

4 | Extension Achievements





4.1 Programs under Tribal-Sub Plan (TSP)

Nodal Officer: Dr. Sukham Muniikumar

Under the TSP component, ICAR-CIFE has conducted a total of 16 training programs in the States of Jharkhand, West Bengal, Manipur, Bihar, Maharashtra, Arunachal Pradesh, Chhattisgarh, Meghalaya, Assam and Tripura in the year 2023.

1. Technical Know-How for Spirulina Biomass Production and Utilization

Course Coordinator- Dr. K. A. Martin Xavier and Dr. S. P. Shukla

Training program on "Technical Know-how for Spirulina Biomass Production and Utilization" was organized at ICAR-CIFE, Mumbai, from 13-17 February 2023. The training provided hands-on training on spirulina biomass culture and its utilization for value-added compounds. A total of 10 participants (5 males & 5 females; Jharkhand - 5, Manipur- 2, Gujarat- 1, Bihar-1, and Arunachal Pradesh- 1) attended the training program. The practical classes were focused on light microscopy studies on Spirulina, media preparation (Zarrouk's medium and CIFE medium), inoculation of mother culture in indoor and outdoor units, estimation of water quality parameters, batch culture techniques of Spirulina cultivation, techniques for growth measurement using Spectrophotometric methods (turbidity, specific growth rate, Doubling time), Secchi disc, Chlorophyll estimation, cell/filament counting (Sedgwick-R after counting slide), technique for pigments estimation, microbiological techniques for evaluation of biomass purity (TPC method), protein estimation techniques, drying methods (Mechanical and Spray Drying), extraction and estimation of the concentration and purity of Phycocyanin, CHNS analysis of biomass, etc.

2. Genetic Broodstock Management of Common Carp

Course Coordinator-Mr. Angom Lenin Singh

ICAR-CIFE, Mumbai, in collaboration with KVK- Senapati, Hengbung, Manipur, organized a Awareness-cum-Skill Development Programme on "Genetic Broodstock Management of Common Carp" at KVK-Senapati, Hengbung during 16-18 February, 2023. Fifty farmers from Senapati and Kangpokpi districts attended the training program. A training manual on "Genetic Broodstock management of Common carp" was also released to help the farmers practice in the field. The rationale of the program was to give hands-on expertise on induce breeding and brooder management of common carp. This training gave farmers confidence in producing good quality fish seed, which may address the issue of the unavailability of quality fish seed in these hilly districts.



3. Aquaculture & Millet Farming: Potential Livelihood Options for Tribal Communities

Course Coordinator- Dr. Shivaji Argade

The ICAR-CIFE, Mumbai, organized training-cum-awareness program on 'Aquaculture & Millet Farming: Potential Livelihood Options for Tribal Communities' on 8 March 2023 at Dimbhe Reservoir (Pune, Maharashtra). The program was attended by 60 tribal fishers (Male-54, Female-6) from

Shivechiwadi and Chikhali villages in the Junnar and Ambegaon blocks. The program aimed to demonstrate cage aquaculture activities, value-added fish products, and millet products as profitable livelihood options for fishers residing near Dimbhe and Manikdoh reservoirs and make them aware of its potential to create employment and income opportunities. The field exposure visit to cage aquaculture unit at Dimbhe Reservoir was organised for the trainees. The training demonstrated the preparation of fish fillet, fish vada, etc., as well as the importance of millet and its nutritional value.



4. Freshwater Prawn Breeding and Seed Production

Course Coordinators- Dr. Madhuri Pathak and Dr. Kapil Sukhdhane

ICAR-CIFE, Mumbai, organized an awareness-cum-skill development program on "Freshwater Prawn Breeding and Seed Production" from 15-19 March 2023. The training program was attended by 12 participants (8 Male and four female) from Amboli, Andheri Suburb Mumbai. The training program aims to impart knowledge about freshwater prawn breeding and seed production to the tribal farmers in different hamlets around Mumbai and Maharashtra. It covered the present status of freshwater prawn aquaculture, freshwater prawn biology, water and soil quality management in freshwater prawn culture, freshwater prawn life cycle, essentials of freshwater prawn hatchery, maturation and breeding, larval rearing and nursery management of larvae. The training gave hands-on experience in broodstock identification, water quality management, feed management- egg custard preparation, and feeding.



5. Exposure Visits of Tribal Fish Farmers at ICAR-CIFE, Kolkata

Course Coordinator- Dr. Hanjabam Mandakini Devi

ICAR-CIFE, Kolkata Centre organized an exposure visit for 20 male fish farmers of Chandel district, Manipur, at Kolkata on 22 -24 March 2023, in collaboration with the District Fishery Office, Chandel, Manipur. The farmers were educated on nursery and rearing pond management techniques for raising carp seed, feed and feeding management, and soil and water quality management. Practical demonstrations on analysis of soil and water quality, artificial feed preparation and live feed culture techniques were conducted. Fish farmers also visited Naihati fish seed market and hatchery, fishing net market at Chetala.

6. Cage Aquaculture: A Profitable Livelihood Option

Course Coordinator- Dr. Kapil Sukhdhane

ICAR-CIFE, Mumbai, organized awareness-cum-training program on "Cage Aquaculture: A Profitable Livelihood Option" at Shive village, Rajgurunagar Pune (Maharashtra) on 23 February 2023. The program was attended by 54 tribal fishers (Male – 48, Female - 6) residing near Bhamaskhed reservoir. The cage culture in the reservoir was demonstrated. The trainees were



educated on cage fabrication, net cleaning, net replacement, fish stocking and feed management. Two extension bulletins on cage culture in reservoirs (Marathi & English) were also released on this occasion. Trainees were also enlightened on the role of women in cage farming, the economics of cage farming, and Central & State Government schemes and subsidies for cage aquaculture. Seven floating cages and its accessories for starting cage farming were distributed.

7. Fatty Acid Analysis of Fish and Feed Samples

Course Coordinators - Dr. Layana P. and Martin Xavier K. A.



Short-term training program on 'Fatty acid analysis of fish and feed samples' organized at ICAR-CIFE, Mumbai, from 27-29 March 2023. The training was designed to provide hands-on training on the analysis of fatty acids in fish and feed samples using Gas chromatography- Mass spectrometry (GCMS). Eight student participants (3 males and 5 females)

from the States of Jharkhand, Chhattisgarh, Manipur, Arunachal Pradesh & Karnataka attended the training program. An intensive training schedule imparted basic theoretical knowledge on 1. Chromatographic techniques- principles and applications, Different methods of fat extraction, classification of seafood lipids, and structure, classification and nomenclature of fatty acids, Properties of different types of fat etc. Hands- on-practical activities were carried out under the supervision of subject matter experts of Fish processing technology department, ICAR-CIFE. The practical classes were focused on the comparison of fat extraction methods such as Bligh and Dier, Folch, and Soxhlet methods, Fatty acid methyl ester preparation, operation of vacuum rotary evaporator and its working principle, fish, feed, and fish oil FAME analysis by GC, working principle of mass spectrometry, data analysis and interpretation, categorization of fatty acids based on its types, compositional analysis of SAFA, MUFA and PUFA, etc.

8. Cage Farming

Course Coordinators- Dr. Kapil Sukhdane and Dr. Sukham Munilkumar

The one-day workshop on cage aquaculture practices was organized on 14 October 2023 for 15 tribal fishers (13 males, two females) at Shive village, Rajgurunagar (Pune). Three theories and three practical sessions were conducted on different aspects of cage farming in reservoirs.



9. Fish-cum-Piggery Farming

Local Course Coordinator- Dr. Brajamani Meetei

Training Programme on Fish-cum-Piggery Farming was conducted in association with Krishi Vigyan Kendra (KVK), Bishnupur district, Manipur on 17 October 2023 for 25 ST participants (9 males, 14 females) at KVK, Bishnupur district, Manipur. The training covered the importance of integrated fish farming, demonstration of Fish-cum-Pig farming and technical skills/ capacity building of the intended beneficiaries.



10. Fish-based Integrated Farming Systems

Course Coordinator- L. V. Khonglah

The training program was conducted from 14-16 November 2023 in collaboration with Krishi Vigyan Kendra (KVK), East Khasi Hills district, Meghalaya. Technologies on horticultural crops, animal Science, fishery Science, and fodder crops were discussed while distributing planting materials, poultry chicks, and fingerlings to the farming community of the East Khasi Hills district. KVK also demonstrated different IFS models.



11. Fish-based Integrated Farming Systems

Course Coordinator- Dr. Biswajit Bal

The one-day training program was conducted in collaboration with KVK Unakoti, Tripura at KVK Unakoti on 21 December 2023, on "Fish-based Integrated Farming Systems" for 25 female trainees from Unakoti District. Training manuals and extension leaflets/folders related to fish-based integrated farming systems were distributed. They were also exposed to various integrated fish farming demonstration facilities at the KVK, Unakoti farm.



