensive private technicians, field-level technical officers of the Fisheries Department shall undergo an intensive four-month specialized training program at the four designated ADAK farms. In addition, expert technical staff shall be engaged through ADAK at the field level to provide continuous advisory and technical support to farmers. Further, farmers shall be provided with structured residential training programs at ADAK demonstration farms to enhance their technical skills, promote adoption of best practices and ensure sustainable and efficient aquaculture operations.
13. **Credit Mobilization:** NABARD shall develop and implement suitable financial models to provide accessible and affordable credit support to shrimp farmers through nationalized/ scheduled banks, enabling investment in infrastructure, technology adoption and sustainable aquaculture practices.
14. **Interest Subvention:** Farmers availing term loans for aquaculture infrastructure development shall be made eligible for special interest subvention schemes to reduce financial burden and encourage long-term investment in sustainable shrimp farming.
15. **Promotion of Contract Farming Models:** To encourage aquaculture development in high-investment areas such as Pokkali fields, contract farming models involving farmers, exporters and private investors shall be promoted.

This will facilitate assured markets, shared risks, access to technology and finance, and enhanced profitability for farmers while attracting private investment into the sector.

16. **Insurance Coverage for Infrastructure and Crop:** Aquaculture infrastructure facilities and crops shall be brought under comprehensive insurance coverage to safeguard farmers against losses due to disease, natural calamities and other unforeseen risks. The Department of Fisheries and ADAK shall take appropriate steps to facilitate availing of the 40% subsidy on insurance premium from NFDB, thereby making insurance more affordable and accessible to shrimp farmers.
17. **Separate Head of Account for Vannamei Projects:** A separate "Head of Account" shall be created in the State Budget exclusively for Vannamei shrimp farming projects to ensure timely release of subsidies, transparent fund allocation and effective monitoring of financial support for the sector.
18. **Power Support and Renewable Energy Promotion:** In remote areas, renewable energy solutions such as solar power and other sustainable power sources shall be promoted for aquaculture operations. Wherever required, extension of a three-phase power line with transformer facilities shall also be provided to ensure a reliable and uninterrupted electricity supply for shrimp farming activities.
19. **Adoption of Smart Aquaculture Technologies:** Promote the adoption of AI, CCTV surveillance and IoT-based technologies in aquaculture to reduce labour requirements, strengthen real-time farm monitoring, improve disease and water quality management and enhance overall operational efficiency and productivity.
20. **Promotion of Water Reuse and Recycling Systems:** Promote water reuse systems by encouraging recycling and minimal discharge of wastewater in aquaculture farms. This will reduce environmental damage, conserve water resources and support eco-friendly and sustainable farming practices.
21. **Promotion of Organic Tiger Shrimp Farming:** Alongside Vannamei shrimp farming, the promotion of organic farming of tiger shrimp shall be undertaken to

enhance sustainability, conserve biodiversity and strengthen the long-term resilience of the shrimp aquaculture sector.

22. **Market Diversification and Strengthening Domestic Value Chain:** Explore alternate export markets beyond traditional destinations to reduce dependency and enhance market resilience. Simultaneously, strengthen the domestic value chain by promoting processing, branding and marketing channels so as to absorb increased production and stabilize market prices to a certain extent, ensuring better returns and income security for farmers.
23. **Promotion of Good Management Practices (GMP):** GMP guidelines shall be adopted with special emphasis on the use of zero-water exchange systems and the implementation of strict biosecurity measures to promote sustainable, disease-free and environmentally responsible aquaculture. Financial incentives shall be provided to aquaculture farms that strictly comply with GMP standards. Furthermore, special rewards and recognition shall be granted to farms that properly treat and disinfect sludge and wastewater before discharge, thereby protecting open water bodies and strengthening environmentally responsible and sustainable aquaculture practices.
24. **Pre-Harvest Testing and SHAPHARI Certification:** Ensure Pre-Harvest Testing (PHT) to guarantee food safety and compliance with national and international quality standards. Adoption of SHAPHARI certification issued by MPEDA shall be made mandatory for all shrimp farms in Kerala. This certification provides a scalable and globally accepted model for seafood safety assurance and offers bonus pricing incentives to certified shrimp farmers, thereby improving market access, consumer confidence and overall profitability of the sector.
25. **Promotion of Better Management Practices (BMPs):** Promote the adoption of Better Management Practices (BMPs) in shrimp farming to ensure environmental sustainability while simultaneously addressing the socio-economic concerns of farming communities. BMPs shall focus on responsible resource utilization, pollution prevention, disease control, biosecurity, worker welfare and community harmony, thereby supporting sustainable and inclusive growth of the aquaculture sector.

