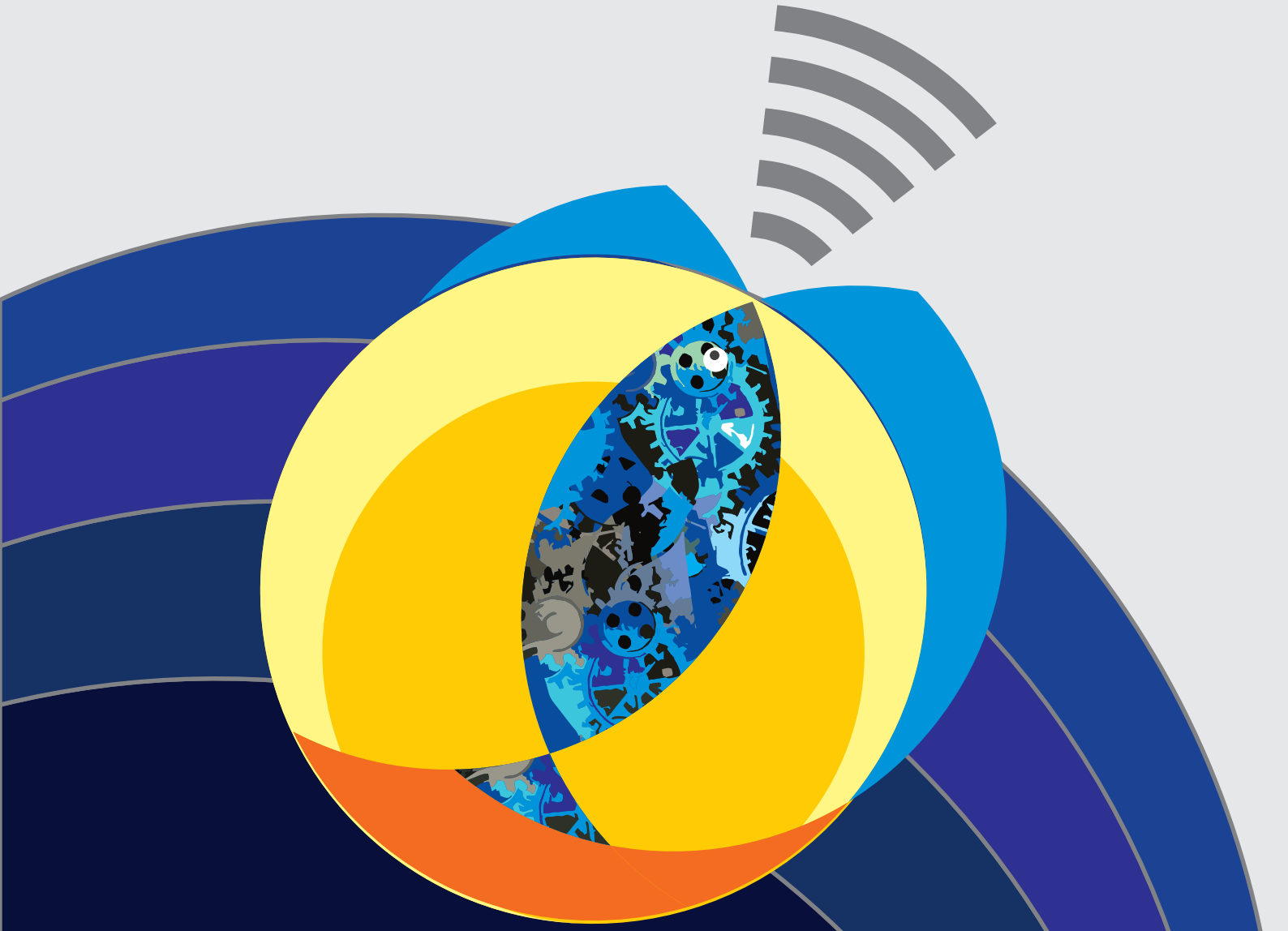
ICAR-CIFE
ANNUAL REPORT 2017-18



भा.कृ.अनु.प.-केन्द्रीय मात्स्यिकी शिक्षा संस्थान
मुंबई-भारत

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Annual Report 2017-18

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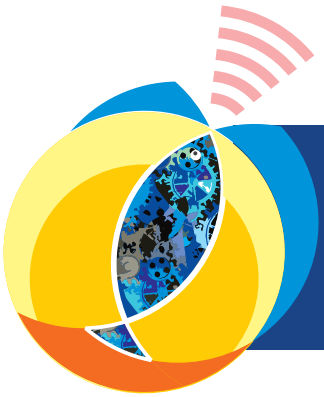


Chapter 1

Preface

Preface

Almost five and a half decades since its inception, this institute the torch bearer of higher fisheries education, continues to support the sector by creating quality human resources for fisheries and aquaculture. Very strong growth in aquaculture sector concomitant with increasing export earnings from fisheries products has drawn the attention of policy makers and researchers of the country. Fisheries education remains in the forefront to lead this sector through its active and innovative youth power. I strongly believe that technology-led aquaculture will be the driving force for future development and our pedagogy should complement the Government's initiative of "Make in India" and "Digital India". After a massive recruitment of fisheries scientists by ICAR, opening of new fisheries colleges have upheld the stride of recruitment of the professional graduates passing out from this prestigious institution. This year, students have secured 10 out of 11 ARS positions and several others got selected in the State Fisheries Department as Developmental Officers, Assistant Professors in State Agricultural Universities, Bank Officers and in the private industries. The institute bore a truly national colour with its 77 M.F.Sc. and 56 Ph.D. students representing almost all states of the country. ICAR-CIFE with its world class amenities, including the state-of-art laboratories, in-campus hostel, wi-fi connectivity, indoor sports complex, play grounds and well equipped library encourage the students to participate and interact in national and international events. Students' accomplishments are also recognized by providing institutional awards and travel grants through several endowments.

Apart from stellar academic performances of the students, the faculty of CIFE have also made outstanding scientific contributions. Twelve institutional and nine externally funded projects were successfully completed during this year. Nine institutional projects are underway and a World Bank funded multidisciplinary Mega Project (National Agricultural Higher Education Project) with a budget of Rs.1994.8 lakhs on "Development of Energy Efficient and Environment Protective Aquaculture Technologies for Degraded Soils" comprising ten research sub-components has been launched recently. Additionally, 12 externally funded ongoing projects worth 737 lakhs, which also include one International Multi-country Project including UK, Bangladesh and Malawi funded by DBT-BBSRC and three National Network Projects are the important components of CIFE's focus.

The thrust research areas of the institute encompass disease prediction in *Litopenaeus vannamei*, antimicrobial resistance monitoring in aquaculture, up-scale production trials of DNA vaccine against WSSV for shrimps, development of a bicistronic DNA vaccine construct for protection against *Edwardsiella tarda*, nano-diagnostics for betanoda virus infection, health assessment of fish reared in cage culture ecosystem, selective breeding of *Clarias magur*, leaf-meal based feed for fish, waste utilization and value addition, seafood safety, value chain analysis for farmed shrimp and disaster management strategy and cataloguing the socio-economic profile of fisher community of Maharashtra. These research efforts have resulted in the publications of 161 research papers in peer reviewed national and international journals with an average NAAS rating of 6.21 including five book chapters, 14 popular articles and 33 technical bulletins. The

National Policy on Inland Fisheries and Aquaculture was drafted first time in the country after a series of expert consultations, where CIFE steered Zonal Stakeholder Consultation along with DADF, New Delhi and local State Fisheries Departments.

The efforts of CIFE for livelihood generation by imparting need based training to the farmers have been well recognised by the State Governments such as Haryana, Punjab, Bihar and Maharashtra. A total of 84 Short Training Programs (STP) and Skill Development Programs (SDP) were organized that have benefitted 2629 farmers and young entrepreneurs from all over the country. The trainings and awareness programs were conducted at North-Eastern Hill (NEH) region and other programs for the welfare of SC/ST/OBC and tribal communities under Tribal Sub Plan (TSP) in which more than 1800 participants were trained.

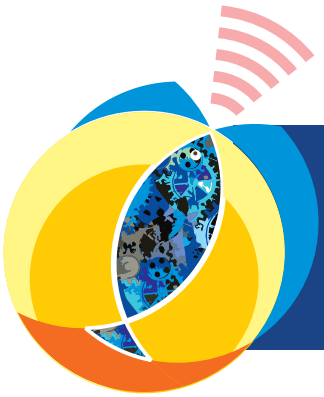
The centers of CIFE enact a vital onus in scheduling training and diploma courses. CIFE along with different centers has made its PAN India existence for developing technologies to cater the need of the different geographical regions and the whole country as well. In this context, our newly inaugurated centre at Motipur, Bihar will augment the skilled human resources required for "Blue Revolution" in the most potential eastern region of the country as envisioned by our Hon'ble Prime Minister. The land mark achievement of acquiring the ownership of the land of Powarkheda centre in the name of CIFE from the state Govt. of Madhya Pradesh will definitely boost up our research and training activities in the freshwater domain. Besides, we have also created Centre Advisory Committees for each of the centre first time for further strengthening our activities in research, teaching and extension in the different regions.

ICAR-CIFE has established close linkages with several international and national institutions for technology transfer and dissemination, faculty training, student exchange program and curriculum development. More than 10 MOUs have been signed with organizations such as State Agricultural Universities, Private Industries and State Fisheries Department of UP, Institute of Livelihood and Training, Hyderabad which will focus our prominence in national and international arena.

We gratefully acknowledge the constant and unceasing support, guidance and immense encouragement by Dr. Trilochan Mohapatra, Secretary, DARE & DG, ICAR in all our endeavors. We are grateful to Dr. J. K. Jena, DDG (Fisheries Science) for his constant help and benevolence in all our activities. Being an educational institute under ICAR, constant encouragement and support from Dr. N.S. Rathore, DDG (Agricultural Education) is duly acknowledged. We are indebted to the Members of Board of Management, Chairman and Member of Research Advisory Committee, Members of Academic Council, Institute Research Council, Extension Council, Board of Examiners and other institute level committees for their co-operation and encouragement. I especially acknowledge the support of Team CIFE, and congratulate the publication team for bringing out this wonderful compilation of our annual activities.

I, on behalf of *CIFE-PARIVAR,* offer our heartfelt condolence on the sudden demise of Dr. E.G. Silas present Chairman of Research Advisory Committee. CIFE will always remain grateful to him for his scrupulous guidance and immense contribution towards the development of this institute. We pray to the Almighty to rest his noble soul in peace.

(Gopal Krishna)
Director/Vice-Chancellor



Chapter 2

Executive Summary

Executive Summary

ICAR-CIFE is a distinguished academic institution known for its excellence in teaching and research in the field of fisheries science. As a Deemed University, ICAR-CIFE strives to achieve global standards through cutting-edge research, education and technology development in fisheries. The institute with its highly trained faculty and modern infrastructure, is well equipped to impart quality post graduate education in 11 disciplines. The institute has six divisions and five research centers, one each at Kakinada (Andhra Pradesh), Powarkheda (Madhya Pradesh), Kolkata (West Bengal), Rohtak (Haryana) and Motipur (Bihar) and is actively engaged in region-specific fisheries research, training and extension. The recently established center in Motipur, Bihar will boost research, across the eastern part of India, that is the seat of second blue revolution in the country. Further, CIFE also acquired 5 acres of land from the state government for strengthening its field activities at Powarkheda center. The online admission process was introduced for the first time in which 77 masters and 56 Ph.D. students registered online. In 2017-18, 67 masters and 22 Ph.D. students successfully completed their degree programs. Students passed out from the institute have been well placed in agricultural research service (ARS) (11), state fisheries departments (17), State Agricultural Universities (11), public sector banks (3), private industries (6) and overseas (3), while the remaining students opted for higher studies for better career opportunities.

ICAR-CIFE is engaged in research on a wide spectrum of fisheries science. Inland saline water aquaculture is the flagship program of ICAR-CIFE and the technology developed and standardized has benefitted a large number of farmers in different states of India including Maharashtra, Haryana, Punjab and Rajasthan. In 2017-18, the institute was awarded a multidisciplinary research project funded by World Bank through National Agricultural Higher Education Project (NAHEP) on inland saline aquaculture with an outlay of Rs. 19.94 crores. Twenty-one institutionally funded projects were in operation in 2017-18, of which 12 projects were successfully completed and 9 other projects are in progress. The research at the institute is focused on enhancing the aquaculture production and the productivity, sustainable aquaculture and capture fisheries, reduction of post harvest losses and waste utilization, risk analysis, value addition to fishery products, monitoring and management of infectious diseases of cage cultured fish, leaf meal-based feed development and species cataloguing by DNA barcoding. Further, the institute is actively engaged in market and value chain analysis, disaster management studies and extension education. Some of the research breakthroughs include development of vaccine for shrimp against WSSV and a bicistronic DNA vaccine against *Edwardsiella tarda* infection in carps, which are in the field trial stage, development of inbred lines of zebrafish, biofloc-based shrimp rearing system, development of water filtration

system etc. The institute is involved in network projects on disease surveillance, antimicrobial resistance monitoring in aquaculture, and development of national repository of shrimp infectious agents. The institute is also engaged in consultancy and contract research projects.

In the year under report, the institute published 161 research papers in peer reviewed scientific journals, of which 77 were published in international journals and 84 in national journals with total and average NAAS factors of 1001 and 6.21, respectively. Other publications include one book, 5 book chapters, 14 popular articles, 28 training manuals and 33 technical bulletins. In addition to teaching and research, we offer diploma and skill development programs with the aim of enhancing the skill of youths engaged in fisheries sector. The training programs conducted by ICAR-CIFE included skill development programs (84), programs under TSP (11), Center for Advanced Faculty Training (CAFT), winter and summer schools (4) and training programs under NEH funding (4). A total of 2629 individuals were trained under different training programs. The efforts of ICAR-CIFE in farmers' training, popularization of aquaculture and skill development programs have been appreciated by the Governments of Maharashtra, Bihar, Haryana and Punjab.