12. Sustainable Freshwater Aquaculture for Livelihood Improvement

Course Coordinator- Dr. Biswajit Bal

A one-day training program was conducted in collaboration with KVK on 22 December 2023, on the topic "Sustainable Freshwater Aquaculture for Livelihood Improvement" for 25 female trainees of Unakoti District. Training manual and extension leaflet/folders related to fish-based integrated farming systems were distributed. They were also exposed to various integrated fish farming demonstration facilities at the KVK, Unakoti farm.



Programs / Events Organized under TSP

S.No.	Title	Date & Place	No. of Participants (Male+ Female)	Name of Coordinator(s)
13.	Development of best management practices in aquaculture for increased fish production	20-23 March, 2023 Barwani (MP)	20 (20+0)	S. K. Nayak D. Reang
14.	Fish feed preparation and feeding management	27-29 March, 2023 Mumbai	12 (10+2)	Sikendra Kumar Tincy Varghese
15.	Sustainable fisheries management in Dimbhe reservoir	28 October, 2023 Dimbhe, Pune	99	Vinod Kumar Yadav Karan Ramateke
16.	Genetically improved fish stocks for aquaculture	18-20 December, 2023 , Assam	38	Mukunda Goswami Shrinivas Jahageerdar Angom Lenin Singh

4.2 Scheduled Caste Sub Plan (SCSP) Component

Nodal Officer: Dr. Sukham Munilkumar Co-Nodal Officer: Dr. A. K. Verma

Under the SCSP component, ICAR-CIFE conducted six training and capacity-building programs, benefiting over 372 Scheduled Caste beneficiaries in 2023. The programs were conducted in the States of Jharkhand, West Bengal, Gujarat, Manipur, Bihar, Maharashtra, Arunachal Pradesh, Chhattisgarh, Meghalaya, Andhra Pradesh, and Tripura.

1. Training Programme on Aquaculture Technologies as Livelihood Options

Course Coordinator- Dr. Sujata Sahoo

A three-day skill development training program on "Aquaculture technologies as livelihood options" (in Bengali) was organized from 08-10 February 2023 at ICAR-CIFE, Kolkata Centre. Training covered the integrated fish



farming systems, ornamental fish culture, analysis of water quality parameters using CIFE water testing kits, and demonstration of prophylactic control measures for fish diseases. A total of 20 Scheduled Caste female fish farmers from Malda actively participated and received critical inputs for fish farming.

2. Training Programme on Aquaculture Technologies as Livelihood Options

Course Coordinator- Mrs. Sweta Pradhan



A three-day skill development training program on "Aquaculture technologies as livelihood options" was organized at ICAR-CIFE, Kolkata Centre on 14-16 February 2023 for 20 Scheduled Caste fish farmers of Gosaba, Sunderban, South 24 Parganas districts. The training covered contents on nursery and rearing pond management techniques for raising carp seed, feed, and feeding strategies in composite culture, freshwater aquaculture and culture of magur, homemade feed & common disease problems in aquaculture, monosex tilapia culture, pangus farming, freshwater prawn farming and soil and water quality management using pH kit & DO kit developed by ICAR-CIFE.

3. Freshwater Pearl Farming and Entrepreneurship Development

Course Coordinator- Mrs. Sweta Pradhan



A three-day skill development training program on "Freshwater pearl farming and entrepreneurship development" was organized at ICAR-CIFE, Kolkata Centre on 14-16 March 2023 for 12 fish farmers from Malda, Hooghly, North 24 Parganas, and South 24 Parganas districts of West Bengal. Training covered pond management practices in fish farming, different implantation techniques in the pearl culture, preparation of the nuclear beads, physiology, anatomy, and basics of freshwater mussels, harvesting, value addition and marketing of pearl, feeding of the freshwater mussels using algal culture, culture of chlorella & spirulina and soil and water quality management using pH kit & DO kit developed by ICAR-CIFE.

4. Value Added Fish Products

Course Coordinator- Dr. H. Mandakini Devi

The ICAR-CIFE, Kolkata Centre organized a five day entrepreneurship-cum-skill development training program on "Value-Added Fish Products" from 20-24 March 2023 for 12 (9 female, 3 male) SC participants from different parts of West Bengal such as Murshidabad, Sonarpur, Canning 1 and Nimpith. The program provided a hands-on



demonstration on preparing different value-added fish products such as prawn pickles, prawn spicy masala powder, fish momos, fish sausage, fish cutlets, fish balls, fish fingers, and fish popcorn. The trainees were also given a chance to prepare customized prawn pickles based on the regional preferences of the ingredients. A set of processing equipment (mincer, weighing balance, steamer, and gas burner) was distributed to all trainees to help them start a small food venture.

5. Fish Farming in Plastic-Lined Farm Ponds

Course Coordinator- Dr. Ankush Kamble

ICAR-CIFE, Mumbai organized a discussion forum on “Fish farming in plastic lined farm ponds” at Karjat, Ahmednagar (Maharashtra) on 23 November 2023 for 23 scheduled caste farmers. The discussion with farmers was held on various difficulties in plastic-lined farm ponds while doing fish farming, the value and advantages of fish farming in plastic-lined farm ponds, and how to make fish farming successful in plastic-lined farm ponds.

6. Seed Enrichment through Lined Pond-based Semi-Biofloc Technology (In Hindi)

Course Coordinator- Dr. Md. Aklakur

The training on “Seed enrichment through lined pond based semi-bio floc technology” (In Hindi) was organized during 22-28 December 2023 for 20 SC youths at ICAR-CIFE Motipur center. The local farm visit was arranged at Jasaulipakri Dayal and the nearby culture area. For advanced culture, the biofloc-based aquaculture visit was planned to see the farm and operation by Mr. Abhishek Kumar Kanhauli Vaishali. The program was successfully completed, and certificates were distributed to participants and beneficiaries along with seed and cash for travel support.



Programs / Events Organized under SCSF

S.No.	Title	Date & Place	No. of Participants (Male+ Female)	Name of Coordinator(s)
7.	Broodstock management, induced breeding and nursery rearing of common carp in inland saline aquaculture system	21-30 March, 2023 Rohtak (HR)	5 (5+0)	M. A. Pathan, Babitha Rani A. M. Pankaj Kumar Sreedharan K.
8.	On-farm training and demonstration in inland saline aquaculture	9 March - 7 April, 2023 Rohtak (HR)	10 (10+0)	Babitha Rani A.M. Pankaj Kumar
9.	Demonstration and hands-on training on ornamental fish rearing and breeding and aquaculture of pedigreed common carp seed	04- 13 March, 2023 Powarkheda (MP)	15 (12+ 03)	S. K. Nayak D. Reang, H. Haridas
10.	Machali swashtya prabhandhan Powarkheda (MP)	20 December, 2023	15 (13+ 02)	A. Sharma, S. K. Nayak D. Reang, H. Haridas
11.	Shrimp culture	6-15 March, 2023 Kakinada (AP)	10 (10+0)	Muralidhar P. Ande, Karthireddy Syamala P. Srinivasa Rao M. Usha Rani
12.	Seed production and culture techniques of <i>Clarias magur</i>	09-13 October, 2023 Kakinada (AP)	8 (5+3)	Shamna N. , Vidhya V. P. Srinivasa Rao
13.	Feed-based aquaculture technologies as livelihood options	16-18 August, 2023 Kolkata (WB)	40 (38+2)	Parimal Sardar Sweta Pradhan
14.	Freshwater pearl farming and entrepreneurship development	14-16 March, 2023 Kolkata (WB)	14 (7+7)	Sweta Pradhan
15.	Fish breeding and hatchery management	22-24 August, 2023 Lower Dibang Valley (Assam)	20 (17+3)	Dilip Kumar Singh Gouranga Biswas
16.	Freshwater pearl farming and entrepreneurship development	9-13 October, 2023 Kolkata (WB)	20 (18+2)	Sweta Pradhan
17.	Modern methods of freshwater aquaculture	6-8 December, 2023 Sonamukhi, Bankura	50 (43+7)	Suman Manna
18.	Market networking for value added fish products	2-3 February, 2023	40	Amjad Balange R. K. Majumdar Avinash Sable
19.	Fatty acid analysis of fish and feed samples	27-29 March, 2023	8	Layana P. Martin Xavier K. A.