26. **Adoption of Good Aquaculture Practices (GAP) and Traceability:** Ensure the mandatory adoption of Good Aquaculture Practices (GAP) in all shrimp farms, along with robust traceability systems and proper record keeping. This will prepare production units to comply with the regulatory, food safety and quality requirements of importing countries, enhance market acceptance, improve transparency in the supply chain and strengthen Kerala's position in the global shrimp export market.
27. **Phased Allocation of Brackish Water Areas for Vannamei Farming:** Utilize 2,500 hectares of brackish water fields exclusively for Vannamei shrimp farming in a phased manner over a period of five years, ensuring planned expansion, sustainable resource utilization and adequate infrastructure and regulatory support for large-scale development of the sector.
28. **Pond Drying, Cleaning and Disinfection Protocol for Drainable Ponds:** In the case of drainable ponds, complete draining shall be mandatory after every harvest to enable effective cleaning and disinfection. The pond shall be dried for a minimum period of three weeks, as White Spot Syndrome Virus (WSSV) can survive in soil for up to 19 days. Drying shall continue until cracks develop up to a depth of 25–30 cm, after which the contaminated topsoil shall be removed. Subsequently, the pond shall be disinfected using bleaching powder (Calcium hypochlorite) to achieve 20 ppm available chlorine and this concentration shall be maintained for 4–5 days. Proper drying and disinfection are essential, as accumulated organic matter acts as a reservoir for spores and pathogens and failure to remove it significantly increases the risk of disease outbreaks in subsequent crops.
29. **Cleaning and Disinfection Protocol for HDPE Lined Ponds:** In the case of HDPE lined ponds, the entire pond surface shall be cleaned thoroughly using high-pressure water spray and scrubbing to remove all biofilm and organic residues. After cleaning, the pond shall be disinfected using 30 ppm active chlorine with Sodium hypochlorite, ensuring a minimum contact time of 60 minutes (with effective disinfection lasting 12 24 hours). All accumulated sludge shall be completely removed from the pond. Each pond shall be provided with *shrimp toilets* covering 5–7% of the pond area, with a depth of 30–45 cm

below the pond bottom to facilitate effective collection of sludge. Regular sludge pumping and removal shall be strictly practiced for efficient waste management, maintenance of water quality and prevention of disease outbreaks.

30. **Mandatory Sedimentation and Turbidity Management:** In areas with high turbidity levels (250–500 NTU), installation of a sedimentation tank shall be mandatory. Source water shall be allowed to settle for 4–5 days in the sedimentation tank before pumping into the reservoir pond to ensure effective removal of suspended solids. Poly Aluminium Chloride (PAC) shall be applied at a dosage of 5–7 ppm for coagulation and flocculation to reduce turbidity. In addition, routine application of PAC combined with Potassium Permanganate ($KMnO_4$) at 3 ppm shall be practiced to further reduce turbidity and organic load, thereby improving water quality and minimizing disease risks in aquaculture operations.
31. **Inactivation of EHP Spores in Soil:** For effective inactivation of *Enterocytozoon hepatopenaei* (EHP) spores in pond soil, disinfection shall be carried out using either Potassium Permanganate ($KMnO_4$) at a concentration greater than 15 ppm or Chlorine at a concentration greater than 40 ppm. Proper application of these disinfectants is essential to eliminate persistent EHP spores from the pond bottom, reduce the risk of re-infection in subsequent crops, and ensure a healthy and biosecure farming environment.
32. **Three-Stage Water Filtration:** All water intake for aquaculture operations shall strictly follow a three-stage filtration system consisting of 120 µm screen (first stage), 80 µm screen (second stage) and 40–60 µm screen (third stage). This sequential filtration is essential to prevent the entry of unwanted organisms, pathogens and debris into culture ponds, thereby strengthening biosecurity and ensuring better water quality management.
33. **Provision of Reservoir Pond Area:** At least 15% of the total farm area shall be reserved and developed as a reservoir pond to ensure adequate water storage, facilitate proper water treatment and filtration and support effective biosecurity and water management practices in aquaculture farms.
34. **Mandatory Biosecurity Measures:** Strict biosecurity measures shall be followed in all aquaculture farms. These shall include installation of bird fencing