Currently, 82 scientists are in position against 104 sanctioned vacancies, supported by 75 technical personnel and 249 staff from administration, finance and other sections. Sixteen persons including two scientists retired and 26 were promoted during this year. During the annual day, the outstanding efforts of the faculty were honored with institutional awards for research, teaching and institutional building activities. The institute successfully conducted meetings of Research Advisory Committee (RAC), Institutional Research Committee (IRC), Academic Council (AC), Extension Council and Board of Management (BOM). The institute formulated a policy on inland fisheries and aquaculture in association with DADF, New Delhi. The institute celebrated Vigilance Awareness Week, Yoga Day, Hindi Pakhwada, Industry Day, Farmer's Day, Sadbhavana Diwas, Republic and Independence Days. Some of the institutional building activities in 2017-18 include plantation around the campus, replacement of fluorescent lights with LED lights, strengthening of CIFE centers with faculty and equipment, and purchase of library books. In ICAR zonal sports meet, CIFE won nine gold and two silver medals, and also the “Best Woman Athlete of the ICAR-West zone Award”. CIFE won one gold and two silver medals in the ICAR-Inter Zonal Sports Meet.

CIFE is making rapid strides towards achieving the goals of education and research with the help of its committed faculty, brilliant students and dedicated staff. The support from ICAR headquarters and cooperation from sister institutions is helping the institute in its endeavor of supplying qualified and trained human resources for the country in general and the fisheries sector in particular.

कार्यकारी सारांश

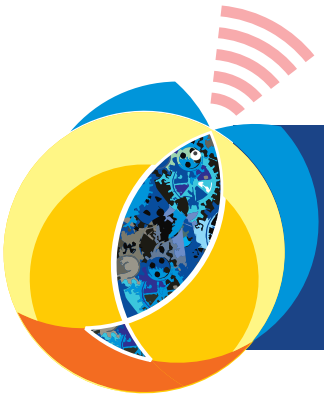
भा.कृ.अनु.प. - के.मा.शि.सं. एक प्रतिष्ठित शैक्षणिक संस्थान है जो मत्स्य विज्ञान के क्षेत्र में तथा शिक्षण एवं अनुसंधान के क्षेत्र में उत्कृष्टता के लिए जाना जाता है । यह एक समतुल्य विश्वविद्यालय है जो कि मत्स्य पालन के क्षेत्र में नवीनतम अनुसंधान, शिक्षा एवं प्रौद्योगिकी विकास के माध्यम से वैश्विक मानकों को हासिल करने में अग्रसर है । यह संस्थान अपनी उच्च प्रशिक्षण सेवाओं एवं आधुनिक आधारभूत संरचना के साथ भारत एवं विदेशी छात्रों का मत्स्य विज्ञान के ग्यारह विषयों में गुणवत्तापूर्ण शिक्षा प्रदान करने हेतु पूर्णत: सुसज्जित है । इस संस्थान में छ: विभाग एवं पांच शोध केन्द्र हैं जो काकिनाड़ा (आंध्रप्रदेश), पवारखेड़ा (मध्यप्रदेश), कोलकाता (प.बंगाल), रोहतक (हरियाणा) एवं मोतीपुर, मुज्जफरपुर (बिहार) में स्थित हैं । उक्त सभी केन्द्र सक्रिय रूप से मत्स्य पालन अनुसंधान, प्रशिक्षण एवं विस्तार गतिविधियों में संलग्न है । मोतीपुर केन्द्र को हाल ही में भारत के उत्तरी हिस्सों में अनुसंधान एवं प्रशिक्षण को बढ़ावा देने के लिए स्थापित किया गया है । इस केन्द्र की स्थापना के साथ ही के.मा.शि.सं. ने पवारखेड़ा केन्द्र हेतु मध्यप्रदेश राज्य सरकार से अपनी मत्स्य अनुसंधान गतिविधियों के लिए पांच एकड़ जमीन का अधिग्रहण भी हासिल किया है । प्रथम ऑनलाइन प्रवेश प्रक्रिया के माध्यम से 77 स्नातकोत्तर छात्रों एवं 56 पीएच.डी. छात्रों का पंजीकरण किया गया । वर्ष 2017-18 में 67 स्नातकोत्तर एवं 22 पीएच.डी. छात्रों ने डिग्री प्राप्त की है । भा.कृ.अनु.प. - के.मा.शि.सं. के 11 स्नातकोत्तर छात्र कृषि अनुसंधान सेवाओं में, 17 राज्य मात्स्यिकी विभाग, 11 राज्य मात्स्यिकी महाविद्यालय तथा विश्वविद्यालय, 3 सार्वानिक क्षेत्र के बैंक, 6 निजी उद्योगों तथा 3 विदेशी पदों पर चयनित होकर कार्य कर रहे हैं । इसके साथ ही अन्य सभी छात्र मात्स्यिकी में उच्च शिक्षा प्राप्त कर अपना भविष्य संवार रहे हैं । भा.कृ.अनु.प.- के.मा.शि.सं. द्वारा बड़े स्तर पर मात्स्यिकी विज्ञान में अनुसंधान कार्य किया जा रहा है ।

अंतरस्थलीय लवणीय जलकृषि, भा.कृ.अनु.प. - के.मा.शि.सं. का एक प्रमुख कार्यक्रम है जिसमें विकसित प्रौद्योगिकी तथा मानकीकरण द्वारा विभिन्न राज्यों के साथ हरियाणा, पंजाब तथा राजस्थान के किसान लाभान्वित हुए हैं । 2017-18 में संस्थान को 19.94 करोड के व्यय के साथ अंतरस्थलीय लवणीय जलकृषि पर राष्ट्रीय कृषि उच्च शिक्षा परियोजना (NAHEP) द्वारा बहुआयामी अनुसंधान परियोजना से सम्मानित किया गया । 2017 में 21 संस्थागत वित्त पोषित परियोनाएं प्रारंभ की गईं जिनमें से वर्ष 2018 में 12 परियोजनाएं सफलतापूर्वक पूर्ण की गईं और 9 अन्य परियोजनाएं प्रगति पर हैं । संस्थान में अनुसंधान परियोजनाएं जलकृषि विस्तार तथा उत्पादकता में वृद्धि, टिकाऊ जलकृषि तथा प्रग्रहण मात्स्यिकी, प्रग्रहणोपरांत नुकसान में कमी, अवशिष्ट का उपयोग, जोखिम विश्लेषण, मात्स्यिकी उत्पाद के मूल्यवर्धन संबंधित मत्स्य तथा पिंजडा संवर्धित मछली में संक्रमित रोगों की जाँच, पत्ता आहार पर आधारित आहार विकास तथा प्रजातियों पर डी एन ए बारकोडिंग विषयों पर केन्द्रित थीं । इसके अलावा संस्थान सक्रिय रूप से बाजार और मूल्य शृंखला विश्लेषण, आपदा प्रबंध अध्ययन व विस्तार शिक्षा में संलग्न है । के.मा.शि.सं. द्वारा बाजार एवं मूल्य शृंखला विश्लेषण, आपदा प्रबंधन अध्ययन एवं विस्तार शिक्षा भी प्रदान की जाती है । संस्थान द्वारा किए गए कुछ प्रमुख शोध उपलब्धियों में डब्ल्यू.एस.एस.वी. से बचाव हेतु श्रिम्प के लिए वैक्सीन एवं कार्प में एडवर्डसिला टार्डा संक्रमण से बचाव हेतु बायसिस्ट्रोनिक डीएनए वैक्सीन का विकास किया जा रहा जो कि प्रायोगिक चरण में है ।

संस्थान द्वारा उत्कृष्ट रुप से समीक्षित 161 शोध पत्रों का प्रकाशन किया गया है जिसमें 77 अन्तरराष्ट्रीय जर्नल्स में एवं 84 राष्ट्रीय जर्नल्स में प्रकाशित हुए जिसका राष्ट्रीय कृषि विज्ञान अकादमी (NAAS) गुणक क्रमश:

1001 एवं 6.21 रहा । अन्य प्रकाशनों के अंतर्गत एक किताब, 5 अध्याय, 14 प्रसिध्द लेख, 28 प्रशिक्षण मैन्युअल एवं 33 तकनीकी बुलेटिन प्रकाशित हुए । इसके साथ मात्स्यिकी क्षेत्र में कार्यरत युवाओं हेतु संस्थान द्वारा कौशल विकास कार्यक्रम के माध्यम से उनके कौशल का विकास किया जाता है । भा.कृ.अनु.प.- के.मा.शि.सं. द्वारा कौशल विकास कार्यक्रम (84), आदिवासी उपयोजना (TSP) (11), उन्नत संकाय प्रशिक्षण केन्द्र (CAFT), शीत एवं ग्रीष्म स्कूल (4), उत्तरपूर्वी पर्वतीय क्षेत्र (NEH) के अंतर्गत (4), प्रशिक्षण कार्यक्रम आयोजित किए गए । संस्थान द्वारा कुल 2629 प्रशिक्षणार्थियों को विभिन्न प्रशिक्षण कार्यक्रमों के अंतर्गत प्रशिक्षित किया गया । भा.कृ.अनु.प.- के.मा.शि.सं. द्वारा किसानों के प्रशिक्षण, जलकृषि का प्रसार एवं कौशल विकास कायक्रमों के क्षेत्र में किए जा रहे है सराहनीय प्रयासों को महाराष्ट्र, बिहार, हरियाणा एवं पांजब सरकार द्वारा प्रशंसित किया गया ।

वर्तमान में संस्थान में वैज्ञानिकों हेतु स्वीकृत 104 पदों में से 82 वैज्ञानिक, 75 तकनीकी एवं प्रशासन, वित्त एवं अन्य विभागों के 249 कर्मचारी / अधिकारी कार्यरत हैं । इस वर्ष 2 वैज्ञानिकों सहित 16 कर्मचारी सेवानिवृत्त हुए एवं 26 पदोन्नत हुए । संस्थान द्वारा इस वर्ष के दौरान वैज्ञानिक / अधिकारी एवं कर्मचारियों को अनुसंधान, अध्ययन एवं संस्थागत उन्नयन हेतु किए गए असाधारण योगदान हेतु सम्मानित किया गया । संस्थान द्वारा इस वर्ष अनुसंधान सलाहकार समिति (RAC), शैक्षणिक परिषद (AC), विस्तार परिषद एवं प्रबंधन बोर्ड (BOM) की बैठकों का सफलतापूर्वक आयोजन किया गया । संस्थान द्वारा पशुपालन, डेयरी एवं मात्स्यिकी विभाग (DADF), नई दिल्ली के सहयोग से अंतरस्थलीय मात्स्यिकी एवं जलकृषि के लिए नीति-निर्माण किया गया । संस्थान द्वारा इस वर्ष सतर्कता जागरुकता सप्ताह, योग दिवस, उद्योग दिवस, सद्भावना दिवस, हिन्दी पखवाड़ा, गणतंत्र दिवस एवं स्वतंत्रता दिवस भी मनाए गए । इसी के साथ ही संस्थान परिसर में अधिकांश स्थानों पर पौधारोपण किया गया, फ्लूरोसेन्ट की जगह एल.ई.डी. बल्ब लगाए गए, संकायों एवं आधुनिक उपकरणों के माध्यम से संस्थान के केन्द्रों को और मजबूत बनाया गया। भा.कृ.अनु.प. क्षेत्रीय खेल स्पर्धा में के.मा.शि.सं. को 9 स्वर्ण एवं 2 रजत पदकों के साथ ही "भा.कृ.अनु.प. पश्चिम क्षेत्र सर्वश्रेष्ठ एथलीट" का पुरस्कार भी प्राप्त हुआ। संस्थान को भा.कृ.अनु.प.- अंतरक्षेत्रीय खेल स्पर्धा में एक स्वर्ण एवं दो रजत पदक प्राप्त हुए । भा.कृ.अनु.प.- केन्द्रीय मात्स्यिकी शिक्षा संस्थान अपने प्रतिबध्द संकाय, प्रतिभाशाली छात्रों एवं समर्पित स्टाफ के माध्यम से शिक्षा एवं अनुसंधान के लक्ष्यों की प्राप्ति की ओर सतत अग्रसर है । भारतीय कृषि अनुसंधान परिषद मुख्यालय एवं सम्बद्ध संस्थानों का केन्द्रीय मात्स्यिकी शिक्षा संस्थान द्वारा विशेषकर मात्स्यिकी क्षेत्र के अंतर्गत देश में योग्यतम मानव संसाधन को उपलब्ध कराने में महत्वपूर्ण सहयोगात्मक योगदान रहा है।



Chapter 3

Introduction

Introduction

Central Institute of Fisheries Education (CIFE) was established as a training center in 1961 under the administrative control of Ministry of Agriculture to promote fisheries education in the country by training officials of the state governments. In 1979, the institute was transferred to ICAR with the mandate of imparting fisheries education. The institute was granted the Deemed-to-be University status in 1989, offering post graduate education across 11 disciplines in fisheries science. Apart from post graduate education, the institute offers certificate courses and skills development programs. With the state-of-the-art facilities and laboratories, the institute has emerged as a center of excellence in HRD by producing competent manpower and catering to the needs of fisheries sector with its research in frontier areas of fisheries science. The activities of the institute are aligned in line with the national mandate of increasing fish production and farmers' income, with an ultimate goal of ensuring nutritional security. Apart from teaching and research, the institute plays a pivotal role in expansion of fisheries activities, enhancement of competence of fisheries professionals and dissemination of technology through training programs and extension activities.