4.3 Programs under the North-Eastern Hill (NEH) States Scheme

Nodal Oføcer: Dr. A. K. Verma

The NEH program, operating in eastern India, encompasses a wide array of initiatives aimed at bolstering fisheries practices and enhancing livelihoods. Its core offerings are comprehensive training programs designed to impart scientific farming techniques explicitly tailored for carp cultivation. These sessions equip participants, predominantly rural farmers, with the knowledge and skills needed to optimize their fisheries output, fostering sustainable practices and bolstering regional food security. The NEH program, by far, covered the eastern and northeastern parts of India. The programs conducted comprised training on scientific farming of carp, training-cum-demonstration program on fish breeding and culture for the rural farmers of lower Dibang Vally, skill Development program on the preparation of value-added fish products, mass scale production of pure fish seed of indigenous commercially important minor carp, *Labeo calbasu*, for improving livelihood and nutritional security of rural farmers. Skill-oriented training program on aquarium fabrication & ornamental fish keeping for entrepreneurship development, integrated farming systems, sustainable freshwater aquaculture practice for livelihood improvement, ornamental fish culture and aquarium management, integrated fish culture and fish health management. The NEH program extends its reach to address the intricacies of fish breeding and culture, mainly targeting rural communities in areas like the Lower Dibang Valley. Through training and demonstration sessions, farmers are educated on best practices in fish breeding, focusing on indigenous species. By empowering local communities to cultivate fish effectively, the program enhances livelihood opportunities and contributes to the conservation of native aquatic ecosystems. A total of 1042 individuals benefitted from the NEH programs organized by ICAR-CIFE, with 497 male and 545 female participants.

The NEH programs covered 19 districts insix states. The trainings were conducted in districts such as Lower Dibang Valley, Changlang, Dhemaji, Lakhimpur, Udalguri, Darrang, Dhalai, Gandacherra, Tinsukia, South Garo Hills, Wangbal, Unakoti, Imphal East, Aizwal, Gangtok, Churanchandpur, Thoubal, Moreh, Bishnupur and Nagoan. The states covered under the NEH program are Arunachal Pradesh, Assam, Tripura, Meghalaya, Manipur, and Mizoram. In addition to fostering technical expertise, the NEH program places significant emphasis on skill development to enable rural entrepreneurs to diversify their income streams through value-added fish product preparation. By imparting knowledge on processing techniques and product innovation, the program empowers individuals to capitalize on the market demand for processed fish products, creating sustainable economic opportunities and fostering local entrepreneurship. Furthermore, the NEH program prioritizes distributing fisheries-related inputs among beneficiaries, including essential supplies like fish fingerlings, feed and water testing kits. This comprehensive support infrastructure ensures that participants have access to the resources necessary to effectively implement the skills and techniques they acquire through the program. Through collaborative efforts with institutes and KVKs, the program strives to maximize its impact, reaching communities across 19 districts and six states in the eastern region of India, ultimately driving positive socioeconomic change and sustainable development. CIFE collaborated with the local Institutes and KVKs to conduct the programs.



4.4 Skill Development Programmes (SDP) / Refreshers Course / Online Courses etc. Organized

Title	Name of Coordinator(s)	Date (Duration)	No. of Participants Total (Male + Female) Place (State/District)
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ICAR-CIFE, Aquaculture Division

Fish and prawn culture	Kapil Shukhdae	13-27 June, 2023	14 (13+1)
Freshwater pearl culture	Upasana Sahoo Paramita B. Sawant	21-23 June, 2023	12 (9+3)
Ornamental fish culture & aquarium management	Debajit Sarma Paramita B. Sawant Upasana Sahoo	18-25 August, 2023	14 (14+0)
Academic and scientific writing of the manuscript workshop	Debajit Sarma Madhuri Pathak	4-5 October, 2023	50 (28+22)
Aquaculture engineering	Debajit Sarma Chandrakant M. H.	9-14 October, 2023	10 (9+1) Meghalaya
Cage aquaculture: Profitable livelihood option	Debajit Sarma Kapil Sukhdhane, Madhuri Pathak, Sukham Munilkumar	27 October, 2023	12 (10+2)

ICAR-CIFE, FEES Division

Student workshop: Introduction to virtual reality modules	Ananthan P. S. Abuthagir Ibrahim	5-7 August, 2023	60
Student workshop: Introduction to virtual reality modules	Ananthan P. S. Abuthagir Ibrahim	23-27 August, 2023	60
Geospatial analysis using open source software	Vinod Kumar Yadav Vidya Shree Bharti Arpita Sharma	4-9 September, 2023	25 (9+16)
Aquaculture: Potential income generation option	Shivaji Argade Kapil Sukhdhane	11 October, 2023	27 (20+7) Maharashtra State Agriculture Department Officers, Konkan Region
Student workshop: Introduction to virtual reality modules	Ananthan P. S. Abuthagir Ibrahim	29 November - 3 December, 2023	60
Internship on geo-informatics and precision aquaculture for MTech students, IIT Bombay	Vinod Kumar Yadav	4 December, 2023 - 3 January, 2024	3 (3+0)

ICAR-CIFE, FRM&PHM Division

Role of Taxonomy and biology in conservation and management of fishery resources	Asha T. Landge K.K. Ramteke Shobha Rawat S. Monalisha Dayal Devadas	3-12 January, 2023	11 (5+6)
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Antimicrobial resistance in food fish: Challenges & mitigation	Sanath Kumar H. B. B. Nayak Manjusha L.	09-29 January, 2023	16 (10+6)
Dry fish handling and value-added products - Vrutti NGO	A. K. Balange	20-23 February, 2023	29 (0+29)
Value-added fish and shellfish products –Vrutti NGO	A. K. Balange	13-16 March, 2023	37 (0+37)
Dry fish handling and value-added fish products - Vrutti NGO	A. K. Balange	8-10 March, 2023	28 (0+28)
Value-added fishery products - Blue ocean fish cluster	A. K. Balange	17-19 March, 2023	32 (16+16)
Fish processing and value-added fishery products -JNPA	A. K. Balange Lanaya P.	21-27 April, 2023	40 (15+25)
Role of taxonomy in assessment of aquatic biodiversity and management of fisheries resources	Asha T. Landge Shashi Bhushan Abuthagir Ibrahim Dayal Devadas	21-30 June, 2023	05 (2+3) Tamil Nadu & Maharashtra

ICAR-CIFE, FN&BP Division

Aquafeed production technology and feeding management for sustainable aquaculture Sikandra Kumar

Manish Jayant 11-15 December, 2023 32 (28+4)

ICAR-CIFE, FGB Division

Advances in molecular taxonomy and phylogenetics	Aparna Chaudhari Annam Pavan Kumar Kiran Rasal	30 January - 8 February, 2023	20 (7+13)
NGS data analysis with special reference to transcriptomics and metagenomics	Mukunda Goswami N. S. Nagpure M. P. Brahmane Arvind Sonwane Kiran Rasal	16-20 October 2023	10 (5+5)

ICAR-CIFE, AE&HM Division

Technical know-how for spirulina biomass production utilization	S. P. Shukla Kundan Kumar Saurav Kumar	16-21 January, 2023	7 (5+2)
PCR-based disease diagnosis	Megha K. Bedekar Jeena K.	16-21 January, 2023	6 (2+4)
Technical know-how for spirulina biomass production utilization	S. P. Shukla Saurav Kumar Kundan Kumar	13-17 February, 2023	10 (5+5)
PCR-based disease diagnosis	Megha Kadam Bedekar Jeena K.	2-4 August, 2023	6 (3+3)
Technical know-how for spirulina biomass production utilization	S. P. Shukla Saurav Kumar Kundan Kumar	18-23 December 2023	6 (5+1)

ICAR-CIFE, Kakinada Centre

Improved fish culture and management practices for fisheries cooperatives	Muralidhar P. Ande Karthireddy Syamala P. Srinivasa Rao M. Usha Rani	25-27 January, 2023	21(21+0) Warangal, Telangana
<i>Machali evam Jhinga Palan ki adhunik vidhiyan</i>	Muralidhar P. Ande Karthireddy Syamala P. Srinivasa Rao	28 January - 03 February, 2023	25 (25+0) Purmea, Bihar
		17-23 March, 2023	23 (23+0) Begusarai, Bihar
Eco-friendly fish feed preparation & marketing	Muralidhar P. Ande Karthireddy Syamala M. Usha Rani	17-23 April, 2023	30 (30+0) East Godavari, Andhra Pradesh
Better management practices for shrimp farming	Muralidhar P. Ande Karthireddy Syamala P. Srinivasa Rao	17-21 July, 2023	28 (11+17) Andhra Pradesh
Carp breeding and hatchery management	Shamna N. Vidhya V. Muralidhar P. Ande Karthireddy Syamala	07-11 August, 2023	34 (27+7) Andhra Pradesh
<i>Machali evam Jhinga Palan ki adhunik vidhiyan</i>	Muralidhar P. Ande Karthireddy Syamala M. Usha Rani	13-19 September, 2023	25 (25+0) Madhubani, Bihar
Seed production and culture techniques of <i>Clarias magur</i>	S. Jahageerdar Shamna N. Vidhya V. P. Srinivasa Rao	9-13 October, 2023	22 (14+8) Andhra Pradesh
<i>Machali evam Jhinga Palan ki adhunik vidhiyan</i>	Muralidhar P. Ande Karthireddy Syamala P. Srinivasa Rao	15-21 December, 2023	25 (25+0) Patna, Bihar