and crab fencing to prevent the entry of disease carriers, restricted movement of people, vehicles and equipment between ponds to avoid cross-contamination and provision of foot dips with Potassium Permanganate ($KMnO_4$) at 500 ppm at all entry points & hand dips with Iodine at 100 ppm for all personnel entering culture areas. These measures are essential to prevent the introduction and spread of pathogens, strengthen farm-level biosecurity and ensure healthy and sustainable shrimp farming operations.

35. **Procurement of Quality Seed (SPF PL):** Procure only healthy, PCR-certified, SPF PL 10–12 from CAA-approved hatcheries and it should be checked for swimming activity, gut fullness, body pigmentation and uniformity in size. The preferred seed characteristics are 8–12 mm size having more than 5 rostrum teeth and weigh < 300 PL/g.
36. **Feeding Management under Stress Conditions:** Feeding should be avoided or reduced during night hours, moulting period, algal bloom and plankton crash, rainy or cloudy conditions, low dissolved oxygen, stress or disease conditions and extreme temperature fluctuations.
37. **Maintenance of Alkalinity and Ionic Balance:** Maintain alkalinity at 120–150 ppm ionic balance of Ca:Mg:K as 1:3:1 and that of Na:K as 28:1 to 40:1.
38. **Application of Probiotics and Water Exchange Protocol:** Organic-based probiotics can be applied from day 15 onwards in a mixotrophic system. No water exchange is preferred for the first 2 months. During the third month, if required, 8–15% water exchange may be done using treated reservoir water only.
39. **Aeration and Power Backup:** Use of both paddle wheel aerators for sludge movement and circulation and air blowers with diffusers for bottom DO improvement with minimum 24-hour power backup system is ideal for high density culture in lined ponds.
40. **Regulation of Chemical Use and Avoidance of Antibiotics:** The use of antibiotics shall be strictly avoided in aquaculture operations. Chemical usage shall be carefully regulated and only compounds approved by the Coastal Aquaculture Authority (CAA) shall be used, strictly adhering to the recommended dosages and application protocols. This is essential to prevent

antibiotic resistance, ensure food safety, protect the environment, maintain export quality standards and promote sustainable and responsible shrimp farming practices.

41. **Disease Outbreak Reporting and Containment:** In the event of a disease outbreak, farmers shall immediately inform the local fisheries authorities and neighbouring farms to enable prompt response and containment. Under no circumstances shall infected or suspect pond water be discharged into open water bodies without proper treatment and disinfection. Timely reporting and strict containment measures are essential to prevent the spread of disease, protect surrounding farms and safeguard the sustainability of the aquaculture ecosystem.
42. **Sludge Management and Mandatory Effluent Treatment System (ETS):** All sludge generated from aquaculture ponds shall be collected only in designated sludge pits and properly dried before its disposal or reuse. Direct disposal of wet sludge into open areas or water bodies shall be strictly prohibited. An Effluent Treatment System (ETS) shall be made mandatory for all farms, and discharge of water shall be permitted only after proper treatment and compliance with prescribed environmental standards. This is essential to prevent environmental pollution, protect open water bodies, ensure regulatory compliance and promote environmentally responsible and sustainable aquaculture practices.
43. **Safe Disposal of Dead and Moribund Shrimp:** Dead and moribund shrimp shall be disposed of only in designated disposal pits. The pits shall be treated with lime or bleaching powder to ensure proper disinfection and prevent the spread of pathogens. Adequate measures shall be taken to prevent access by scavengers, birds and other animals, including proper covering and fencing of disposal pits. This practice is essential to maintain farm biosecurity, prevent disease transmission and protect the surrounding environment and neighbouring farms.
44. **Grant-Based Financial Assistance:** Financial assistance in the form of grants shall be disbursed at the rate of 40% of the approved unit cost, based on the standard unit costs prescribed for the following three models:

Model	Production Target	Fixed Capital	Operational Cost
Medium production system	5 ton/ha	₹20 Lakh	₹10 Lakh
High production system	10 ton/ha	₹40 Lakh	₹20 Lakh
Intensive production system in BFT/RAS	25 ton/ha	₹100 Lakh	₹80 Lakh

45. **Pond Size, Depth and Production Strategy:** Average pond size, depth, and production strategy shall be standardized and adopted as per the recommended technical specifications for Vannamei shrimp farming to ensure optimal water quality management, effective biosecurity, efficient aeration, ease of sludge management and sustainable high-density production.

Pond Condition	Size & Depth	Aeration Requirements	Lining	Stocking Density	Target Production
Drainable pond & in desirable soil pH	1 ha 1.5 m	1 HP aerator per 350–400 kg biomass	Optional	30 PL/m²	5 t/ha Medium production system
Drainable pond & in desirable soil pH	0.4 ha 1.8 m	1 HP aerator per 250–350 kg biomass	Bund lining only	60 PL/m²	10 t/ha High production system
Non drainable pond or soil pH < 5	0.1 ha 2.1 m	1 HP aerator per 200 kg biomass	Full lining including bottom	100 PL/m²	25 t/ha Intensive production system in BFT/RAS

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88. Shri. Sreekumar J, Assistant Director of Fisheries, Head Office, ADAK.
89. Shri. Riyas Rahman P. K, Fisheries Officer, Vypeen.
90. Smt. Prajina K, Biochemist, Aquatic Animal Health Centre, Thevara.
91. Shri. Unnikrishnan, Technician, ADAK.
92. Shri. Abe Abraham, Journalist.

B. Farmers

1. Shri. C.K. Damodaran, Chethukulam Nikathil, Ketamangalam.
2. Shri. Gireesh, Ponath House, Nayarambalam P.O.
3. Shri. Jossey K. J, Kalloor House, Kaitharam P.O, Kottuvalli, N. Paravur.
4. Shri. K. X. Sebastian, Kalloor House, Kaitharam P.O, N. Paravur.
5. Shri. T. M. Abdul Jabbar, Thareparambil, Manjaly, Mannam, N.Paravur.
6. Shri. Shyam Sunder, Pallathupady House, Nayarambalam P.O – 682509.
7. Shri. Rakesh C. G, Chakkala Parambil, Kumbalam P.O, Cochin.
8. Shri. Varghese M. M, Kadamakkudy, Pizhala P.O, Kochi – 682027.
9. Shri. M. K. Pradeep, Muthedathu House, Library Road, North Paravur.
10. Shri. Sunil Kumar M. T, Mattapillil House, Vallarpadam P.O, Cochin.
11. Shri. Sunil James, Parapara House, Poonithara P.O, Kochi – 682038.
12. Shri. Manthan, Millenia Aqua Farm, Thrippunithara.
13. Shri. George V. Marcos, Maradu, Ernakulam.
14. Shri. Thankaraj K. J, Kochencherril House, Palluruthy P.O, Kochi.
15. Smt. Kunjamma Sebastian, Aqua Aura Shrimp Farm, Kannamaly.
16. Shri. Reejan Mathew, Kocheril, Kumbalangi, Kochi.
17. Shri. Aadhithya Madhu, Kudilil House, Peruvaram, North Paravur.
18. Shri. Madhu K. V, Kudilil House, Peruvaram, North Paravur.
19. Shri. Raju Menon, Sarada Vilasam, Ezhikkara, North Paravur.
20. Smt. Gritta, Karyadiparambil, Andhakaranazhi P.O.
21. Shri. George Alexander, Vattekkattussery, Thuravur P.O,
22. Shri. Sheen P. I, Pallickathayil House, Arthunkal P.O, Cherthala.
23. Shri. Shaji P. A, Palaparambil, N. Nagar P.O, Cherthala.