Mission

To achieve academic and research excellence

Mandate

- Conduct post-graduate programmes in fisheries science
- Basic and strategic research in frontier areas of fisheries science
- Human Resource Development, capacity building and skill development through training, education & extension

Vision

To be a world-class organisation providing leadership in fisheries education and research

3.2. Organogram

ICAR-CIFE, Mumbai

- Board of Management
- Research Advisory Committee
- Institute Research Council
- Academic Council
- Extension Council

Director and Vice-Chancellor

Joint Director

DIVISIONS	OFFICE/ ACCOUNTS	CENTRES	SECTIONS	CELLS	CAFT
Aquaculture	Joint Director (Admn.)	Kakinada, Andhra Pradesh	Administration	Academics	
Fisheries Resources, Harvest and Post-harvest Management	Chief Finance & Accounts Officer	Kolkata, West Bengal	Finance and Accounts	Examination	
Fish Nutrition, Biochemistry and Physiology	Senior Administrative Officer	Powarkheda, Madhya Pradesh	Library	PME	
Aquatic Environment and Health Management	Finance & Accounts Officer	Rohtak, Haryana	Hindi	ICT	
Fish Genetics and Biotechnology		Motipur, Bihar	Stores	ITMU	
Fisheries Economics Extension and Statistics			Vehicles	PDCC	
			Works	Students Welfare	
				International Relations	
				Vessel Management	
				NEH	
				HRD	
				Consultancy	

Board of Management

Chairman
Dr. Gopal Krishna

Members
Dr. A. Gopalkrishnan
Dr. P. Paul Pandian
Mr. Devendra Kumar
Dr. K. K.Vijayan
Dr. N. P. Sahu
Dr. S. N. Ojha
Mr. Mahesh Khubdikar
(Member Secretary)

Research Advisory Committee

Chairman
Dr. E.G. Silas

Members
Dr. J.K. Jena
Dr. Gopal Krishna
Dr. T.K. Srinivasa Gopal
Dr. P.N. Pandey
Dr. Sridhar Sivasubbu
Dr. Indrani Karunasagar
Dr. K. Pani Prasad
(Member Secretary)

Academic Council

Chairman
Dr. Gopal Krishna

Members
Dr. M. V. Gupta
Dr. K. M. Bujarbaruah
Dr. N. S. Rathore
Dr. Ravi Shankar C. N.
Dr. A. K. Singh
Dr. B. K. Das
Dr. N. P. Sahu
Dr. N. K. Chadha
Dr. K. V. Rajendran
Dr. Aparna Chaudhari
Dr. B. B. Nayak
Dr. S. N. Ojha
Dr. K. K. Jain
Dr. Kiran Dubey Rawat
Dr. B.K. Mahapatra
Dr. Nalini Ranjan Kumar
Dr. Gayatri Tripathi
Dr. K. Pani Prasad
Dr. P. P. Srivastava
Dr. Ashok Jaiswar
Dr. Rupam Sharma
Dr. Swadesh Prakash
Dr. Subodh Gupta
Dr. Zeba Abidi
Dr. Sanath Kumar
Dr. Ashutosh Deo
Dr. Pavan Kumar
Mr. Hari Krishna
Dr. S. K. Nayak
President, PGSSU
Representative of ACM of PGSSU
Mr. Mahesh Khubdikar
(Member Secretary)

Extension Council

Chairman
Dr. Gopal Krishna

Members
Dr. Paul Pandiyan
Mr. Madhukar Gaikwad
Dr. P. Jayasankar
Dr. A. K. Singh
Mr. Vinod Naik
Dr. N. P. Sahu
Dr. N. K. Chadha
Dr. K. V. Rajendran
Dr. B. B. Nayak
Dr. S. N. Ojha
Dr. S. Jahageerdar
Dr. V. K. Tiwari
Dr. Ashutosh Deo
Dr. Amjad Balange
Dr. Swadesh Prakash
Dr. Ananthan P. S.
Dr. Hari Krishna
Dr. Arpita Sharma
(Member Secretary)

3.3. Staff Position (2017-18)

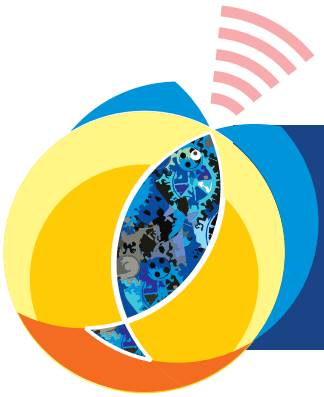
Category Wise

CIFE Staff	Sanctioned	In position	Vacant
RMP	02	01	01
Scientific	104	82	22
Technical	106	75	31
Administrative	64	42	22
Skilled Supporting	69	48	21
Non Ministrial	01	01	00
Total	**346**	**268**	**78**

3.4. Budget (2017-18) (Rs. in Lakh)

S. No.	Head	Sanctioned/ Balance C/f	Received	Expenditure Incurred
1.	Institute Expenditure	5,987.85	6,422.60	5,838.51
2.	CAFT	-	28.87	7.84
3.	SDU	-	624.26	476.50
4.	Externally Funded Projects	245.13	199.32	184.58
	Total	**6,232.98**	**7,275.05**	**6,507.43**

Revenue generation Rs. 75.62



Chapter 4

Academic Achievements

4.1. Enrollments

A total of 56 and 77 students have enrolled for the doctoral and master degree programmes respectively including one foreign student from Bangladesh for the Ph.D. programme, one student from Nigeria has enrolled for the Post-doctoral programme.

M. F. Sc. (Batch 2017-2019)

Sr.No.	Name of the Programme	No. of students enrolled
1.	Aquaculture (AQC)	12
2.	Fisheries Resource Management (FRM)	08
3.	Post Harvest Technology (PHT)	07
4.	Fish Nutrition and Feed Technology (FNT)	06
5.	Aquatic Environmental Management (AEM)	06
6.	Fish Genetics and Breeding (FGB)	06
7.	Fish Physiology and Biochemistry (FPB)	06
8.	Aquatic Animal Health Management (AAH)	08
9.	Fish Biotechnology (FBT)	06
10.	Fisheries Economics (FEC)	06
11.	Fisheries Extension (FEX)	06
	Total	**77**

Ph. D. (Batch 2017-2020) -

Sr.No.	Name of the Programme	No. of students enrolled
1.	Aquaculture (AQC)	13
2.	Fisheries Resource Management (FRM)	09
3.	Post Harvest Technology (PHT)	06
4.	Fish Nutrition and Feed Technology (FNT)	04
5.	Aquatic Environmental Management (AEM)	03
6.	Fish Genetics and Breeding (FGB)	03
7.	Fish Physiology and Biochemistry (FPB)	02
8.	Aquatic Animal Health Management (AAH)	06
9.	Fish Biotechnology (FBT)	04
10.	Fisheries Economics (FEC)	02
11.	Fisheries Extension (FEX)	04
	Total	**56**

4.2 Foreign Students Enrolled in 2017-2018

Name of the student	Institution and place	Division attached to
Post-doctoral (DBT-TWAS)		
Mr. Oluwagbenga Olanrewaju Olude	Federal University of Agriculture, Abeokuta, Ogun State, Nigeria	Fish Nutrition, Biochemistry & Physiology
Ph.D.		
Mr. Mritunjoy Paul	Bangladesh Fisheries Research Institute, Bangladesh	Fish Nutrition, Biochemistry & Physiology

4.3. Results

A total of 67 students successfully completed the Master's programme and 22 students were awarded the Ph.D. degree under various disciplines as follows:

List of passed-out students during the year 2017

M. F. Sc.

Sr.No.	Name of the Programme	No. of successful students
1.	Aquaculture (AQC)	10
2.	Fisheries Resource Management (FRM)	09
3.	Post Harvest Technology (PHT)	05
4.	Fish Nutrition and Feed Technology (FNT)	05
5.	Aquatic Environmental Management (AEM)	05
6.	Fish Genetics and Breeding (FGB)	05
7.	Fish Physiology and Biochemistry (FPB)	05
8.	Aquatic Animal Health Management (AAH)	07
9.	Fish Biotechnology (FBT)	04
10.	Fisheries Economics (FEC)	06
11.	Fisheries Extension (FEX)	06
	Total	**67**

M.F.Sc. -

Ph. D.

Sr.No.	Name of the Programme	No. of successful students
1.	Aquaculture (AQC)	03
2.	Fisheries Resource Management (FRM)	04
3.	Post Harvest Technology (PHT)	03
4.	Fish Nutrition and Feed Technology (FNT)	01
5.	Aquatic Environmental Management (AEM)	01
6.	Fish Physiology and Biochemistry (FPB)	03
7.	Aquatic Animal Health Management (AAH)	03
8.	Fish Biotechnology (FBT)	02
9.	Fisheries Economics (FEC)	01
10.	Fisheries Extension (FEX)	01
	Total	**22**

Ph.D.

4.4. List of Dissertations Submitted by M. F. Sc. Students

Sr. No	Name of the student Registration no.	Major adviser	Topic
1. Aquaculture			
1	Ms. Sonia AQC-MA5-01	Dr. N. K. Chadha	Effect of pulsed feeding in GIFT strain of tilapia under biofloc technology using inland saline water
2	Ms. Meenu Devassykutty AQC-MA5-02	Dr. V. K. Tiwari	Evaluation of growth and survival of *Ompok pabda* (Hamilton,1822) larvae under different stocking densities and feeding regimes
3	Mr. Syam K. R. AQC-MA5-04	Dr. Paramita B.Sawant	Study on molecular differentiation and colour variation in oscar, *Astronotus ocellatus* (Agassiz, 1831)
4	Ms. Peersaba Manzoor AQC-MA5-05	Dr. Babitha Rani A. M.	Gonadal maturation and physiological response of *Cyprinus carpio* (Linnaeus, 1758) in biofloc systems fed with varying dietary lipid content
5	Mr. Himanshu B. AQC-MA5-06	Dr. Paramita B. Sawant	Study of molecular differentiation and colour variation in discus, *Symphysodon* spp. (Pellegrin, 1904)
6	Mr. Pranaysree P.Kumar AQC-MA5-07	Dr. Subarata Dasgupta	Photothermal manipulation of gonad recrudescence in *Trichogaster lalius* (Hamilton 1822)
7	Ms. Hogaina Panmei AQC-MA5-09	Dr. Babitha Rani A.M	Assessment of egg and larval quality of Pabda catfish, *Ompok pabda* (Hamilton, 1822) bred with different inducing agents
8	Ms. Neethu M AQC-MA5-10	Dr. Kiran Dube Rawat	Exogenous methylfarnesoate supplementation and its effect on moulting and maturation of freshwater prawn, *Macrobrachium rosenbergii* (De man,1879)
9	Ms. Dasari Mamatha AQC-MA5-11	Dr. A. K.Verma	Zero water exchange system for *Labeo rohita* (Hamilton, 1822) spawn and fingerling production
10	Mr. Sachin Sahu AQC-MA5-12	Dr. Subhendu Datta	Effect of water temperature and pH on growth and survival of *Trichogaster lalius* (Hamilton, 1822) under captivity
2. Fisheries Resources Management			
11	Mr. Suraj Kumar Pradhan FRM-MA5-01	Dr. Latha Shenoy	Gillnet fishery and resource mapping of Bhayander estuary, Maharashtra
12	Mr. S. Abuthagir Iburahim FRM-MA5-02	Dr. Latha Shenoy	Dol net fishery and resource mapping of Karanja estuary, Maharashtra
13	Mr. Imtiaz Ahmed FRM-MA5-03	Dr. Asha T. Landge	Study of fish assemblage and tropic status of Mer beel (Wetland) in Morigaon district, Assam
14	Ms. Suman Takar FRM-MA5-04	Dr. Geetanjali Deshmukhe	Intertidal biodiversity of mangrove ecosystem around Mumbai coast
15	Mr. Chennuri Satish FRM-MA5-05	Dr. A. K. Jaiswar	Taxonomic review of Genus Metapenaeus Wood-Mason, 1981 from Indian waters using morphological and molecular tools

16	Mr. Rinchen Nopu Bhutia FRM-MA5-06	Dr. Asha T. Landge	Stock structure analysis of *Ailia coila* (Hamilton, 1822) in selected stretches of Ganga and Brahmaputra riverine system, India
17	Mr. Sri Hari M. FRM-MA5-07	Dr. Zeba Jaffer Abidi	An interdisciplinary studies on stock structure analysis of *Chanos chanos* (Forsskal,1775) Sinhabiting in Indian waters
18	Mr. Dayal Devadas FRM-MA5-08	Dr. A. K. Jaiswar	A taxonomic study of shrimps of subfamily Sergestinae (family: Sergestidae) from Indian waters
19	Mr. Amulya Kakati FRM-MA5-09	Dr. Zeba Jaffer Abidi	Ichthyofaunal diversity of selected floodplain wetlands (Beels) of Karmrup district, Assam with special emphasis on conservation
3. Post-Harvest Technology			
20	Ms. Jerusha S. PHT-MA5-01	Dr. Sanath Kumar H	Bio-control of histamine-forming Gram-negative bacteria in seafood
21	Mr. Soumya Pradhan PHT-MA5-02	Dr. B. B. Nayak	Survivability of microaerophilic bacterial pathogens in seafood
22	Mr. Dipin K. M. PHT-MA5-03	Dr. Sanath Kumar H	Efficacy of selected natural antimicrobials for and control of *Listeria monocytogenes* in fish and processing environment
23	Ms. Lekshmi S. PHT-MA5-04	Dr. A. K. Balange	Use of seaweed extract as natural preservative for chill stored fish
24	Mr. Toni Apang PHT-MA5-05	Dr. K. A. Martin Xavier	Effect of natural preservatives in icing medium for quality enhancement of chilled mackerel
25	Mr. Subal Kumar Ghosh PHT-MA5-06	Ms. Manjusha L.	Occurrence of adenoviruses in seafood in Mumbai
4. Fish Nutrition & Feed Technology			
26	Mr. Chetan Kumar Garg FNT-MA5-01	Dr. N. P. Sahu	Studies on growth and immune responses of *Labeo rohita* (Hamilton, 1822) fed with *Houttuynia cordata* leaf
27	Mr. Sheikh Irfan Rasool FNT-MA5-02	Dr. K. K. Jain	Differential expression study of growth and immune genes in *Danio rerio* (Hamilton, 1822) fed with graded levels of protein
28	Mr. Prasanta Jana FNT-MA5-03	Dr. G. H. Palian	Evaluation of formulated dietary supplements for gonadal inhibition and growth in *Labeo bata* (Hamilton, 1822)
29	Ms. Shweta Meshram FNT-MA5-04	Dr. Ashutosh D. Deo	Utilisation of treated sweet potato leaf meal as a replacer of deoiled rice bran in the diet of *Labeo rohita* (Hamilton, 1822)
30	Mr. Yogananda T. FNT-MA5-06	Dr. Ashutosh D. Deo	Utilization of *Leucaena leucocephala* (Subabul) leaf meal as a replacer of deoiled rice bran in the diet of *Labeo rohita* (Hamilton, 1882) fingerlings
5. Aquatic Environment Management			
31	Ms. Jyoti Matolia AEM-MA5-01	Dr. S. P. Shukla	Evaluation of toxicity of triclosan towards freshwater microalgae and its removal using column mode device
32	Mr. Ashutosh Kumar Singh AEM-MA5-02	Dr. S. P. Shukla	Development of column based water filtration unit for arsenic (III) and arsenic (V)