ICAR-CIFE, Powarkheda Centre

<i>Machali evam Jhinga Palan ki adhunik vidhiyan</i>	S. K. Nayak D. Reang H. Haridas Hasan Javed	22 February- 03 March, 2023	20 (20+0) Nalanda, Bihar
		23-29 March, 2023	13 (13+0) Patna, Bihar
		10-16 May, 2023	15 (15+0) Begusarai, Bihar
		19-25 May, 2023	9 (9+0) Nalanda, Bihar
		10-16 July, 2023	13 (13+0) Arwal, Bihar
Carp hatchery management	S. K. Nayak D. Reang H. Haridas	17-22 July, 2023	9 (9+0) Madhya Pradesh
<i>Machali evam Jhinga Palan ki adhunik vidhiyan</i>	S. K. Nayak D. Reang H. Haridas Hasan Javed	14-20 August, 2023	15 (15+0) Kaimur, Bihar
		21-26 August, 2023	10 (10+0) Madhya Pradesh
Hands-on training on	S. K. Nayak	23 August -	12 (8+4) B.F.Sc.

aquafarming and finfish/shell fish breeding	D. Reang H. Haridas Hasan Javed	20 October, 2023	students from Nagpur, Maharashtra
<i>Machali evam Jhinga Palan ki adhunik vidhiyan</i>	S. K. Nayak D. Reang H. Haridas Hasan Javed	3-9 September, 2023	14 (14+0) Madhubani, Bihar
Hands-on training on aquafarming and finfish/shell fish breeding	S. K. Nayak D. Reang H. Haridas Hasan Javed	26 September-20 November, 2023	05 (4+1) B.F.Sc. students from Itawah, Uttar Pradesh
<i>Machali evam Jhinga Palan ki adhunik vidhiyan</i>	S. K. Nayak D. Reang H. Haridas Hasan Javed	12-18 October, 2023	15 (15+0) Begusarai, Bihar
		27 November-01 December, 2023	14 (14+0)
		28 November-04 December, 2023	14 (14+0) Alwar, Bihar
		06-12 December, 2023	14 (14+0) Gaya, Bihar
		14-20 December, 2023	14 (14+0) Supaul, Bihar

ICAR-CIFE, Rohtak Centre

Standard operating protocol for singhi catfish rearing in biofloc culture system	Babitha Rani A.M. Sreedharan K.	21-23, August, 2023	8 (5+3) Haryana, Maharashtra & Madhya Pradesh
		24-26, August, 2023	9 (9+0) Maharashtra, Haryana & Delhi
		30 October-1 November, 2023	10 (8+2) Punjab and Maharashtra
		1-4 November, 2023	9 (8+1) Punjab and Gujarat

ICAR-CIFE, Kolkata Centre

Mithe pani me machli palan	Sujata Sahoo	4-10 January, 2023	15 (15+0) Buxar, Bihar
Mithe pani me machli palan	Sweta Pradhan	4-10 January, 2023	15 (15+0) Gaya, Bihar
Mithe pani me machli palan	Gouranga Biswas	11-17 January, 2023	15 (15+0) Banka, Bihar
Mithe pani me machli palan	G. H. Pailan	11-17 January, 2023	15 (15+0) Nalanda, Bihar
Mithe pani me machli palan	D. K. Singh	18-24 January, 2023	15 (15+0) Vaishali, Bihar
Mithe pani me machli palan	H. Mandakini Devi	18-24 January, 2023	15 (15+0) Darbhanga, Bihar
Mithe pani me machli palan	Suman Manna	25-31 January, 2023	15 (15+0) Jehanabad, Bihar
Mithe pani me machli palan	Gouranga Biswas	25-31 January, 2023	15 (15+0) Aurangabad, Bihar

Advances in freshwater aquaculture	Gouranga Biswas Parimal Sardar	13-19 June, 2023	Participants from different place
Fish nutrition and Feeding strategies	Parimal Sardar D. K. Singh	12-18 July, 2023	Participants from different place
Internship programme on entrepreneurship development in ornamental fish breeding, culture & trade	Suman Manna	19 July - 8 August, 2023	College of Fisheries, AAU, Assam
Biotechnological applications in aquaculture	Sujata Sahoo Leesa Priyadarsani	8-14 August, 2023	Participants from different place
<i>Mithe pani me machli palan</i>	Sweta Pradhan	29 August - 4 September, 2023	20 (20+0) Nalanda, Bihar
Mithe pani me machli palan	Gouranga Biswas	19-25 September, 2023	20 (20+0) Jehenabad, Bihar
Fish processing and value added fish products	H. Mandakini Devi G. H. Pailan	3-9 October, 2023	Participants from different place
<i>Mithe pani me machli palan</i>	D. K. Singh	10-16 October, 2023	20 (20+0) Sitamarhi, Bihar
Aquaculture and integrated farming system for rural development	T. K. Ghoshal	7-9 November, 2023	Participants from Tata Steel Foundation, Jamshedpur
<i>Mithe pani me machli palan</i>	Parimal Sardar	27 November - 4 December, 2023	(20 (20+0) West Champaran, Bihar
Entrepreneurship development in ornamental fish breeding & culture	Gouranga Biswas G. H. Pailan	5-11 December, 2023	Fish farmers from Meghalaya
Diagnosis of fish diseases and their management	Suman Manna Leesa Priyadarsani	5-11 December, 2023	Participants from different place
<i>Mithe pani me machli palan</i>	T. K. Ghoshal	12-18 December, 2023	20 (20+0) Siwan, Bihar

CAFT Programmes / Winter School Summer School Organised



Winter school on "Antimicrobial Resistance in FoodFish: Challenges & Mitigation" was organised from 09-29 January, 2023. The winter school was coordinated by Dr. Sanath Kumar, Dr. B. B. Nayak, and Dr. Manjusha L. This was attended by 16 (10M+6F) participants from different States of India. This winter school program was designed to emphasize on the issue of antibiotic resistance in in seafood pathogens, mechanisms, spread and different approaches for its mitigation through the "One Health" approach. The target participants included faculty members and scientists working in the level of Assistant Professor and above. A total of 16 trainees participated in this hands-on training programme. The trainees included assistant professors and scientists from various state agricultural universities and research institutes in Jammu and Kashmir, Punjab, Bihar, Madhya Pradesh, Tamil Nadu, Kerala, and Maharashtra. The topics covered in training included theory and practical classes on the status of antimicrobial use in food systems, antibiotic resistance and spread, fish-borne pathogens of public health significance, known and emerging, mechanisms of antibiotic resistance, genotypic and phenotypic methods for detection of antibiotic resistance, antimicrobial resistance in aquaculture systems and the environment, One Health approach for mitigation of antibiotic resistance, mechanisms of dissemination of resistance traits, microbiome, and AMR gene mining. The training systematically covered the basic and advanced molecular techniques for the detection of AMR in bacteria from seafood. The trainees were given exposure to the international guidelines for testing antimicrobial resistance in bacteria, standard methods of antimicrobial susceptibility testing, bacteriophage techniques, gene cloning, and transformation. Lectures on infographics and phylogenetic evolution of antimicrobial resistance were also arranged.

4.5. Workshops, Seminars, Farmer Meets, etc. Organised

Title	Organising Team	Date & Place	In Association with	No. of Participants (Male+Female)
Innovative symposium-cum-Exhibition-FISHERISTIC: Future of fisheries, imagined now	Ananthan P. S. Neha Qureshi Sanath Kumar Kapil Sukhdhane Nalini Poojary Dasari Bhoomaiah	20-22 March, 2023 Mumbai	NA	> 100
Student-led symposium on enhancing fish consumption brings out imaginative and pragmatic pathways	Ananthan P. S. Neha Qureshi Sanath Kumar Kapil Sukhdhane Nalini Poojary Dasari Bhoomaiah	22 March, 2023 Mumbai	NA	45
Workshop on women led development	All staffs of ICAR-CIFE, Rohtak Centre	27 March, 2023	NA	25
Stakeholders consultation workshop on fisheries development in Rajasthan: Status, challenges and way forward	Ananthan P. S. Neha Qureshi Sukham Munilkumar	10 May, 2023 Udaipur	Department of Fisheries, Rajasthan	59
Agriculture & fisheries doordarshan program advisory workshop	Shivaji Argade Ankush Kamble Arpita Sharma	09 June, 2023 Mumbai	Doordarshan Kendra, Worli	45 (38+7)
Panel discussion on Vaccine trials : aquaculture perspective	Megha K. Bedekar Saurav Kumar Kundan Kumar	16 August, 2023 Mumbai	Indian Immunological Limited (IIL), Hyderabad	18 (12+6)
Personal interview skill workshop	Arpita Sharma Manish Jayant Kapil Sukhdhane Deepitha Abuthagir Ibrahim	28 August, 2023 & 01 November, 2023 Mumbai	NA	30 (15+15)
Interaction workshop with Dr. Arun K. Dhar, Director tuscan university, Arizona, USA and fulbright fellow and other scientists of CIFE	S. P. Shukla & team	5 September, 2023 Mumbai	The University of Arizona, USA	75
Workshop on climate change and its impact on reproductive and mental health of women	Paromita Banerjee Sawant Vidya Shree Bharti	6 September, 2023 Mumbai	NA	70
NAHEP Workshop on techniques in animal health management	Megha K. Bedekar Saurav Kumar	7 September, 2023 Mumbai	NA	99 (48+ 51)