24. Shri. Nowfeeq A. K, Aliya Manzil, Pattanakkad.
25. Shri. Pramod S, Pattanakkad P.O, Cherthala.
26. Shri. P. K. V. Kaimal, Kodiparambu, Ezhupunna South.
27. Shri. Joe Antony, Joe Villa, Cherthala.
28. Shri. Sebastian Antony, Kattuthara (H), Thycattussery, Cherthala.
29. Shri. Boniface P. Gasper, Pallickathayil House, Arthunkal P.O.
30. Shri. Edwin K. J, Koilparambil House, Arthunkal P.O, Cherthala.
31. Shri. Abdul Gafoor, Veliparambil House, Aroor.
32. Shri. Suhail, Veliparambil House, Aroor.
33. Shri. Abhilash Y, Chandranivas, Kandalloor South, Kayamkulam.
34. Shri. Abdul Vajid, Panama, C.H. Road, Thaliparamba.
35. Shri. C. Muhammed Hussan, Ayisha Manzil, Idimutt, Pattuva – 670143.
36. Shri. E. V. Kabeer, T.T. House, Kattampally, Kannur.
37. Shri. Jude Martin, Nilavareth House, Kaloor, Ernakulam, Kochi.
38. Shri. K. V. Balakrishnan, Thiruvathira House, Kanjirangad P.O.
39. Shri. K. V. Rameshan, Pavithram, Meloor, Kannur.
40. Smt. Khairunisa M, Ayisha Manzil, Idimutt, Pattuva P.O, Thaliparamba.
41. Shri. Muhammed Afsal K. V, Kakkadavan Vayath, Azhikode.
42. Shri. P. V. Sujith Kumar, Geetha Nivas, Vengara, Kannur – 670305.
43. Shri. P. V. Subhash, PuthusseryValappil, Chunda, Kannapuram.
44. Shri. Pramod Palakkandy, Parambath Veedu, Vadakkumbad, Thalassery.
45. Shri. Sekharan P, Vaisakasree, Kunnaru Centre, Palakkod P.O, Kannur.
46. Shri. Sooraj K. V, Kannarath Valappil, Chunda, Kannapuram.
47. Shri. Sreekumar M, Sreyas, Koodali, Thalassery.
48. Shri. Surendran Palakkeel, Chamandi House, Thekkumbad, Kovappuram
49. Shri. Jeswanth K. P, Nirmala Nivas, Kannur.
50. Shri. Purushothaman, Kunhimangalam, Kannur.
51. Shri. Ambarish Kishore, Kuniyil Kadavu, Thiruvangoor, Calicut.
52. Shri. Manoj, Sreethilakam, Chevayoor P.O – 673017.
53. Shri. Munnas Kandanath, NP (H), Kallithodi Chungam, Feroke, Calicut.