33	Ms. Priyanka Sahu AEM-MA5-03	Dr. S. P. Shukla	Development and performance evaluation of column based water filtration unit for chromium (VI) removal
34	Ms. Aswathy Ashokan AEM-MA5-05	Dr. Vidya Shree Bharti	Quantification and mapping of marine litter in the beaches of Mumbai
35	Mr. Vikas Kumar Sahu AEM-MA5-06	Dr. Kundan Kumar	Study on the occurrence of triclosan in sewage-fed aquaculture and its toxicity in fish
6. Fish Genetics and Breeding			
36	Ms. Riya Kumari FGB-MA5-01	Dr. Shrinivas Jahageerdar	In silico characterization of tyrosinase of selected fish species and virtual screening for putative modulators
37	Ms. Nilangana Kalita FGB-MA5-02	Dr. N.S. Nagpure	Population structure of *Cyprinion semiplotum* (McClelland) based on mitochondrial DNA variations
38	Ms. Ankita Madhukalya FGB-MA5-03	Dr. Gopal Krishna	Genetic diversity analysis of Indian Major Carp, *Labeo calbasu* populations using molecular markers
39	Mr. Nzanthung T. Yanthan FGB-MA5-05	Dr. Shrinivas Jahageerdar	Divergent selection for body length in guppy and correlated responses in economic traits
40	Ms. Sneha Surendhan FGB-MA5-06	Dr. Rupam Sharma	Study on nano delivery of progestin for enhancing spermiation in *Clarias magur* (Linnaeus, 1758)
7. Fish Physiology & Biochemistry			
41	Ms. Jaini Jeshwanthi FPB-MA5-01	Dr. P. P. Srivastava	Responses of plant and animal proteins on ovarian tissue development and expression of Vitellogenin protein in indigenous ornamental fish *Dawkinsia tambraparniei* (Silas, 1954)
42	Mr. Gyandeep Gupta FPB-MA5-02	Dr. Subodh Gupta	Single and multiple-dose pharmacokinetic study of fenbendazole in *Labeo rohita* (Hamilton, 1822)
43	Ms. Hemlata Singh Sengar FPB-MA5-03	Dr. Sujata Sahoo	Gene expression study of GHRH and TNF-b gene in *Labeo rohita* (Hamilton, 1822) fed with graded levels of carbohydrate
44	Mr. Munish Kumar FPB-MA5-05	Dr. S. Dasgupta	Branchial expression pattern of Na^+/K^+-ATPase in hilsa (*Tenualosa ilisha*) during migration across the salt barrier
45	Ms. Sherin B N FPB-MA5-06	Dr. Subodh Gupta	Pharmacokinetics and physio-metabolic responses of metronidazole to *Labeo rohita* (Hamilton, 1822)
8. Aquatic Animal Health Management			
46	Mr. Pangambam Ingoba Meitai AAH-MA5-01	Dr. Gayatri Tripathi	*In vitro* assessment of DNA construct conjugated with PLGA nanoparticles
47	Mr. Tensubam Wanglemba AAH-MA5-02	Dr. Gaurav Rathore	Evaluation of antigenicity of inactivated *Flavobacterium columnare* in *Labeo rohita* (Hamilton, 1822)
48	Mr. Rahul Krishnan AAH-MA5-03	Dr. K. Pani Prasad	Molecular cloning and characterization of mitochondrial antiviral signalling protein (MAVS) gene from *Lates calcarifer* (Bloch, 1790)

49	Mr. Zahoor Mushtaq AAH-MA5-04	Dr. K. Pani Prasad	Identification, characterization and expression profiling of galectin gene in *Labeo rohita* (Hamilton, 1822)
50	Mr. Vikas K. C. AAH-MA5-05	Dr. R. P. Raman	Evaluation of dietary supplementation of symbiotic on growth and immunity in *Pangasianodon hypophthalmus* (Sauvage, 1878)
51	Judiana Nongkyanrih AAH-MA5-06	Dr. Megha K. Bedekar	Molecular characterisation and expression analysis of Interleukin-2 (IL-2) in *Labeo rohita* (Hamilton, 1822)
52	Mr. B. Madhu Sudhana Rao AAH-MA5-07	Dr. Megha K. Bedekar	Bio-distribution, persistence, and environmental transmission studies of DNA construct conjugated with PLGA nanoparticles in *Labeo rohita* (Hamilton, 1822)
9. Fish Biotechnology			
53	Ms. Archana Mishra FBT-MA5-01	Dr. Gireesh Babu P.	Toxicity studies on WSSV DNA vaccine in shrimp
54	Mr. Utsa Roy FBT-MA5-02	Dr. Aparna Chaudhari	*In vitro* optimization of promoter length for design of novel eukaryotic expression vector
55	Ms. Rutuparnna Priyarshini FBT-MA5-03	Dr. Annam Pavan Kumar	Development of molecular markers for identification of selected *Tor* and its hybrid species
10. Fisheries Economics			
56	Mr. Sachin S.M. FEC-MA5-01	Mr. Vinod Kumar Yadav	As assessment of coastal ecosystem goods and services of mangroves in Uttara Kannada
57	Ms. Gomathi P FEC-MA5-02	Dr. M. Krishnan	Livelihood assessment of bereaved fisher families in Ramanathapuram District, Tamil Nadu
58	Mr. Pritam Tripathy FEC-MA5-03	Dr. Ramasubramanian V.	Economic analysis and livelihood assessment of fishers in Rushikulya Rookery, Ganjam District, Odisha
59	Mr. Khemraj Bunkar FEC-MA5-04	Dr. Swadesh Prakash	A problem turned potent-value chain analysis of fish in Bharatpur, Rajasthan
60	Ms. Gomathy V FEC-MA5-05	Dr. Rama Sharma	Indo-Sri Lankan trans-border fishing conflict at Ramanathapuram District, Tamil Nadu
61	Mr. Pulin Dekha FEC-MA5-06	Dr. Nalini Ranjan Kumar	Value chain analysis of fish seed production in Assam
11. Fisheries Extension			
62	Mr. Sambit Priyadarshi FEX-MA5-01	Dr. S. N. Ojha	Impact of climate variability on fishers livelihood in coastal Odisha: An assessment of vulnerability and analysis of adaptation
63	Mr. T. Velumani FEX-MA5-02	Dr. Ananthan P. S.	Fisheries governance and fisher's livelihood in Krishnaraja Sagar (KRS) reservoir of Karnataka
64	Mr. Gaindsingh FEX-MA5-03	Dr. Arpita Sharma	Livelihood impact assessment of fisheries development programmes on fish farmers of Chattisgarh
65	Ms. Dileshwari Ratre FEX-MA5-04	Dr. S. N. Ojha	An analysis of relationship between gender and opinion leadership among fish farmers of Jashpur District, Chhattisgarh

66	Mr. Rajpal Yadav FEX-MA5-05	Dr. S. N. Ojha	Factors affecting opinion leadership in capture fisheries of Jaisamand lake in Udaipur district, Rajasthan
67	Ms. Sethulakshmi C S FEX-MA5-06	Dr. Arpita Sharma	Knowledge, practice and attitude towards use of sea safety devices and occupational hazards among marine fishers of Kerala coast

4.5 List of Students Awarded Ph.D. Degree (2017- 2018)

Sr. No.	Name of the student Regn. No. Batch	Topic of the thesis	Major Advisor	Date of Viva-voce
1	Mr. Ramkumar S. FRM-380 2010-13	Diversity and temporal variation of trawl by catch along Mumbai coast	Dr. A. K. Jaiswar	4 April, 2017
2	Ms. Jesmi Debbarma PHT-404 2010-13	Development of fish sausage from *Pangasius hypophthalmus* fortified with seaweed dietary fibre	Dr. L. Narasimha Murthy	7 April, 2017
3	Mr. Manoj M.Ghughuskar AQC-PA1-10 2011-14	Studies on mitigation of transportation stress in *Catla catla* (Hamilton, 1822) fingerlings using selected immunostimulants	Dr. Neelam Saharan	11 April, 2017
4	Mr. Anutosh Paria AAH-422 2010-13	Moleculr characterization, expression and functional anlysis of Pattern Recognition Receptors (PRR) in Asian sea bass, *Lates calcarifer* (Bloch)	Dr. K. V. Rajendran	27 April, 2017
5	Mr. Vikas Phulia FNB-412 2010-13	Detoxification of defatted *Jatropha curcas* kernel meal for optimum utilization in the diet of *Labeo rohita* (Hamilton, 1822) fingerlings	Dr. Parimal Sardar	12 May, 2017
6	Mr. Sreekanth G.B. FRM-PA1-01 2011-14	Spatio-temporal assessment of fishery and fish biodiversity along Siridao coast of Goa	Dr. S.K.Chakraborty	30 May, 2017
7	Ms. Sushree R. Senapati PHT-PA3-01 2013-16	Changes in melanin inducing compounds in whiteleg shrimp (*Litopenaeus vannamei*) during chilled storage	Dr. A. K. Balange	2 June, 2017
8	Mr. Chongtham B. Singh PHT-PA3-04 2013-16	Seaweed utilization in extruded products: physical, functional and organoleptic evaluation	Dr. A. K. Balange	18 July, 2017
9	Mr. Lloyd Chrispin C. FEX-PA2-01 2012-15	RAPFISH for assessment of reservoir fisheries management in Indian states	Dr. P. S. Ananthan	5 August, 2017
10	Mr. Shardul Sham Gangan FRM-PA4-08 2014-17	Taxonomic evaluation of species of family Enragulidae occurring in Indian waters	Dr. A. K. Jaiswar	9 August, 2017
11	Mr. Apu Das FEC-PA4-02 2014-17	Poverty dynamics: role of fisheries in poverty alleviation in Tripura	Dr. Nalini Ranjan Kumar	22 August, 2017

12	Mr. Shashi Bhuhsan PHD – 414 2010-13	Taxonomic evaluation of flatfishes of family Bothidae employing traditional and molecular tools	Dr. A. K. Jaiswar	30 August, 2017
13	Mr. Jitendra Kumar J. FNB-410 2010-13	Studies on flesh quality of *Pangasianodon hypophthalmus* (Sauvage, 1878) through dietary intervention of nutrients and nutraceuticals	Dr. A. K. Pal	21 November, *2017*
14	Mr. Amit Ranjan FNT-PA4-02 2014-17	Strategies for maximizing utilization of de-oiled rice bran in the diets of *Labeo rohita* (Hamilton, 1822)	Dr. N. P. Sahu	30 December, 2017
15	Ms. Manju Lekshmi N. AEM-PA1-01 2011-14	Ecological and economic impacts of aquaculture in coastal water of Goa	Dr. P. K. Pandey	5 January, 2018
16	Mr. Harshavardhan D. Joshi AQC-PA3-06 2013-16	Effects of nanoconjugated Aromatase Inhibitor (AI) particles on masculinisation efficiency in Nile Tilapia *Oreochromis niloticus* (Linnaeus, 1758)	Dr. V. K. Tiwari	12 January, 2018
17	Mr. Nitin Verma AQC-PA1-08 2011-14	A study on minimizing the heterogeneous individual growth (HIG) in freshwater prawn, *Macrobachium rosenbergii* (de Man, 1879) during nursery phase	Dr. V. K. Tiwari	5 February, 2018
18	Ms. Karthireddy Syamala FBT-PA4-04 2014-17	Growth and physiological response of *Litopenaeus vannamei* (Boone, 1931) to different carbon source based biofloc systems	Dr. W. S. Lakra	12 February, 2018
19	Ms. Rejani Chandran FRM-PA1-06 2011-14	Fish diversity with reference to spatial distribution of river IB, a tributary of Mahanadi, India	Dr. A. K. Jaiswar	14 February, 2018
20	Mr. Mujahid Khan A. Pathan FB-PA1-02 2011-14	Estimation of inbreeding and inbreeding depression : A comparison of genealogical and marker heterozygosity approach in zebra fish	Dr. Gopal Krishna	17 February, 2018
21	Mr. Saurav Kumar AAH-PA1-01 2011-14	Studies on monogenean parasite(s) in *Pangasianodon hypophthalmus*: characterization, pathology and immune responses	Dr. R. P. Raman	27 February, 2018
22	Mr. Abhay Kumar AAH-PA1-04 2011-14	Establishment of embryonic stem-like cell culture from *Carassius auratus* (Linnaeus, 1758)	Dr. Gayatri Tripathi	27 February, 2018