Interactive Meet (Hybrid mode) With All ICAR Fisheries Institute Scientists' with Dr. Arun K. Dhar, the University of Arizona, USA	Megha K. Bedekar Nalini Poojary & team	7 September, 2023 Mumbai	The University of Arizona, USA	60
Agri Education Fair- 2023	S. Jahageerda Rupam Sharma Sunil Kumar Nayak Shashi Bhushan Shamna N. Dhalongsiah Reang Harsha Haridas	09 September, 2023 Powarkheda		350 (200+150)
One-day international workshop on writing winning proposals to secure international grants	Kundan Kumar Jeena K.	12 September, 2023 Mumbai	The University of Arizona, USA	100
International workshop on diagnostics of future: Precision diagnostics in aquaculture	Megha Bedekar Team AEHM	13 September, 2023 Mumbai	The University of Arizona, USA	154 (90+64)
Write shop on fish and shrimp health management for increased productivity and sustainability	Gayatri Tripathi Jeena K.	14 September, 2023 Mumbai	The University of Arizona, USA	11
Interactive meet with young scientists on building career of a young scientists	Saurav Kumar	15 September, 2023 Mumbai	The University of Arizona, USA	24 (14+10)
Workshop on self-management for success and harmony and psychology of winning	Vidya Shree Bharti Nalini Poojary	25 September, 2023 Mumbai	Brahmakumari's	40
Workshop on ornamental fish disease management	Megha Bedekar Team AEHM	04 November, 2023 Mumbai	NA	150
NAHEP concluding workshop	N. P. Sahu NAHEP team	14-15 December, 2023 Rohtak	ICAR & World Bank	300 (279+21)
Workshop on fish health management	Arun Sharma Sunil Kumar Nayak Dhalongaih Reang Harsa Haridas	20 December, 2023 Powarkheda	NA	15 (13+2)
Machali swashtya prabhandhan	A. Sharma S. K. Nayak D. Reang H. Haridas	20 December, 2023	NA	15 (13+02)

Fishers/Farmers' Meet Organised

Title	Name of Coordinators	Date and Place	No. of farmer participants (Male+Female)
Live feed culture	S. Munilkumar Kapil Sukhdhane Upasana Sahoo	14 June, 2023 Mumbai	77 (72+5)
National fish farmers day	S. K. Nayak D. Reang H. Haridas	10 July, 2023 Powarkheda	40 (40+0)
National fish farmers day	Suman Manna	10 July, 2023 Kolkata	75 (55+20)
Farmer's meet in connection with the visit of Secretary, Fisheries, Govt. of India	Babitha Rani. A.M M. A. Pathan Pankaj Kumar Sreedharan K.	29 September, 2023 Rohtak	100 (90+10)
Awareness-cum-training program on Health Management of Tilapia	Megha Kadam Bedekar K Pani Prasad Gayatri Tripathi	9-11 October, 2023 Mumbai	5 (5+0) farmers 3 Officials from DoF, Mumbai
CIFE technology awareness programs	Asha Landage Kapil Sukhdane Avinash Sable	19 October, 2023 Palghar	15 (15+0)
World soil day	Suman Manna	5 December, 2023 Kolkata	40 (32+8)
Farmer's meet on NAHEP concluding workshop	NAHEP team	15 December, 2023 Rohtak	300 (279+21)
Kisan Diwas	S. K. Nayak D. Reang H. Haridas	23 December, 2023	50 (48+2)



Interactive meeting of Prof. Arun K. Dhar with Scientists

An interactive meeting of Prof. (Dr.) Arun K. Dhar (Director of Aquaculture Pathology Laboratory; University of Arizona, Tucson, USA) Fulbright Fellow, with the Scientists of ICAR-CIFE was organized on 5th September, 2023. Dr. Dhar delivered a presentation on his area of expertise, focusing on recent developments, emerging trends, and their relevance to the research outputs. The presentation was followed by a discussion on potential areas for collaboration between University of Arizona, USA and CIFE through joint research projects and knowledge sharing initiatives. The session was coordinated by Dr. S.P. Shukla, Principal Scientist, AEHM Division.

Interactive Meet (Hybrid mode) With All ICAR Fisheries Institute Scientists and an Online lecture

ICAR-CIFE Mumbai organized the Interactive Meet (Hybrid mode) with All ICAR Fisheries Institute Scientists' and an Online lecture by Dr. Arun K. Dhar on the topic "Overview of shrimp diseases world wide" on 7th September 2023. The event was conducted in a hybrid mode. The lecture and interactive session was designed to transcend boundaries, facilitating the sharing of valuable insights in aquatic animal health. The lecture was attended by over 60 scientists from Fisheries institutes of India.

The interactive session provided an opportunity for knowledge exchange for addressing issues from the farmer's perspective and to look above and beyond science. The program was coordinated by Dr. Nalini Poojary, CTO, AEHM division.

NAHEP sponsored workshop on "Techniques in Health Management"

ICAR-Central Institute of Fisheries Education, Mumbai conducted a workshop on "Techniques in Health Management" on 7th September 2023 under the aegis of National Agricultural Higher Education Project (NAHEP).



Full Bright Fellow, Prof. (Dr.) Arun K. Dhar, Director of Aquaculture Pathology Laboratory, University of Arizona, Tucson, USA delivered the lectures on "Diagnosis for aquatic animal diseases" and "Troubleshooting in molecular diagnostics". The workshop was designed to provide an idea about the various diagnosis techniques started from conventional to rapid and sensitive molecular that employed in the health management practices of aquaculture. A total of 99 participants including

48 males and 51 females from different divisions of ICAR-CIFE attended the workshop. During the workshop, participants had the opportunity to explore a wide range of tools used in aquatic health management, particularly focusing on advanced diagnostic techniques for shrimp and fish diseases. Dr. Dhar also shared valuable insights into virology and demonstrated how to enhance our understanding of genome sequences from histology blocks. He provided guidance on interpreting histology slides and using advanced tools such as PCR, RT-PCR, Western blotting, and ELISA. The session concluded with an engaging Q&A session, where participants had the chance to seek clarification and gain further insights. Overall, the workshop motivated, inspired, and enriched the students through various interactions. The workshop was organized by Dr. Megha K. Badekar, Principal Scientist & Head, Aquatic Environment and Health Management Division and Dr. Saurav Kumar, Scientist, AEHMDivision, ICAR-CIFE.

One-day International Workshop on "Writing Winning Proposals to Secure International Grants"

An International workshop was organized by ICAR-Central Institute of Fisheries Education, Mumbai on 'Writing Winning Proposals to Secure International Grants' on 12th September 2023 from 2.30 PM onwards in hybrid mode. The workshop was conceptualized to build confidence and to discuss the directions and know-hows on writing impactful proposals for winning external grants. Four distinguished speakers, Prof. Dr. Indrani Karunasagar, Head, Projects and DST-TEC, NITTE University, Head, FAO Reference Centre for Antimicrobial Resistance and Aquaculture Biosecurity, Director, UNESCO Resources Centre for Biotechnology; Prof. Dr. Riji John, Former Vice Chancellor, Kerala University of Fisheries and Ocean Studies, Kochi; Dr. P. Krishnan, Director BOBP-Intergovernmental Organization and Prof. Dr. Arun K. Dhar, Director, Aquaculture Pathology Laboratory, School of Animal & Comparative Biomedical Sciences, the University of Arizona, Tucson, Arizona were the invited resource persons of the workshop. Dr. Indrani Karunasagar delivered a comprehensive talk on



'Internationalization and research grants' which emphasized on the significance of international collaborations and research partnerships and how to internationalize the research. She also emphasized on the importance of consistency and perseverance and threw light on the major funding

agencies available globally. Prof. Riji John spoke on the 'Grant Opportunities for Life Sciences Research' and the importance of preparedness for exploring the opportunities and best out of it. 'Developing grant winning proposals-building right perspectives' was the topic covered by Dr. P. Krishnan. He shared his insights on right perspectives, strengths of our country and the responsibility of researchers in attracting funds. He elaborated on the importance of specialization, building project teams and on the duration of projects. Prof. Arun Dhar spoke on the topic 'Evaluation and Assessment criteria for proposals, funding cycle'. He elaborated the topic using his experiences in winning grants and fulfilling it. The session was attended by 20 participants in person and 100 participants online. The workshop was live streamed in YouTube as the limit of the online attendees crossed the maximum. The program was concluded by summing up by Dr. N.P. Sahu. The organizing secretaries of the program were Dr. Kundan Kumar, Senior Scientist and Dr. Jeena K., Scientist AEHM Division.