54. Shri. Prassed K. R, Ram Niketh, Jail Road, Puthiyara.
55. Shri. Praveen Raj, Thayyil House, Meloor P.O, Antholi – 673315.
56. Shri. Sajith R. Raj, Kuniyil Kadavu, Thiruvangoor, Calicut.
57. Shri. Abdul Vaheed Saleem, Darul Salam, Holy Cross Hospital Road.
58. Shri. Ansarudeen A, Puthuvalveedu, Pullichira.
59. Shri. Aswin Asok, Rachana, Kurumandal, Paravoor, Kollam.
60. Shri. Athul Das Y, Akhil Nivas, Padappakara P.O, Perayam, Kollam.
61. Shri. Badarudeen P, Shinu Cottage, Kottiyam P.O – 691571.
62. Shri. Binu Karunakaran, Karunalayam, Munroethuruth.
63. Shri. K. Basheer, ThekkeputhenVayalil, Mundrothuruth.
64. Shri. Bhadran K, Sudha Bhavanam, Pratheeksha Nagar 112, Kilikolloor.
65. Shri. Chandralal N, Tharayil, Kidapram North, Perungalam P.O.
66. Shri. G. Pramod Kumar, Nirmalyam, Villimangalam, Mundrothuruth.
67. Shri. Gopalakrishnan K, Nenmeni, Mundrothuruth.
68. Shri. Jeedhi Divakaran, Vayalisseril House, Kottiyam P.O, Kollam.
69. Shri. Jijo Raj, Raj Mandiram, Near Chempottu Temple, Kottiyam.
70. Shri. Patric Lazar, Mary Dale, Ammattuveedu, Sakthikulam.
71. Shri. Prakash G, Vyshak, Nedungolam P.O, Paravur, Kollam.
72. Shri. P. T. Pradeep, Payyalazhikam, Mundrothuruth.
73. Shri. Santhosh Kumar, Kochayyathu, Pada North, Karunagappally.
74. Shri. Santhosh C, Mundrothuruthu, Kollam.
75. Shri. Sarath S, Krishna Aqua Farms, Peringalam.
76. Smt. Semeena Azad, Nazar Bhavan, Kottiyam P.O, Kollam – 691571.
77. Shri. Sethunathan, Mundro Island, Kollam.
78. Shri. Sharafudeen Alikunju, Vanchiyoor House, PPM Road, Punaloor.
79. Shri. Sudarsanan R, Darsana, Kidapram North, Perungalam P.O.
80. Shri. Sureshkumar Sasidharan, Suresh Bhavan, Sasthavattom P.O.
81. Shri. Sutheesh, Surendra Bhavanam, Kidapram, Perungalam.
82. Shri. Tennyson F. J, Roshni, Pullichira P.O.
83. Shri. Vinukuttan V. G, Lekshminivas, Kidapram North, PerungalamP.O.

84. Shri. Athul Franklin Miranda, Leeja Cottage, Kazhakuttom.
85. Shri. Christiano J. P, Pereira's, Anjuthengu P.O.
86. Shri. Nizarudeen M. P, Valiyamanakattil Veedu.
87. Shri. Akshay T. S, Thundiparambil.
88. Shri. Christy Rodriguez, KanakkanKasavu, Pullut, Thrissur.
89. Shri. Anilkumar M. P, Madathiparambil House.
90. Shri. Athul Araj, VadakkedathuParambil (H), Mala P.O, Neithakudy.
91. Shri. Devadasan T. C, Thullakkaran.
92. Shri. Dilip P, Puduvath House, Kodungallur, Pullut, Thrissur – 680663.
93. Shri. Ismail, Konekkattu Parambil.
94. Shri. Jayarajan K. R, Kadalikkattil House, Karumathra P.O.
95. Shri. Kiran K. R, Kuriyedath House, Padakulam West.
96. Shri. Madhusoodanan, Madathiparambil House, Kombathukadavu P.O.
97. Shri. Mohammed Raheeb K. A, Kanjirathinkal House.
98. Shri. Mohanan M. S, Madathiparambil House, Narayanamangalam.
99. Shri. Mujeeb Rahiman, Aguaroots Innovation Pvt. Ltd.
100. Shri. Johar K. J, Kanakkan Karavu, Pullut.
101. Shri. Prajeesh, 44, Chaithanya Residents, Edathirinji P.O – 680122.
102. Shri. Rinju K. S, Kizhakkedath House, Anapuzha, Kodungallur.
103. Shri. Shiyas E. S, Erattuparambil House, Pullut P.O.
104. Sruthy V. V, Eezhuvathra House, Edathirinji P.O – 680122.
105. Shri. Unni Damodaran, Thaiparambil House, Vallivattam P.O.
106. Shri. Vishnu Gopal Babu A, Akkliparambil, Vallivattom.
107. Shri. Ashraf V. A, Vaippankattil (H), Nedunganam, Karumathra.
108. Shri. Viswanath M. S, Madathiparambil House, Narayanamangalam.
109. Shri. Abhilash Mangalassery, AamasseryP.O.
110. Shri. Sudhakaran, Narayanamangalam, Pullut, Kodungallur.

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