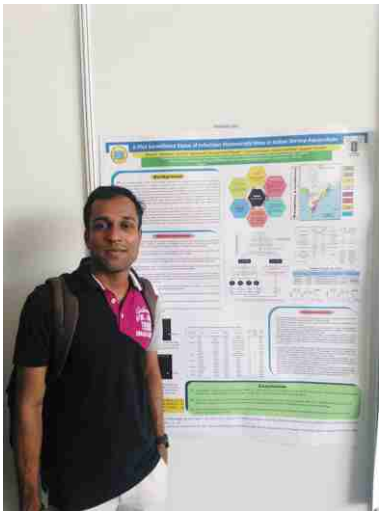
4.6 Medals/Endowment Awards Received by Students

S.No.	Name of the student	Discipline	Batch
Dr. Hiralal Chaudhuri Gold Medal (Discipline-wise Topper)			
1	Ms. Harsha Haridas	AQC	2013-15
2	Mr. Gladston Y.	FRM	2013-15
3	Ms. Sreepriya Prakasan	PHT	2013-15
4	Ms. Sampa Pal	AAH	2013-15
5	Ms. Ananya Ashok	AEM	2013-15
6	Mr. Manu Kumar G.	FEB	2013-15
7	Mr. Nilav Aich	FBT	2013-15
8	Mr. Balkam R. Sangma	FEX	2013-15
9	Mr. Jamuna Debbarma	FEC	2013-15
10	Ms. Amrutha Gopan	FNT	2013-15
11	Mr. Showkat Ahmad Dar	FPB	2013-15
12	Ms. Jess Maria Wilson	AQC	2014-16
13	Ms. Dhanya M. Lal	FRM	2014-16
14	Ms. Sahna Don	PHT	2014-16
15	Mr. Shyam K. U.	AAH	2014-16
16	Mr. Santhana Kumar V.	AEM	2014-16
17	Ms. Payal P. S.	FGB	2014-16
18	Ms. Angela Marcy A.	FBT	2014-16
19	Mr. Suman Dey	FEX	2014-16
20	Mr. Ubair Nisar	FEC	2014-16
21	Mr. Ratul Ghoshal	FNT	2014-16
22	Mr. Arunava Chatterjee	FPB	2014-16
Dr. C. V. Kulkarni Award (Best M.F.Sc. Student Research)			
23	Ms. Sampa Pal	AAH	2013-15
24	Mr. Shyam K.U.	AAH	2014-16
Shri B. N. Sharma Award (Best M.F.Sc. Student, Fisheries Extension)			
25	Mr. Balkam R. Sangma	FEX	2013-15
26	Mr. Suman Dey	FEX	2014-16
Shri M. A. Upare Award (Best M.F.Sc. Student, Fisheries Economics)			
27	Mr. Jamuna Debbarma	FEC	2013-15
28	Mr. Ubair Nisar	FEC	2014-16
Prof. K. Ravindranath Award (Best M.F.Sc. Student, Aquatic Environmental Management)			
29	Mr. Shyam K. U.	AAH	2014-16

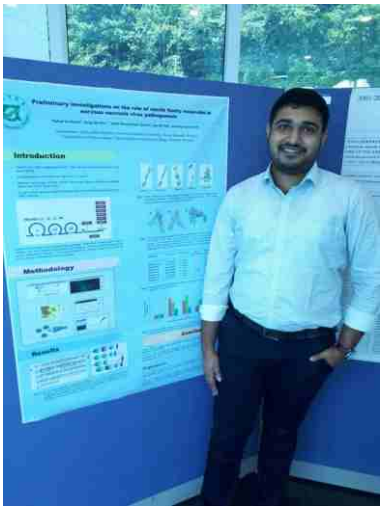
4.7. Awards Received by Students

International Awards

Name of student	Name of the award received and purpose	From whom/ on what occasion	Date
Mr. K. U. Shyam AAH/2016-19	Sir Darobji Tata Endowment Award	International Training at Protein Interaction Platform Group, Dr. Saengehan Senapin's lab, Centex Shrimp, Biotec, NSTDA, Faculty of Science, Mahidol University, Bangkok, Thailand	5 March-4 April, 2017
Mr. Arun V.V. AQC/2016-19	Netaji Subhas Chandra Bose International Fellowship for pursuing Ph.D., College of Veterinary Medicine, Mississipi State University, USA	Indian Council of Agricultural Research, New Delhi	4 November, 2017
Mr. K. U. Shyam AAH/2016-19	Netaji Subhas Chandra Bose International Fellowship for pursuing Ph.D., Korea Chonnam National University, South Korea	Indian Council of Agricultural Research, New Delhi	8 January, 2018
Mr. Rahul Krishnan AAH/2015-17	Overseas Fellowship for pursuing Ph.D., Chonnam National University, South Korea	Chonnam National University, South Korea	2 February, 2018
Mr. Pravesh Kumar FGB/2015-18	International Fellowship to attend the Training	Wageningen University & Research, Netherlands to attend the Training on "Rights Based Approach to Nutrition and Food Security"	26 February- 09 March, 2018



K. U. Shyam



Rahul Krishnan

Pravesh Kumar

National Awards

Professional Fisheries Graduates Forum, India Awards (3 October, 2017)

Name	Regd.No.	Award
Mr. Sutanu K.	AEM/2016-18	First Rank, Dr. K.C. Naik Award, Best Fisheries Graduate of India 2016
Ms. Kasturi C.	PHT/2016-18	Third Rank, Dr. K. C. Naik Award, Best Fisheries Graduate of India-2016
Mr. Tapas Paul	AEM/2016-18	Fourth Rank, Dr. T.J . Varghese Award, Best Fisheries Graduate of India 2016
Ms. Saumya P.	FBT/2016-18	Fifth Rank, Dr. T.J. Varghese Award, Best Fisheries Graduate of India-2016
Mr. Chittaranjan R.	AEM/2016-18	Sixth Rank, Best Fisheries Graduate of India-2016
Miss. Vandana V.R.	AAH/2016-18	Ninth Rank, Best Fisheries Graduate of India-2016
Mr. Arul Murugan	AAH/2016-18	Tenth Rank, Best Fisheries Graduate of India-2016
Mr. Pratap MG	AAH/2017-19	Second Rank, Prof. H.P.C. Shetty Award Best Fisheries Graduate of India-2017
Mr. Aditya K. Baruah	AAH/2017-19	Third Rank, Dr. E.G. Silas Award, Best Fisheries Graduate of India-2017
Ms. Madhushmita K.	AEM/2017-19	Sixth Rank, Best Fisheries Graduate of India-2017

Name of student	Name of the award received and purpose	From whom/ on what occasion	Date
Mr. Vignaesh D. PHT/2014-16	Award for Overall Best M.F.Sc. Dissertation	ICAR-CIFE, Mumbai	6 June, 2017
Dr. Naresh Mehta PHT/2011-14	Award for Overall Best Ph.D. Thesis	ICAR-CIFE, Mumbai	6 June, 2017
Mr. Arun V. V. AQC/2016-19	Best Paper with Highest Impact Factor	ICAR-CIFE, Mumbai	6 June, 2017
Mr. Chinmaya N. FEX/2016-18	Best Article Award-2017	Aquaculture Times Magazine	8 September, 2017
Ms. Nuzaiba P. M. FNFT/2014-17	Best Poster Award	11th Indian fisheries and aquaculture forum, ICAR-CIFT, Kochi, Kerala	24 November, 2017
Mr. Parmanand P. PHT/2014-17	Best Poster Award	58th AMI held at Babasaheb Bhimrao Ambedkar University, Lucknow, Uttar Pradesh	16-19 November, 2017
Mr. Ubaid Qayoom FBT/2016-19	INSPIRE Fellowship 2017	INSPIRE	3 December, 2017
Mr. Rahul Krishnan AAH/2015-17	Best Poster Award	VIROCON 2017, Nitte University, Mangalore, Karnataka	9-10 December, 2017
Mr. Bhushan N. Sanap FNFT/2014-17	Best Paper Award	International Conference on "Recent trends in Agriculture, Veterinary and Life Sciences-2017"	28-30 December, 2017
Mr. Tapas Paul AEM/2016-18	Best Poster Award	National Conference on "Empowerment of Rural Communities Through Aquaculture", College of Fisheries, Ratnagiri, Maharashtra	9-10 February, 2018
Mr. Atish Mane AQC/2014-17	Best Paper Award	National Conference on "Empowerment of Rural Communities Through Aquaculture", College of Fisheries, Ratnagiri, Maharashtra	9-10 February, 2018
Mr. Sandesh. V. Patil FEX/2015-18	Best Paper Award	National Conference on "Empowerment of Rural Communities Through Aquaculture", College of Fisheries, Ratnagiri, Maharashtra	9-10 February, 2018
Ms. Saumya Pandey FGB/2016-18	Second Prize for Best Paper	First International Conference on "Recent Trends in Bioengineering (ICRTB, 2018)" MITADT University, Pune, Maharashtra	17 February, 2018
Ms. Peer Saba M. AQC/2015-17	Best Paper Award	11th Indian Fisheries and Aquaculture forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Ms. Panmei H. AQC/2015-17	Certificate of Appreciation	International seminar on "Recent Trends in Best Management Practices of Aquaculture" World Aquaculture Society Asian Pacific	25 November, 2017

4.8. Papers Presented by Students

Name of student	Title of Paper/poster presented	Name of Conference/Symposia place	Date
Mr. Kantharajan G. AAH/2016-19	Molluscan diversity of recreational beaches along the Mumbai Coast, Maharashtra, India	Fourth Indian Biodiversity Congress (IBC 2017), Pondicherry University, Puducherry	12 April, 2017
Mr. K.U. Shyam AAH/2016-19	A pilot surveillance status of infectious myonecrosis virus in Indian shrimp aquaculture (ISAAHE)	International Symposium on "Aquatic Animal Health Epidemiology" ICAR-NBFGR, Lucknow, Uttar Pradesh	20-21 April, 2017
Mr. Rahul Krishnan AAH/2015-17	Modulation of mitochondrial morphology and rlr siganling by betanodavirus *in vitro*	International Symposium on "Aquatic Animal Health Epidemiology" ICAR-NBFGR, Lucknow, Uttar Pradesh	20-21 April, 2017
Mr. Somu Sunder Lingam AQC/2015-18	Genetically manipulated seaweed production and its scope in India	National Conference on "Advancements of Applied Zoology for Sustainable Development- Current Trends and Furure Perspectives (NCAAZSD- 2017)", Chennai, Tamil Nadu	5-6 October, 2017
Ms. Siddhika Meher FEX/ 2016-18	Way forward towards leveraging and digital inclusion: Developing a mobile application for fish sale by the fisher women's in Mumbai	4th International Conference on "Life Skill and Livelihood: Leveraging digital India for rural empowerment", Dr. MCR HRD Institute, Hyderabad, Telangana	16-17 November, 2017
Mr. Rahul Krishnan AAH/2015-17	Abrogation of RLR downstream Virus is mediated through drp1 dependent mitochondrial fission	11th Indian Fisheries and Kochi, Kerala	21-24 November,
Mr. Om Pravesh Ravi AEM/2014-17	Enhancement of calcium removal efficiency of locally available macrophytes from calcium rich inland saline water in presence of nitrogen	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Ms. A. Angela Mercy FGB/2015-17	Pharmacokinetic and toxicity studies on WSSV DNA vaccine in shrimp	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Mr. Tarachand Kumawat FRM/2014-17	A review on coastal and marine protected areas as ecosystem based management tool: goodwill for marine life	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Mr. Santosh N. Bhendekar FRM/2014-17	Spatio–temporal distribution and ichthyofaunal diversity in the trawling grounds off Mumbai` coast, Maharashtra	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Ms. Bhargavi Priyadarshini PHT/2015-18	Quality attributes of single washed surimi gels of tilapia as affected by different washing media	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017

Md. Aman Hassan PHT/2014-17	Isolation and partial characterization of acid and pepsin soluble collagen from the skin of *Pangasianodon hypophthalmus*	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Mr. Vignaesh D. PHT/2016-19	Valorization of paste shrimp (*Acetes* spp.) for the production of protein hydrolysate	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Ms. Lekshmi S. PHT/2017-20	*In vitro* anti-oxidant and antimicrobial activity of different seaweeds from Ratnagiri coast	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Mr. Sreepriya P. PHT/2015-18	Isolation of shiga toxin-producing *E. coli* (STEC) harbouring putative variant *stx* genes from seafood	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November 2017
Mr. Srinu R. PHT/2013-16	Study of pathogenic potentials of seafood isolates of *Archobacter butzleri* using human epithelial cell line	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Mr. Pramanand Prabhakar PHT/2014-17	Prevalence of non-typhoidal *Salmonella enterica* in seafood in Mumbai	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Ms. Vandita PHT/2015-18	Distribution of human pathogenic *Vibrio* spp. in wild caught and aquaculture fish and shellfish	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November 2017
Ms. Lidiya W PHT/2017-20	Molecular identification of commercially relevant shrimp species by PCR targeting to the 12s rRNA/tRNA^{VAL} mt DNA	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Ms. Oishi Das PHT/2015-18	Prevalence of extreme halophiles in fermented fish products	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Mr. G. Praveen K. PHT/2013-16	Sustainability of *Pangasius hypopthalmus* as a raw material for fermented fish product, *Ngari*	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Ms. Madhurima A. Jadhav PHT/2016-19	Evaluation of viscosity as an index of freshness of rohu, *Labeo rohita* (Hamilton, 1822)	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Mr. Joshikumar Khangembam PHT/2014-17	Antihypertensive and antioxidant activities of *tungtap*	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Mr. Bharat Yadav FEX/2014-17	Practical and strategic needs assessment of ornamental fish producers	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Mr. Gaind Singh FEX/2015-17	Impact of fisheries development programmes on livelihood of fish farmers of Chhattisgarh	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Ms. Sethulakshmi FEX/2015-17	Assessment of vulnerability of marine fishers of Odhisa due to climate change	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Ms. Shweta Kumari FEX/2015-18	Cage culture in reservoirs for sustainable and equitable fisheries development	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017