NAHEP sponsored International workshop on "DIAGNOSTICS FOR FUTURE: PRECISION DIAGNOSTICS IN AQUACULTURE"

ICAR-Central Institute of Fisheries Education, Mumbai conducted an international workshop on "Diagnostics for future: precision diagnostics in aquaculture" on 13th September 2023 under the aegis of National Agricultural Higher Education Project (NAHEP). The objective of the workshop was to illustrate the importance and execution of precision diagnostics in aquatic animal health management to augment sustainability and security of the aquaculture sector to meet global demands of aquatic food production. Under the theme of precision diagnostic in aquaculture there were seven invited talks of focused on the theme delivered by eminent scientists. The workshop had Session 1 on Pathogen discovery and precision diagnostics covered four talks and session 2 on Future diagnostic for field application covered three talks. Dr. P. K. Sahoo, Director, ICAR-Central Institute of Freshwater Aquaculture, Bhubaneswar and Chairman of the Workshop emphasized on the prerequisite for developing need based precise diagnostics for suitable therapeutic development and enhancing the fish production. Dr. Sahoo commenced the first Session by delivering a talk on "Overview on freshwater fish diseases with emphasis on emerging pathogens" followed by Fulbright Fellow Dr. Arun K. Dhar, Professor and Director, Aquaculture Pathology Laboratory, School of Animal and Comparative Biomedical Sciences, The University of Arizona who delivered a talk on "Expediting pathogen discovery pipeline to prevent disease pandemics in shrimp aquaculture". The first session ended by a talk on "Precision diagnostics in context of pathogen discovery" delivered by Dr. Shyam Sunder Nandi, Scientist E/Deputy Director ICMR-National Institute of Virology, Mumbai Unit, Haffkine Institute Compound, Parel, Mumbai.

The second session began with the "Challenges in disease diagnosis in aquatic systems" presented by Dr. K.V. Rajendran, Professor Dept. of Zoology, School of Biological Sciences, Central University of Kerala, Kasaragod followed by a talk on "Versatility of CRISPR-Cas technology for diagnosis and management of the virus: A plant virus perspective" by Dr. Anirban Roy, Principal Scientist Division of Plant Pathology, ICAR-Indian Agricultural Research Institute, New Delhi. Further Dr. M. Makesh, Principal Scientist ICAR-Central Institute of Brackishwater Aquaculture, Chennai spoke on "Field level diagnosis for aquaculture" The session ended with the talk by Dr. Megha Bedekar HoD and Principal Scientist AEHM Division, ICAR- Central Institute of Fisheries Education, Mumbai who delivered her talk on "Revolution of aquaculture health: Future machine learning and IoT for disease diagnosis".



A total 154 participants including 90 males and 64 females actively participated in the workshop including faculty and students of ICAR-CIFE attended in person and faculty from sister ICAR institutes through online mode. The workshop generated lot of intensive discussion among the faculty and the students and the following key points emerged from the questions raised during the workshop which were summarized by the Chairman of the workshop, Dr. P. K. Sahoo, Director ICAR-Central Institute of Freshwater Aquaculture.

- Disease prediction is need of the time and important at field
- Robust database will be the future of disease diagnosis
- Histopathology and other conventional tools are non-replaceable and should be use to comprehend the diagnostic tests
- Farmers requirement should be the base of all inventions
- While designing futurist tools like AI and machine-learning based small scale farmers must be considered
- Disease diagnosis in field level not only in quarantine system
- Developing new pathogen detection tools need to be prioritized based on economy impact of the pathogen in terms of time and money
- Diagnosis should be comprehensive, holistic and system specific

The International workshop was coordinated by Faculty of Aquatic Environment and Health Management Division Dr. Megha K. Badekar, Principal Scientist & Head, Dr. K Pani Prasad, Principal Scientist; Dr. S.P. Shukla, Principal Scientist; Dr. Vidya Shree Bharti, Senior Scientist; Dr. Kundan Kumar, Senior Scientist; Dr. Arun Sharma Scientist, Dr. Jeena K., Scientist; Dr. Saurav Kumar, Scientist and Dr. Nalini Poojary, CTO, ICAR-CIFE.

Writeshop on Fish and Shrimp Health Management for Increased Productivity and Sustainability



A writeshop on “Fish and Shrimp Health Management for Increased Productivity And Sustainability” was organized at the Aquatic Environment and Health Management Division on 14th September, 2023. The purpose of the 'Writeshop' was to provide an update based on the best available scientific information to be compiled and brought out in the form of a book in the relevant thrust area of the division. The consolidated source of information on the diverse facets of shrimp and fish health would be useful for the

students, scientists, research scholars and entrepreneurs. Dr. C.N. Ravishankar, Director & Vice Chancellor and Dr. N.P. Sahu, Joint Director, ICAR-Central Institute of Fisheries Education, Mumbai were the Patrons for the Writeshop. Dr. Megha K. Bedekar, Head, Aquatic Environment and Health Management Division was the Program Director and the Writeshop was chaired by Prof. Dr. Arun Dhar, Director, Aquaculture Pathology Laboratory, School of Animal and Comparative Biomedical Sciences, The University of Arizona. Dr. Gayatri Tripathi, Principal Scientist and Dr. Jeena K., Scientist, AEHM Division were the Organizers. Faculty members of the AEHM division constructively contributed in deliberations and decision making on the topics to be covered in the book. A total of 21 chapters were discussed for the compilation. Following faculty members were the resource persons of the Writeshop.

Dr. Megha K. Bedekar, Head, AEHMD
Dr. K. Pani Prasad, Principal Scientist, AEHMD
Dr. Gayatri Tripathi, Principal Scientist, AEHMD
Dr. S. P. Shukla, Principal Scientist, AEHMD
Dr. Vidyshree Bharti, Senior Scientist, AEHMD
Dr. Kundan Kumar, Senior Scientist, AEHMD
Dr. Arun Sharma, Scientist, AEHMD
Dr. Jeena K, Scientist, AEHMD
Dr. Saurav Kumar, Scientist, AEHMD
Dr. Nalini Poojary, Chief Technical Officer, AEHMD

Panel discussion on “Vaccine Trials: Aquaculture Perspective”

Panel discussion on “Vaccine Trials: Aquaculture Perspective” on 16 August 2023 at ICAR-CIFE was conducted. Panel discussed their opinion, inputs and strategies for bringing vaccine from industry to farms in the Indian aquaculture. Following were the members for panel discussion.

1. Dr. Ravishankar C. N. (Director/Vice-Chancellor)
2. Dr. N. P. Sahu (Joint Director)
3. Dr. Megha Bedekar (Convener and consultant)
4. Dr. Kundan Kumar (Consultant)
5. Dr. Saurav Kumar (Consultant)
6. Dr. Aparna Chaudhari (FGB)
7. Dr. Gayatri Tripathi (AEHM)
8. Dr. Ashutosh Deo (FNBP)
9. Dr. Manjusha L (FRHPHM)
10. Dr. Neha Qureshi (FEES)
11. Dr. Kapil Sukhdhane (Aquaculture)
12. Dr. Arvind Sonavne (ITMU Member)
13. Dr. S. P. Shukla (ITMU Chairperson)
14. Mr. Nitin Nikam (Entrepreneur)
15. Members from Indian Immunologicals, Hyderabad

Major points related to vaccine economic viability, safety, food safety etc were discussed.

Interactions meet between Young Scientists with Fulbright Fellow Dr. Arun K Dhar

ICAR-Central Institute of Fisheries Education, Mumbai organised an interaction meet between young scientists (below 40 years) with Fulbright Fellow Dr. Arun K. Dhar, Professor and Director, Aquaculture Pathology Laboratory, School of Animal and Comparative Biomedical Sciences, The University of Arizona on 15th September, 2023. He delivered an inspirational talk on various dynamics of how to “Build career of a young scientist”. He underlined the quality of publications in early career but also mentioned about “Publication should not be your primary goal, rather it should be to develop technology, products that farmers/industry can use and then only high-quality publication will come. Dr. Dhar illustrated some key theme to work for the young scientist as think positively, do not be afraid to dream big and very big, learn from your failure even if it was not your mistake, and do not be cynical. Career goal should be long, mid and short goal. Set up collaboration with scientists, set up goals for international fellowship at least 6 months or 1 year.