Ms. Pooja Gautam FEX/2015-17	An assessment on fisheries status of Rihand reservoir of Uttar Pradesh	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Mr. Sandesh V. Patil FEX/2015-18	Prioritization of training needs of shrimp farmers of Palghar district, Maharashtra.	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Ms. Panmei H. AQC/2015-17	Recent trends in best management practices of aquaculture	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	21-24 November, 2017
Mr. Om Pravesh Ravi AEM/2014-17	Screening of the locally available macrophytes for calcium removal from calcium–fortified ground water	International Conference on "Global Research Initiates for sustainable Agriculture & Allied Sciences" Maharana Pratap University of Agriculture & Technology, Udaipur, Rajasthan	4 December, 2017
Mr. K.U. Shyam AAH/2016-19	Standardization of SYBR green chemistry-based quantitative real-time PCR assay to detect Infectious Myonecrosis Virus (IMNV) from infected shrimp tissues	Virocon 2017, NITTE University, Mangalore, Karnataka	7-9 December, 2017
Mr. Rahul Krishnan AAH/2015-17	Subcellular localisation and *in vitro* antiviral activity of MAVS orthologe from Asian seabass	Virocon 2017, NITTE University, Mangalore, Karnataka	7-9 December, 2017
Mr. Tapas Paul AEM/2016-18	Eco-energy based re-circulatory carp hatchery and seed rearing unit: An integrated system of solar energy and greenhouse pond	National Seminar on "Empowerment of Rural Farmers through Aquaculture" College of Fisheries, Ratnagiri, Maharashtra	9-10 February, 2018
Ms. Pooja ` Chakraborthy AQC/2016-18	Marine protected areas: An approach to protect oceanic ecosystem	National Conference on "Empowerment of Rural Communities through Aquaculture", College of Fisheries, Ratnagiri, Maharashtra	9-10 February, 2018
Mr. Atish Mane AQC/2014-17	Culture of *Brachionus calyciflorus* as fish food organism: an approach to improve larval survival of freshwater fish	National Conference on "Empowerment of Rural Communities through Aquaculture", College of Fisheries, Ratnagiri, Maharashtra	9-10 February, 2018
Ms. Bhargavi Priyadarshini PHT/2015-18	Effect of aqueous and ethanolic extract of coconut husk on gel preparation of tilapia surimi	National Conference on "Empowerment of Rural Communities through Aquaculture", College of Fisheries, Ratnagiri, Maharashtra	9-10 February, 2018
Md. Aman Hassan PHT/2014-17	Extraction and functional properties evaluation of spray dried visceral protein hydrolysate from *Pangasianodon hypophthalmus* (Sauvage, 1878)	National Conference on "Empowerment of Rural Communities through Aquaculture", College of Fisheries, Ratnagiri, Maharashtra	9-10 February, 2018

Ms. Deepitha . Raghuvaran P PHT/2016-19	Protective effect of sodium alginate on pangas mince preservation	National Conference on "Empowerment of Rural Communities through Aquaculture", College of Fisheries, Ratnagiri, Maharashtra	9-10 February, 2018
Ms. Lekshmi S PHT/2017-20	Use of seaweed extract as natural preservative for chill stored fish	National Conference on "Empowerment of Rural Aquaculture", College of Fisheries, Ratnagiri, Maharashtra	9-10 February, 2018
Mr. Sandesh. V. Patil FEX/2015-18	Using discrepancy scores of importance and competency for designing training programmes for shrimp farmers of Maharashtra	National Conference on "Empowerment of Rural Communities through Aquaculture", College of Fisheries, Ratnagiri, Maharashtra	9-10 February, 2018
Mr. Abhijeet Mallik FRM/2016-18	Study of biology and feeding behaviour of *Nemipterus mesoprion* (Bleeker, 1853) from Mumbai coast, Maharashtra	National Conference on "Empowerment of Rural Communities through Aquaculture", College of Fisheries, Ratnagiri, Maharashtra	9-10 February, 2018
Mr. Syam K.R. AQC/2015-17	Studies on colour variation in different varieties of the high value ornamental cichlid oscar, *Astronotus ocellatus* (Agassiz, 1831) fed with non-carotenoid formulated diet	National Conference on "Empowerment of Rural Communities through Aquaculture", College of Fisheries, Ratnagiri, Maharashtra	9-10 February, 2018
Ms. Saumya Pandey FGB/2016-18	Computational modelling of *Tetradon nigrovirdis* Melanocortin-1 Receptor (MC1R) gene and identification of natural compounds as putative modulators	First International Conference on "Recent Trends in Bioengineering (ICRTB, 2018)" MITADT University, Pune, Maharashtra	17 February, 2018
Mr. Abuthagir Iburahim FRM/2017-20	Resource mapping of fishing systems of estuaries in Maharashtra	SAFARI, Symposium, Kochi, Kerala	17 February, 2018

4.9. Workshops/Trainings Attended by Students

Student Name	Name of training programs/ workshops/ conferences/ events and prizes	Venue	Period
Mr. Mukesh Kumar Ph.D. FBT/2015-18	Bioinformatics Workshop on "Genomics, Proteomics, Drug Design & High-Performance Computing"	Indian Institute of Technology, Delhi	21- 31 August, 2017
Mr. Manabesh Mahapatra and Ms. Hema Malini FBT/2016-18	Workshop on "Fundamentals of Mass Spectrometry-Based Proteomics"	Narsee Monjee Institute of Management Sciences, Vile Parle, Mumbai	6-7 October, 2017

4.10. Lectures Delivered in Other Universities/Institutes

Name of the faculty	Title of lecture	Event/Venue	Date
Dr. K. Pani Prasad	Advances in fish health management	International Conference on "Advances in Fish Health" (ICFISH 2017) Universiti Putra Malaysia, Malaysia	6 April, 2017
Dr. Arpita Sharma	Empowerment of fisherwomen	Thane Jila Machhimar Samaj Sangh, Palghar, Mumbai, Maharashtra	19 April, 2017
Dr. K. V. Rajandran	Health management and biosecurity in aquaculture in India: A review	International Symposium on "Aquatic Animal Health and Epidemiology for Sustainable Asian Aquaculture", ICAR-NBFGR, Lucknow, Uttar Pradesh	21 April, 2017
Dr. R. P. Raman	Phytotherapy in aquaculture	International Symposium on "Aquatic Animal Health and Epidemiology for Sustainable Asian Aquaculture", ICAR-NBFGR, Lucknow, Uttar Pradesh	21 April, 2017
Dr. G. H. Pailan	Genetically modified crops-poses a risk or beneficial for the society	Workshop on "Genetically Modified Crops-Poses a Greater risks or Beneficial Kolkata Centre, Kolkata, West Bengal	15 May, 2017
Dr. K. Pani Prasad	Advances in fish health management	International Symposium on "Culture Based Fisheries in Inland Open Waters"& Satellite Symposium on "Fish Immunology", CIFRI, Barrackpore, West Bengal	9 June, 2017
Dr. Gayatri Tripathi	Pluripotency of embryonic stem cells	International Symposium on "Culture based Fisheries in Inland Open Waters" & Satellite Symposium on "Fish Immunology" at ICAR-CIFRI, Barrackpore, West Bengal	11 June, 2017
Dr. G. H. Pailan	Nutrition and feed management in freshwater aquaculture	ICAR-CIBA, Kakdwip, West Bengal	24 June, 2017
Dr. Sunil Kumar Nayak	Effective classroom management	Jawahar Navodaya Vidyalaya, Powarkheda, Hoshangabad, Madhya Pradesh	28 June, 2017
Dr. Aparna Chaudhari	New Horizons In Life Sciences, Silver Jubilee Invited Talk Series, Mumbai University	Department of Life Sciences, Jai Hind College, Mumbai	28 July 2017
Dr. S. N. Ojha	Motivation and stress management	NAARM, Hyderabad, Telangana	4 August, 2017
Dr. K. V. Rajendran	Global warming and aquatic animal diseases "Climate change: Impact on aquatic environment and fish health"	National Seminar organized by ICAR-CIFA & Association of Aquaculturists (AoA), ICAR-CIFA, Bhubaneswar, Odisha	6 September, 2017

Dr. Rupam Sharma	Nanotechnology: Concept and Applications Silver Jubilee Invited Talk Series,	Department of Life Sciences, Jai Hind College, Mumbai University	7 September, 2017
Dr. S. N. Ojha	Diverse Perspective of Extension System	SNDT Women's University, Juhu Campus, Mumbai, Maharashtra	11 September, 2017
Dr. S. N. Ojha	Role and relevance of extension education: Vision 2020	SNDT Women's University, Juhu Campus, Mumbai, Maharashtra	12 September, 2017
Dr. Sunil Kumar Nayak	Aquaculture practices	Agriculture Training Centre, Powarkheda, Hoshangabad	8, 14 & 19 September, 2017
Dr. N. P. Sahu	Prioritising fish nutrition research to enhance farmer's income and aquaculture productivity	National Seminar on "Opportunities and Challenges of Translational Research in the Frontier Areas of Animal Biotechnology" College of Veterinary Science & Animal Husbandry, OUAT, Bhubaneswar, Odisha	23 September, 2017
Mr. Satya Prakash	Introduction of fish and shrimp technology in saline affected areas of Punjab	Sangrur & Abul Khurana, Rohtak, Haryana	27 September, 2017
Dr. Sreedharan K.	Disease of shrimp and its management	Sangrur & Abul Khurana, Rohtak, Haryana	27 September, 2017
Mr. V. Hari Krishna	Best management practices for shrimp farming in Punjab. water quality parameters for shrimp farming	Sangrur & Abul Khurana, Rohtak, Haryana	28 September, 2017
Dr. Sreedharan K.	Carp disease and its prevention	Sangrur & Abul Khurana, Rohtak, Haryana	28 September, 2017
Dr. Chandra Prakash	Utilization of degraded water for aquaculture	Madras University, Chennai	5 October, 2017
Dr. B. K. Mahapatra	Ornamental fishery resources in India: Diversified option for livelihood improvement	9th International Conference on "Hydro-gramin technology sustainable agriculture, rural development and livelihood improvement", International Institute of Bengal Basin (IIBB), Kolkata, West Bengal	28 October, 2017
Dr. B. K. Mahapatra	Organic fish farming for livelihood development in the farmers	Training programme for women farmers of North 24 Parganas district at IBRAD, Prafulla Kanan, Kestopur, Kolkata, West Bengal	2 November, 2017
Dr. K. Pani Prasad	Immunodiagnostics for detections of pathogens	ICAR-CIFRI, Barrackpore, West Bengal	5 November, 2017
Dr. Aparna Chaudhari	Gene Silencing Tools: Applicationof RNAi and CRISPRi technologies in Aquaculture Research	Winter School on Recent Advances in Aquaculture Biotechnology, Central Agricultural University Lembucherra, West Tripura	13 November, 2017

Dr. B. K. Mahapatra	Dissemination of technology essential in achieving best production in amur fish farming	On-Farm Training Programme at Haldia Block, Purba Medinipur Organised by Department of Fisheries, Govt. of West Bengal	14 November, 2017
Dr. A. Pavan Kumar	Application of DNA Barcoding in Fisheries	Winter School on Recent Advances in Aquaculture Biotechnology, Central Agricultural University Lembucherra, West Tripura	15 November, 2017
Dr. K. V. Rajandran	Emerging diseases in shrimp aquaculture: Need for new approach in disease management	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	24 November, 2017
Dr. B. K. Mahapatra	Indigenous ornamental fish species diversity: Current status and prospects in north eastern region	National Symposium on "Biodiversity and Natural Resources for Sustainable Development" at Department of Zoology, Chaudhary Charan Singh University, Meerut, Uttar Pradesh	24 November, 2017
Dr. B. K. Mahapatra	Fisheries and aquaculture in changing climate	National Symposium on "Towards Climate Smart Agriculture –A Key to Livelihood Security",University of Calcutta, Kolkata, West Bengal	11 December, 2017
Dr. K. Pani Prasad	Containment of antimicrobial resistance in cultured fish intended for food	11th Indian Fisheries and Aquaculture Forum, ICAR-CIFT, Kochi, Kerala	20 December, 2017
Dr. Geetanjali Deshmukhe	Algal utilization perspective in aquaculture and mariculture	Multidisciplinary Approaches in Life Science Conference, YCIS College, Satara, Maharashtra	5 January, 2018
Dr. B. K. Mahapatra	Road Map for aquaculture development in Sundarban	Stakeholder Workshop on "Synergy for Biodiversity Conservation and Fisheries Based Enterprise Development in Sundarban Tiger Reserve" West Bengal	10 January, 2018
Dr. B. K. Mahapatra	Use of chemotherapeutics, disinfectants in aquaculture	Seminar cum Workshop on "Pros & Cons of Use of Antibiotics in Aquaculture" Digha, Purba Medinipur, West Bengal	11 January, 2018
Dr. N. P. Sahu	Aquaculture nutrition	International Symposium on "Aquaculture Nutrition", World Aquaculture Society (WAS), Chennai, Tamil Nadu.	1 February, 2018
Dr. Sunil Kumar Nayak	Package of practices of local fisheries enterprises and flagship programmes of Department of fisheries, Government of India and of respective State	IECCI, Vidyasagar Institute of Management (VIM), Bhopal, Madhya Pradesh	28 October 2017 7 November, 2017 8 January, 2018 2 February, 2018

Dr. G. H. Pailan	Sustainable aquaculture: A way forward to overcome challenges ahead	Fishery Science of Krishi Vigyan Kendra (KVK), ICAR-ATARI, Kolkata, West Bengal	3 February, 2018
Dr. B. K. Mahapatra	Best management practices for shrimp aquaculture	Bengal Aqua Expo-2018, Kolkata, West Bengal	5 February, 2018
Dr. Shrinivas Jahageerdar	The Big Data: Prospects and Challenges in Aquaculture and Livestock Production	Workshop on "Big Data Analytics in Agriculture" at NAARM, Hyderabad	8-9 February, 2018
Mr. V. Hari Krishna	*L. vannamei* culture practices	ARTI, Hissar, Haryana	9 February, 2018
Dr. Sunil Kumar Nayak	Aquaculture practices	Agriculture Training Centre, Powarkheda, Hoshangabad, Madhya Pradesh	5 January, 2018, 9 January, 2018 17 February, 18
Dr. B. K. Mahapatra	Diversification of aquaculture and ornamental fish farming	Agri-Fisheries training to the marginal farmers of Sundarban region, Sundarban Development Board in association with Ramkrishna Ashram Krishi Vigyan Kendra, Nimpith, West Bengal	28 February, 2018
Mr. V. Hari Krishna	Prospects of shrimp farming in Haryana & fisheries as new investment sector in Haryana	Third Agri leadership Summit, Rohtak, Haryana	24-26 March, 2018
Dr. A. Pavan Kumar	Species delimitation using DNA sequences	National workshop on "Advanced Techniques Related to Analytical, Molecular, Material Testing and Statistical Tools" Department of Zoology, Andhra University, Visakhapatnam	28 March, 2018

4.11. Students Placement

Agricultural Research Services (Scientist)

ARS

- **Mr. Santhana Kumar**
- **Ms. Deepitha R. P.**
- **Mr. Y. Gladston**
- **Mr. Jaspreet Singh**
- **Ms. M. Shaya Devi**
- **Mr. Kantharajan**
- **Mr. Sailender M. Raut**
- **Ms. Sangeetha M Nair**
- **Ms. Ajina S.M.**
- **Ms. Sreepriya**

State Department		
Ms. Payal P. S.	Assistant Director Fisheries	Department of Fisheries, Karnataka
Mr. Roshan Kumar Ram	Agriculture Coordinator	Department of Agriculture, Bihar
Mr. Vikas Kumar Sahu	Fisheries Extension Officer	Department of Fisheries, Chattisgarh
Ms. Pyrinka Sahu	Fisheries Officer	Department of Fisheries, Odisha
Ms. Kiran Das	Fisheries Officer	Department of Fisheries, Odisha
Ms. Poojashree K. J.	Assistant Director	Department of Fisheries, Karnataka
Ms. Nidhi Bhutange	Assistant Fisheries Development Officer	Department of Fisheries, Maharashtra
Mr. Pranaysree P. Kumar	Fisheries Extension Officer	Directorate of Fisheries, Odisha
Mr. Yogananda T.	Assistant Fisheries Director	Department of Fisheries, Karnataka
Mr. Amrapali Janjal	Assistant Fisheries Development Officer	Department of Fisheries, Maharashtra
Mr. Smital D Kamble	Assistant Fisheries Development Officer	Department of Fisheries, Maharashtra
Mr. Vinay Hatte	Assistant Fisheries Development Officer	Department of Fisheries, Madhya Pradesh
Mr. Vinay A.	Assistant Director Fisheries	Department of Fisheries, Karnataka
Ms. Gomathy P.	Fisheries Development Officer	Department of Fisheries, Tamil Nadu
Mr. Brijesh Kumar	Fisheries Development Officer	Department of Fisheries, Rajasthan
Mr. Vikas D.	Fisheries Development Officer	Department of Fisheries, Tripura
Mr. Ramesh Mehta	Agriculture Coordinator	Department of Agriculture, Bihar
Ms. Soumya Pradhan	Project Fellow	ATMA project, West Bengal

Assistant Professor in CAUs/SAUs		
Mr. Ch. Baru Singh	Assistant Professor	College of Fisheries, Central Agricultural University, Tripura
Mr. Irfan Ahmad Bhat	Assistant Professor	Birsa Agriculture University, College of Fisheries, Ranchi, Jharkhand
Mr. Deepak Agarwal	Assistant Professor	Birsa Agriculture University, College of Fisheries, Ranchi, Jharkhand
Mr. Daniel N.	Assistant Professor	Tamil Nadu Dr. J. Jayalalitha Fisheries University, Nagapattinam, Tamil Nadu
Ms. Ranjeeta Kumari	Assistant Professor	Fisheries College & Research Institute, Thoothukudi, Tamil Nadu
Mr. Srijit Chakravarty	Assistant Professor	Birsa Agriculture University, College of Fisheries, Ranchi, Jharkhand
Mr. Sarvendra Kumar	Assistant Professor	Birsa Agriculture University, College of Fisheries, Ranchi, Jharkhand
Mr. Asem Sanjit Singh	Assistant Professor	Pandit Deen Dayal Upadhyay Institute of Agricultural Sciences, Manipur
Dr. Lloyd Crispin	Assistant Professor	Tamil Nadu Fisheries University, Thoothukudi, Tamil Nadu
Mr. R. Srinu	Assistant Professor	College of Fisheries, Telangana
Mr. G. Praveen Kumar	Assistant Professor	College of Fisheries, Muthukur, Andhra Pradesh

Overseas		
Ms. Aparjita Singh	Ph.D. Scholar	Swedish University of Agricultural Sciences, Uppasalaa, Sweden
Ms. Amirtha Johnny	Ph.D. Scholar	Norwegian University of Life Sciences, Oslo, Norway
National Bank		
Ms. Kirti Komal	Probationary Officer	Bank of India, Thane, Maharashtra
Ms. Doreena Suchiang	Agriculture Field Officer	Bank of India, Alibag, Maharashtra
Ms. Ankita Madhukalya	Assistant Manager	NABARD, Mumbai, Maharashtra
Private Companies		
Mr. Chetan Kumar Garg	Technical Officer	C. P. Aquaculture (I) Pvt. Ltd., Chennai, Tamil Nadu
Mr. Gaind Singh Verma	Marketing Executive	C. P. Aquaculture (I) Pvt. Ltd., Chennai, Tamil Nadu
Mr. Pulin Dekha	Marketing Executive	C. P. Aquaculture (I) Pvt. Ltd., Chennai, Tamil Nadu
Mr. Khemraj Bunkar	Marketing Executive	C. P. Aquaculture (I) Pvt. Ltd., Chennai, Tamil Nadu
Mr. Pankaj Mugaonkar	Business Development Manager	Growel Feeds Pvt. Ltd., Vijaywada, Andhra Pradesh
Dr. Amit Ranjan	Technical Manager	CP Feed Pvt. Ltd., Chennai Tamil Nadu
Mr. Sudhanshu Raman	Technical Officer	National Fisheries Development Board, Hyderabad, Telangana

Chapter 5

List of Research Projects

Completed Institutional Projects

FRHPHM

Diversity of *Salmonella enterica* in seafood and molecular bases of its survival and persistence
Sanath Kumar H, Binaya Bhusan Nayak, Manjusha L.

Productivity and fisheries resource mapping of selected estuarine and coastal waters of Maharashtra
Latha Shenoy, Geetanjali Deshmukhe, Asha T. Landge, Vidya Shree Bharti and Neha Qureshi

FNBP

Evaluation of leaf meal as a replacer of de-oiled rice-bran (DORB) in the diet of *Labeo rohita*
Ashutosh D. Deo, Md. Aklakur, Muralidhar Ande and Manish Jayant

AEHM

Studies on host pathogen interactions and development of nano-based diagnostics for betanoda virus infection in *Lates calcarifer*
Paniprasad K, Jeena K, Mujahid Khan Pathan and Husne Banu

Development of vaccine delivery system using nanoparticles against *Edwardsiella tarda*: (DNA vaccine project part- ii)
Megha Bedekar, Gayatri Tripathi, Rupam Sharma, Saurav Kumar, Dhamotharan K and Nalini Poojary

FGB

Purity, stability, toxicity studies and field trials on a commercial batch of DNA vaccine against WSSV
Aparna Chaudhari, Gireesh Babu, Muralidhar P. Ande and A. Pavan Kumar

Development of academic management module for CIFE
Shrinivas Jahageerdar, N.P Sahu, P.P. Srivastava, Ashok Kumar Jaiswar and Sudeep Marwaha

Development of inbred lines of zebrafish and assessment of inbreeding depression
Gopal Krishna, Mujahidkhan Pathan, Shrinivas Jahageerdar and Aparna Chaudhari

FEES

Capacity building of stakeholders to integrate fisheries and aquaculture in emergency response and preparedness
Arpita Sharma, B.K. Mahapatra and Muralidhar P. Ande

CIFE CENTRE KAKINADA

Technology refinement of zero water exchange system in *Litopenaeus vannamei* farming through commercial probiotic and bio-remediator intervention.
Thongam Ibemcha Chanu, N.K. Chadha, Chandra Prakash, Muralidhar P. Ande, Karthireddy Syamala, Arun Sharma, P. Srinivasa Rao, R.R.S. Patnaik, V.N. Acharyulu and J.K. Prasad

Isolation and characterization of pathogenic bacteria associated with *Litopenaeus vannamei* farming
Arun Sharma, Muralidhar P. Ande, Karthireddy Syamala, Thongam Ibemcha Chanu, P. Srinivasa Rao, J.K. Prasad, V.N. Acharyulu and R.R.S. Patnaik,

CIFE CENTRE KOLKATA

Evaluation of flesh quality of *Pangasianodon hypophthalmus* and development of value added products.
Dilip Singh

Captive maturation, breeding and culture of indigenous ornamental fish *Botia dario*
B. K. Mahapatra, G. H. Pailan, Subhendu Datta , Parimal Sardar, S. Munilkumar, S. Dasgupta

Ongoing Institutional Projects

AQUACULTURE

Zero water exchange model for carp seed production
Ajit Kiumar Verma, V.K. Tiwari, Nalini Ranjan Kumar, Chandra Prakash, Babitha Rani A.M, Kundan Kumar, Sunil Kumar Nayak

FRHPHM

Taxonomic evaluation of selected teleosts occurring in Indian waters
Ashok Kumar Jaiswar, Amjad K. Balange, Annam Pavan Kumar, Shashi Bhushan, Karan Kumar Ramteke

Effect of extraneous factors on trophic chain linked to non-conventional resources for sustainable management
Geetanjali Deshmukhe, Binaya Bhusan Nayak, Latha Shenoy, Ashok K. Jaiswar, Amjad K. Balange, Asha T. Landge, Zeba J. Abidi, Sanath Kumar, Manjusha L, Martin Xavier, Shashi Bhushan, Karan Kumar Ramteke and Layana P.

FNBP

Green feed for carp
Narottam P. Sahu, Prem Prakash Srivastava,, Pailan G.H., Parimal Sardar, Subodh Gupta, Munil Kumar, Dasgupta S, Ashutosh Deo, Sujata Sahoo, Md. Aklakur, Sikendra Kumar, Tincy Varghese, Shamna N, Manish Jayant and Dilip Kumar Singh

AEHM

Identification, distribution and prevalence of disease in cage cultured fishes of selected reservoirs of Maharashtra and West Bengal
Gayatri Tripathi, Kiran Dube, Rathi Bhuvaneswari, Shashi Bhusan and Husne Banu

Development of phyto-therapeutics against *Argulus* parasite of fish
Raman R.P., K.V. Rajendran and Saurav Kumar

Performance evaluation and improvement of newly-designed water filtration unit
Satya Prakash Shukla, Sanath Kumar, Vidya Shree Bharti, Kundan Kumar, Saurav Kumar, Muralidhar P. Ande and Nalini Poojary

FGB

Improvement of harvest body weight of *Clarias magur* in India through genetic selection
Shrinivas Jahageerdar, Thongam Ibemcha Chanu, Arun Sharma, Sunil Kumar Nayak, Lenin Singh Angom, Shamna N and Sikendra Kumar

FEES

Knowledge for S-VaISA: Developing & sharing knowledge resources for sustainable *L. vannamei* aquaculture in inland saline areas
Ananthan, P.S, Hari Krishna, K. V. Rajendran, Pankaj Kumar, Neha Qureshi, A. K. Reddy
Technical Assistants: Ashok Kumar, Satyendra Singh, S. K. Sharma, D. Bhoomaiah and Raj Moitra

Development of comprehensive package of practices of inland saline water aquaculture
Gopal Krishna

i **Study on effectiveness of nursery based system in *Litopenaeus vannamei* culture using inland saline water**
Hari Krishna, V.

ii **Mapping and characterization of soil and water quality parameters of –ongoing and potential sites and their correction with different production systems**
Kiran Dube Rawat

iii **Identification and characterization of potential pathogens, with emphasis on bacterial pathogens, of *Penaeus vannamei* cultivated in inland saline water for the development of an effective health management strategy**
Sreedharan, K.

iv **Developing and sharing knowledge resources for socially equitable economically viable and eco-friendly shrimp farming in inland saline areas**
Ananthan, P.S.

v **Assessment of meat quality of inland –saline cultured shrimp (*L. vannamei*)**
Nayak B.B.

vi **Development of zero water exchange biofloc unit under controlled conditions using inland saline water**
Babitha Rani A.M.

vii **Impact of biochar in inland saline aquaculture**
Vidya Shree Bharati

viii **Search for suitable alternative of organic manure to reduce production of greenhouse gases from aquaculture**
Subhendu Datta

ix **Bioprospecting of potential ornamental fishes in inland saline water**
Paramita Banerjee Sawant

x **Studies on functional traits of common carp cultured in inland saline waters**
Aparna Chaudhari

aculture Division

Development of comprehensive package of practices of inland saline water aquaculture

Project duration: 2017-20

Programme Director: Gopal Krishna

Mapping and characterization of soil and water quality parameters of on–going and potential sites and their correction with different production systems

2017- 20

Kiran Dube Rawat, Narinder Kumar Chadha, Paramita B. Sawant, Babitha Rani, Madhuri Pathak, Narendra Aglave and Ashok Kumar

Farmers involved in culture of *Litopenaeus vannamei* in inland saline water (at different stages of shrimp culture practices) in different districts of Haryana were identified and randomly selected for collection of baseline data. Among the 23 selected farmers (selected from 9 districts of Haryana that are under inland saline aquaculture), few were beginners but the remaining were experienced.