A total 24 young scientists of ICAR-CIFE including 14 males and 10 females actively participated in the interaction meet attended in person and online mode. The meet generated lot of intensive discussion among the faculty and overall, the meet makes participants feeling motivated, inspired, and enriched through various interactions. The interaction meet coordinated by Faculty of Aquatic Environment and Health Management Division Dr. Saurav Kumar, Scientist, ICAR-CIFE.

Aquatic Environment and Health division organized a Three Day Awareness cum-training program on “Health Management of Tilapia” jointly organized under National Referral Laboratory Project and National Surveillance Program on Aquatic Animal Disease (NSPAADII). Five tilapia farmers and three officials from state fisheries department, Maharashtra attended the program. The aim of the training program was to create awareness and provide the technical knowhow about fish health management. Program was inaugurated by Dr. N P Sahu, Joint Director, CIFE, who emphasized on the importance of the training on aquaculture and health management practice for farmers. Farmers shared their concerns and challenges being faced in tilapia farming. In three days training basics in presumptive disease diagnosis, important fish pathogens, best aquaculture and fish health management practices were covered. The training included lectures and practical on emerging and challenging fish pathogens, overview of national disease surveillance program, biosecurity measures, best aquaculture management practices, sampling for bacterial, fungal and parasitic disease diagnosis as well as protocols for disinfection and sanitization at tilapia site sampling, and water and soil analysis.

4.6. Invited lectures delivered

Invited Lectures Delivered (Online & Offline) in other Universities/Institutes			
Name of the Faculty	Title of Lecture	Name & Place of University/ Institute	Date
ICAR-CIFE, AE&HM Division			
Dr. Arun Sharma	Fish diseases and management practices	KVK, Gomati, Tripura	8 November, 2023
Dr. Saurav Kumar	Risk associated with biotic & abiotic stressors to fish and potential remedial approach	University of South Bohemia , Vodnany, Czech Republic	10 February, 2023
Dr. Jeena K.	Immune system of fish (Online)	University of Mumbai, Mumbai	18 September 2023
	Immunostimulants and prophylaxis (Online)	University of Mumbai, Mumbai	29 December 2023
ICAR-CIFE, FGB Division			
Dr. Mujahidkhan A. Pathan	Inbred lines and fish population genetics	Tata Institute of Fundamental Research, Mumbai	18 January, 2023
Dr. Rupam Sharma	Nanotechnology: a novel tool for aquaculture and fisheries	ICAR-NBFGR, Lucknow	14 June, 2023
	Toxicity studies using Zebrafish as vertebrate model	West Goalpara College, Assam	11 October, 2023
Dr. S. Jahageerdar	Analysis of research data employing SAS	Dr. BBKKV, Dapoli	
Dr. Annam Pavan Kumar	Barcoding and genetic conservation	CoF, C.A.U., Lembucherra, Tripura	12 December, 2023
	Molecular taxonomy	Kannur University, Kerala	22 June, 2023
	DNA fingerprinting	Kendriya Vidyalaya Sangathan, Mumbai	11 May, 2023

Dr. Aparna Chaudhari	The Biotechnology toolkit for aquaculture and fisheries	CoF, Kisanganj	20 July, 2023
	Whole genome projects - Unravelling the secrets of life Genetic and genomic resources and databases. Genetic diversity assessment and applications. Bioinformatics tools for assessing genetic diversity DNA sequencing methods, automation and analysis. Use of AI in applications of genetic resources.	GADVASU, Ludhiana	5-7 December, 2023
ICAR-CIFE, FN&BP Division			
Dr. Ashutosh D. deo	Fisheries Education and Human Resource Management	Department of Marine Science, Bharathidasan University, Tiruchirappalli	12-13 September, 2023
Dr. Manish Jayant	Strategies to enhance the utilization of cotton seed meal in aquafeed	Aurangabad, Maharashtra	7-8 July, 2023
ICAR-CIFE, FEES Division			
Dr. Shivaji Argade	Making extension & advisory services nutrition-sensitive: Linkages & capacity building	ICAR-Central Institute for Women in Agriculture, Bhubaneswar (Online)	10 January, 2023
	Women leadership development in agriculture	ICAR-Central Institute for Women in Agriculture, Bhubaneswar (Online)	24 January, 2023
Dr. Neha Wajahat Qureshi	Quantifying impact of pollution on fisheries	Sher-e-Kashmir University of Agricultural Sciences and Technology, Kashmir	21 September, 2023
ICAR-CIFE, FRM&PHM Division			
Dr. Layana P.	Trends in fish processing and preservation technologies	Veterinary College, Mumbai	27 December, 2023
Dr. Deepitha R. P.	Role of fish in human nutrition	College of Fisheries, Payyanur	16 October, 2023
Mr. Abuthagir Ibrahim S.	Topics in fisheries resources management and cracking JRF examinations	College of Fisheries Ludhiana	7-11 July, 2023
	Coral reefs and their uniqueness	Jijibai Bhosale Udayan and Zoo, Mumbai	2 September, 2023

Dr. B. B. Nayak	Dry fish quality : The commercial and regulatory requirement	Krishi Odisha	13 January, 2024
	Challenges in developing science-based standards for Indian seafood within the framework of global food standards	IFAF, Kolkata	23 February, 2024
	The exciting world of aquatic sciences	IASR conference, ICAR – CIFRI	30 August, 2023
	Principles and advances in preservation methods	SKAUST, Kashmir	22 September, 2023
	Sustainable utilisation of fish through value addition	College of Fisheries, Kishanganj	20 July, 2023
ICAR-CIFE, Rohtak Centre			
Dr. Pankaj Kumar Dr. Sreedharan K.	Formulation of SOPs for inland saline shrimp farming	Demonstration Farm-cum-Training Centre, Sri Muktsar Sahib, Punjab	17 February, 2023
Mr. Satya Prakash	Digestibility studies in fish- understanding the basic and applied aspects	Dr. J. Jayalalithaa Fisheries University, Tamil Nadu	13 March, 2023
Dr. Babitha Rani A. M.	Inland saline shrimp farming: A technology transforming aquaculture prospects in Northern India	Kisan Kalyan Pradhikaran, Haryana	29 May, 2023
	Aquaculture a way forward	International Institute of Veterinary Education and Research, Rohtak	12 July 2023
	Biofloc aquaculture: The smart and green technology towards sustainability	SKUSAT, Kashmir	4-11 September, 2023

ICAR-CIFE, Powarkheda Centre			
Dr. Sunil Kumar Nayak	Fishery: Entrepreneurship and job opportunity for ELP students	College of Agriculture, Powarkheda, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur	27 February, 2023
	Integrated fish farming and Entrepreneurship and opportunities in fish farming	College of Agriculture, Powarkheda, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur	27 March, 2023
	Freshwater aquaculture: hatchery, seed production and grow-out technologies	LINAC-NCDC, Gurugram, Haryana	03 April, 2023
	Best management practices in aquaculture	Chief Minister House, Shyamala hills, Bhopal, MP	15 May, 2023
	Freshwater aquaculture: hatchery, seed production and grow-out technologies	LINAC-NCDC, Gurugram, Haryana	07 June, 2023
	Freshwater aquaculture: hatchery, seed production and grow-out technologies	LINAC-NCDC, Gurugram, Haryana	02 August, 2023
	Fishery, Package of practices in Aquaculture and schemes of PMMSY	ACABC, IECCI NGO, Chuna Bhati, Bhopal	09 November, 2023
	Freshwater aquaculture: hatchery, seed production and grow-out technologies	LINAC-NCDC, Gurugram, Haryana	01 December, 2023
ICAR-CIFE, Kakinada Centre			
Dr. Muralidhar P. Ande	Azolla as Fish Feed	Pragathi Engineering College, Kakinada	16 February, 2023
	Towards sustainable aquaculture	P. R. Govt. College, Kakinada	4 August, 2023
Dr. Shamna N.	Feed preparation at farm	Assam	18 December, 2023

ICAR-CIFE, Kolkata Centre

Dr. G. H. Pailan	Alternative livelihood development of fisher folks in wetland areas of South 24 Parganas	Sasya Shyamala KVK, Arapanch, Sonarpur, South 24 Parganas, WB	2 February, 2023
	Feed and feeding management improved fish rearing practices.	WBUAFS, Kolkata, WB	20 February, 2023
	Low-cost fish feed preparation for ornamental fish culture	Sasya Shyamala KVK, Arapanch, Sonarpur, South 24 Parganas, WB	16 March, 2023
	Feed and feeding management of freshwater aquarium fish for colour enhancement	The University of Burdwan, Burdwan, WB	14 December, 2023
Dr. G. Biswas	Better management practices in shrimp farming Farming of bhetki	Directorate of Fisheries, Govt. of West Bengal (Online)	23 February, 2023
	Indigenous cultivable fish species	Sasya Shyamala KVK, Sonarpur, West Bengal	23 March, 2023
	Indiscriminate introduction of invasive alien species: Threats to the native fish species	Nature Environment and Wildlife Society, Kolkata (Online)	22 November, 2023
Dr. Suman Manna	Pesticides and their role on agro-ecosystem	Sasya Shyamala Krishi Vigyan Kendra, RMKVERI, Sonarpur, South 24 Parganas	21 March, 2023
	Use of different pesticides and its effect on aquatic ecosystem	Sasya Shyamala Krishi Vigyan Kendra, RMKVERI, Sonarpur, South 24 Parganas	2-3 June, 2023
	Pesticides and their effect effects on environment and aquatic ecosystem	Krishi Vigyan Kendra, Sonamukhi, Bankura	7-8 December, 2023
Dr. T. K. Ghoshal	Adoption of brackishwater aquaculture technologies by themarginal farmers as livelihood activity along the coastal West Bengal	Kakdwip Research Centre, Kakdwip, South 24 Parganas, WB	7 October, 2023
	Feed & feeding management of brackishwater finfishes and shellfishes	The University of Burdwan, Burdwan, WB	14 December, 2023

4.7. Technology Transfer, Consultancy and Advisory Services

4.7.1. Technology Licensed:

Sr. No.	Date of Signing	Licensed to	Title of the Technology	Revenue Generated (Rs.)
1.	18 April, 2023	SHARP Engineering Associates (SEA), Pune	Mechanical-cum-Biological Drum filter	1 Lakh

4.7.2. Contract Services: 2

Sr. No.	Date of Contract	Contracted to	Title of the Technology	Revenue Generated (Rs.)
1.	2 August, 2023	String Bio, Bengaluru	Probiotic medicines	2,35,044/-
2.	4 August, 2023	Indian Immunodiagnostics Limited, Hyderabad	Testing of CIFE-Flavac CIFE-Ed-vac	2,85,368/-

4.7.3. Consultancy Service:

Sr. No.	Date of Consultancy	Consultancy to	Title of the Technology	Revenue Generated (Rs.)
1.	28 December, 2023	M/S Phoenix Agrotech LLP, Borivali, Mumbai	Consultancies on Production of phycocyanin and purification	0.50 Lakh

4.7.4. Fishery Advisory Services / Consultancy etc.

- Technical support and advisory for Fish Vaccine Development provided to IIL, Hyderabad on 4 August, 2023. The advisory is provided on the mass production of vaccines for *Flavobacterium columnare* and *Edwardsiella tarda*, as well as the immunization procedure and schedule (AE&HM).
- Water health cards of 5,500 numbers were generated and necessary advisories were given to inland saline shrimp and fish farmers; Technical Advisory services to biofloc fish farmers through the feedback and problems reported through the Fisheries Department, Govt. of Kerala; Provided the technical guidance to the farmers on culture and disease aspects fish and shrimp & technical guidance to the biofloc farmers in the states of Haryana and Punjab (Rohtak Centre).
- Provided advisory to MAFA, Maharashtra, regarding ornamental fish farming and ornamental fish feed (AQC).
- Provided advisory service/Technical support to Pond, tank Biofloc farmer and setup aquarium and ornamental fish culture at Maharshi Nagar, Sonakshi Naka, Itarsi and Kalaghar, Suktawa, Narmadapuram, MP from March 2023 to December 2023 (Powarkheda).
- Provided technical advisory to Mr. Abhishekh Deshmukh and Shraddha Bashetti, two young entrepreneurs from Pune, during 2023, which helped them grab a grant worth 50 lakhs from BIRAC, DST and start their venture (FEES).
- Provided technical guidance to farmers from Sundarban areas, West Bengal, and farmers from Bihar over the telephone related to soil and water quality management (Kolkata).
- Provided technical guidance to farmers (10) from Bihar and Andhra Pradesh regarding IMC culture, feed, etc., plankton production & measurement, water quality problem & plankton Production, IMC hatchery, plankton development in pond water, unwanted fish removal & controlling green color in pond, argulus infection control, ornamental fish breeding/culture and pangas fish disease control (Kakinada Centre).

4.8. TV Talks/ Radio talks/ YouTube videos/Exhibitions/ Print Media

4.8.1. TV Talk / Radio Talk / YouTube Videos, etc.

Name of faculty	Topic	Date	Language	Program Aired on (channel etc.)
Dr. Geetanjali Deshmukhe	Freshwater Microalgae: Uses and Conservation	March 29, 2023	Marathi	Krishi darshan DD Sahyadri
Dr. Karan Kumar Ramteke	Code of Conduct for Responsible Fishing and Aquaculture	April 03, 2023	Marathi	Krishi darshan DD Sahyadri
Dr. Nalini Poojari	Digital Marketing - An excellent option to increase income for fish farmers	October 04, 2023	Marathi	Amchi Mati Amchi Mansa DD Sahyadri
Dr. T. K. Ghoshal	Climate change and disaster management in respect to fisheries	August 04, 2023	Bengali	Celebration of India's G20 Presidency Akashvani Kolkata
Mr. Ashok Kumar	Inland saline shrimp farming	October 19, 2023	Hindi	DD Kisan Studio KrishiB havan New Delhi DD Kisan
Mr. Abuthagir Iburahim. S. Dr. Neha W. Qureshi	CIFE: India's No. 1 Fisheries University	October 02, 2023		English YouTube ICAR-CIFE YouTube channel
Mr. Abuthagir Iburahim. S.	Exploring the enchanting museum of CIFE: Your ultimate virtual adventure!	May, 2023	English	YouTube ICAR-CIFE YouTube channel

4.8.2. Exhibitions Organized (Offline & Online)

Sl. No.	Name of Program	Dates	Venue	Organizer	Visitors
1.	Farmers' Fair-cum-Exhibition	3 -5 January, 2023	ICAR- National Institute of Natural Fibre Engineering and Technology, Kolkata	ICAR- NINFET, Kolkata	200+
2.	Exhibition program "Zero to Hero"	January 09, 2023	The Park Hotel, Narmadapuram, Madhya Pradesh	Narmada Jewn Dayini NGO, Narmadapuram, Madhya Pradesh	400+
3.	Versova Koli Sea Food Festival	20-22 January, 2023	Versova Koli Grounds, Mumbai	Vesava Machhimar Vividh Karyakari Sahakari Society Limited, Mumbai	1000+
4.	Innovation Festival	1-3 February, 2023	Nehru Science Centre, Worli, Mumbai	Nehru Science Centre, Mumbai	3000+
5.	Krishi Mela	14-16 February, 2023	Sasya Shyamala Krishi Vigyan Kendra (KVK), Ramakrishna Mission Vivekananda Educational and Research Institute (RKMVERI), South 24 Parganas	Sasya Shyamala KVK, RKMVERI, South 24 Parganas	300+
6.	Fish Tech Conference	2-3 March 2023	CIDCO Convention Centre, Navi Mumbai	Maharashtra Economic Development Council, Mumbai	200+
7.	Acharya Prafulla Chandra Roy Smarak Vigyan Mela Pradarshani	16-18 March, 2023	West Bengal University of Animal and Fishery Sciences, Kolkata	WBUAFS, Kolkata	200+
8.	Mahila Koli Sea food Festival	17-19 March, 2023	Versova Welfare School Ground, Mumbai	Versova Koli Mahila Samajik Sanstha, Mumbai	1000+
9.	Fish Swad	March 20, 2023	ICAR-CIFE, Mumbai	ICAR-CIFE, Mumbai	500+
10.	North East-Livestock-Aqua-Poultry Exhibition	18-20 April, 2023	Maniram Dewan Trade Centre at Guwahati, Assam	Government of Assam	200+
11.	Matsya Sampada Jagrukta Abhiyan	September 15, 2023	Brilliant convention centre, Indore, Madhya Pradesh	Department of Fisheries, Govt. of India	2000+

12.	Global Fisheries Conference 2023 and World Fisheries	20-22 November, 2023	Science City Ahmedabad, Gujarat	Coastal Aquaculture Authority, Chennai	2000+
13.	3 rd International Conference on Aquatic Animal Epidemiology (AquaEpi III)	November 29 - December 01, 2023	ICAR- National Bureau of Fish Genetic Resources (NBFGR), Lucknow	ICAR-NBFGR, NFDB, ABCS & ISAAE	235+
14.	9 th International Food Convention (IFCoN)	7-10 December, 2023	CSIR- Central Food Technological Research Institute (CFTRI), Mysore	CSIR-CFTRI, DRDO-DFRL, CSIR-IITR	1000+
15.	NAHEP farmer's meet	December 15, 2023	ICAR-CIFE, Rohtak Centre	ICAR-CIFE, Mumbai	300+