In order to collect the information for baseline data, a format of collection of farm details was prepared. This includes the following details listed under the following subheads: details of farmer, details of farm, culture details and market details after its harvesting.

Bioprospecting of potential ornamental fishes in inland saline water

2017- 20

Paramita B. Sawant, Narinder Kumar Chadha, Kiran Dube Rawat, Babitha Rani, Satya Prakash, Ashok Kumar and Raju K.D.

The euryhaline teleost *Scatophagus argus*(spotted scat) has been selected as the first potential candidate ornamental species (having both food and ornamental value) to be bred in inland saline water. Two stocks procured from local suppliers in Delhi consisting of 170 numbers of *Scatophagus argus* of size range 4- 6 cm. The stocks were acclimatized in freshwater and fed initially @ 5% body weight with commercial aquarium feed containing 50% protein but suffered heavy mortality due to severe infection of *Ichthyopthirius multifilis* (commonly called as Ich parasite).

Suitability of rearing of spotted scat to inland saline water assessed based on its herbivorous/omnivorous, coprophagus habit and euryhaline nature, salinity range for rearing (20-35 ppt), size and age at first maturity (150 g (female) and above 80 g in males, aged 7-9 months. Females having standard length above 14 cm and with oocytes approximately 0.40 mm in diameter or larger may be termed as mature. The spawning corresponds with the SW monsoon.

Infrastructure for ornamental fish culture and breeding has been created in Rohtak centre for the first time. Local survey to investigate the potential of the spotted scat as a commercial candidate ornamental fish species in inland saline regions revealed that its demand is in the size range on 4-6 cm. There is tremendous scope for local employment creation through breeding of the spotted scat by utilizing inland saline water. In order to resolve the issue of acclimation of the fishes, quality of water from suppliers was compared to the water available at the centre and optimization was done based on the ionic composition, alkalinity and hardness.

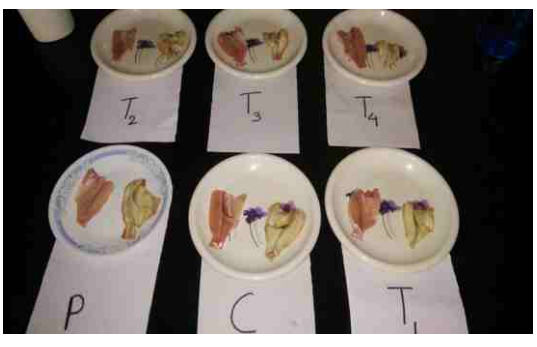
Spotted scat

Development of zero water exchange indoor biofloc units in controlled conditions using inland saline water

2017- 20

Babitha Rani, Narinder Kumar Chadha, Kiran Dube Rawat, Paramita B. Sawant, Harikrishna V. and Shamna N

The evaluation of growth and physiological response of Red tilpia in biofloc system in inland saline ground water at various salinities was carried out. The various treatments were C (0 ppt), T1 (5 ppt), T2 (10 ppt), T3 (15 ppt) and T4



(20 ppt) in triplicates for which indoor biofloc units of 300 L capacity each (N=15 Nos) were used and were stocked with 45 fishes of mean weight 13.97g ± 0.62. The experiment recorded better growth response in 20 ppt salinity treatment after 90 days, when the mean body weight was 53.83 g ± 2.67, which was not significantly different from 15 ppt group. The rearing of red tilapia in inland saline water using biofloc technology can be carried out at salinities between 15-20 ppt.

The haematological parameters among various treatments also indicated significant improvement in fishes reared at 20 ppt salinity. The carcass quality in terms of colour was evaluated in muscle and skin of fishes and was compared to pond reared fishes of similar age group and found significant improvement in biofloc groups compared to pond. But among biofloc groups, salinity has a significant role in the development of skin colour in red tilapia in which all the saline groups were having better colour than freshwater treatment group.

Tomato and Spinach Production in Aquaponics

Zero water exchange model for carp seed production

2016- 19

Ajit Kumar Verma, V.K. Tiwari, Nalini Ranjan Kumar, Chandra Prakash, Babitha Rani A.M, Kundan Kumar, Sunil Kumar Nayak

The design of filter and biofilter was made using geotextile cloth, fine sand, coarse sand, gravels and plastic bio-balls. The integrated column filter model was constructed and tested. The experiments using column filter were conducted to produce spawn of carp and the results were very encouraging. Flow of water in zero water exchange was 20 liter per minute. Microbial Load Studies (TPC) was also conducted to examine the microbial load in outflow and inflow water.

An aquaponic system having 12 separate sets was designed and fabricated for conducting experiments to optimize fish to plant component ratio (40 spawn:14 spinach plants) for production of carp seed. Water quality parameters in recirculating hatchery used for producing carp spawn and water used for producing carp seed in aquaponic system were analyzed. The parameters were found to be in optimum range conducive for aquaculture production.

Recirculating aquaculture system for production of spawn

Fisheries Resource Harvest and Post Harvest Management Division

Productivity and fisheries resource mapping of selected estuarine and coastal waters of Maharashtra

2015-18

Latha Shenoy, Geetanjali Deshmukhe, Asha T. Landge, Vidya Shree Bharti and Neha Qureshi

The productivities of two estuaries of Maharashtra, namely Bhayandar and Karanja-Amba were assessed during 2015 to 2017. Both the estuaries show characteristics of potential fish larval recruitment sites. Uneven productivity patterns were observed at Bhayandar due to sand mining activities. Along Karanja-Amba estuarine ecosystem, 42 species of phytoplankton and 12 groups of zooplankton were recorded. Dol net catch comprised of 50 species of fin fish, 3 species of elasmobranchs, 13 species of shrimp, 10 species of crabs, 5 species of cephalopods, 2 species of jellyfish, 4 species of sea snakes, 1 species of lobster and 2 species of stomatopods. Major catch composition of dol net consisted of *Acetes indicus*, *Arius maculatus*, *Charybdis callianassa* ,*Chrysaora Caliparea*, *Coilia dussumieri*, *Harpadon nehereus*, *Lepturacanthus savala*, *Miyakella nepa*, *Mystus gulio* and *Parapenaeopsis sculptilis.* Significant discards such as jellyfish, juveniles of several fin fish and plastics were recorded in the dol nets. Socio-economic profile of Karanja revealed that 98% of the population is involved only in fishing activities. There is scope for promotion of microfinance enterprises like self-help groups (SHGs) to address their problem of indebtedness. Alternative livelihoods like value addition and fish processing are suggested for the sustainable source of income. Fisheries resource mapping of the main fishing systems in the estuaries, namely dol nets and gill nets was done. Thematic maps of dol net stations and catch per unit effort (CPUE) of gill net and dol net were prepared. An Awareness program on "Estuarine fisheries management and fish utilization" was conducted for fisher community at Karanja in which about 60 fishers including fisher women actively participated. The program was aimed at creating awareness on the sustainable management of estuarine fisheries and preparation of value added fish products. Participants were made aware of the major findings of the project that were of concern for sustainable management of estuarine fisheries of the region. The participants were also sensitized on the consequences of abundance of plastic in the fishing nets (dol nets) that is thrown back into the estuary, catching of the juveniles of commercially important fish using small meshed nets, discarding of unconventional fish with a low value perception and the availability and utilization of jellyfish in the catch.

Salient Findings

- Highly productive estuarine areas with high chlorophyll a and phytoplankton diversity
- Abundance of finfish larvae during monsoon
- Plastics formed about 10 % of the total catch of dol netter per trip
- Discards included jelly fishes and juveniles of commercially important fishes
- Fisheries resource mapping of fishing systems in the estuaries

Diversity of *Salmonella enterica* in seafood and molecular bases of its survival and persistence

2015-18

Sanath Kumar H, Binaya Bhusan Nayak and Manjusha L

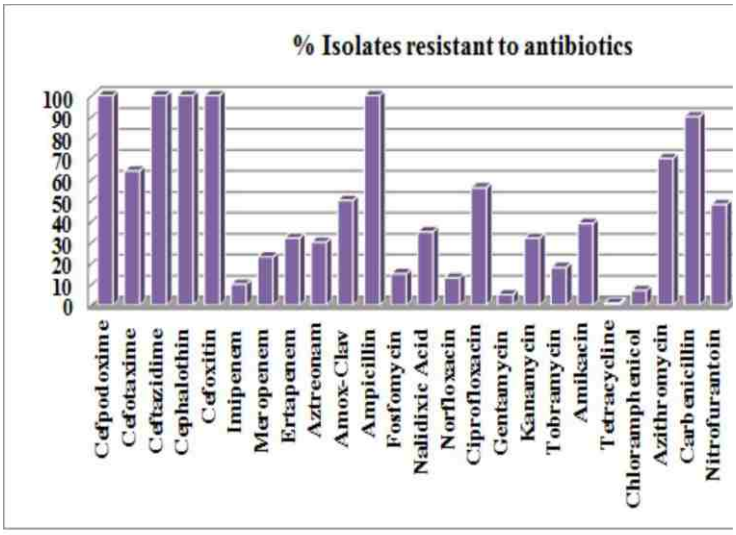
Samples of fish and shellfish collected from landing centers and fish markets were analyzed for *Salmonella*. A total of 82 seafood samples comprising of 58 fish and 24 shellfish were analyzed for *Salmonella enterica* using multiple selective enrichment broths and selective agar plates. *S. enterica* was isolated from 35 (42.68%) samples of seafood, of which 25 (43.1%) were finfish and 10 (41.66%) were shellfish. Altogether, 214 isolates of *Salmonella enterica* were recovered from the positive samples. *Salmonella* contamination varied from 20 to 50 % in fish landing centers, while in the case of retail fish markets, a higher level of contamination (46 to 80%) was observed. The level of contamination increased from landing centers to retail markets. In order to identify the genotypes commonly associated with seafood, the isolates were screened for the distribution of commonly associated *Salmonella* Pathogenicity Island (SPI) genes by PCR. Further, the antimicrobial resistance patterns of seafood isolates of *Salmonella* was studied. All (100%) isolates of this study were resistant to cephalosporins cefpodoxime, ceftazidime (both third generation), cefoxitin and cephalothin (second generation) and ampicillin . Significant percentage of the isolates was resistant to cefotaxime (64%), ciprofloxacin (56%), nalidixic acid (35%), kanamycin (32%) and amikacin (39%). The isolates were highly susceptible to gentamycin, tetracycline, chloramphenicol and imipenem. The study emphasizes the need to perform routine risk assessment of *Salmonella* contamination in seafood.

Table: Incidence of *Salmonella enterica* in seafood in Mumbai

Samples analyzed	No. of samples tested	No. (%) positive for *Salmonella*
Finfish	58	25 (43.10)
Shell fish	24	10 (41.66)
Total	**82**	**35 (42.68)**

Salient Findings

- Seafood in landing centers and retail markets of Mumbai harbor *Salmonella* enterica and the level of contamination increases from landing centers to retail markets.
- Contamination of creeks with sewage and human activities could be responsible for *Salmonella* contamination of seafood.
- The presence of *Salmonella* in seafood is a health risk and seafood can contaminate other foods and food preparation surfaces.
- *invA* PCR was found be very specific to *S. enterica* and could be applied to seafood for unambiguous detection of *Salmonella*.



Virulence genotyping for *Salmonella* pathogenicity islands (SPIs)

Gene	Location	Function	No. (%) isolates positive
invA	SPI-1	Invasion protein	200 (100)
hilA	SPI-1	Regulator protein	200 (100)
iroB	SPI-1	Iron acquision	168 (84)
avrA	SPI-1	Inhibitor of NF-kappa pathway	192 (96)
ssaQ	SPI-2	TypeIII secretion system	195 (97.5)
mgtC	SPI-3	Macrophage survival	195 (97.5)
sipD	SPI-4	Hemolysin	188 (94)
sopB	SPI-5	Effector protein	190 (95)
sopE	Phage	T3SS effector protein	121 (60.5)
spvC	Plasmid	Host survival	80 (40)

Taxonomic evaluation of selected teleosts occurring in Indian waters

2016-19

Ashok Kumar Jaiswar, Amjad K. Balange, Annam Pavan Kumar, Shashi Bhushan, Karan Kumar Ramteke

In this study, a total of 325 specimens of 24 species were studied for morphological characters. The study involved collection, identification and extraction of morphological data, extraction and study of otolith. The samples were further subjected to molecular and biochemical analysis.

Following species have been recorded from different geographical locations of India (Mumbai, Ratnagiri, Mangalore, Kochi, Mandappam, Orissa, Kolkata, Digha).

Mugillidae (Mullets)

Chelon planiceps (Valenciennes, 1836),*Valamugil speigleri* (Bleeker, 1858), *Crenimugil buchanani* (Bleeker, 1853), *Crenimugil seheli* (Forsskål, 1775) *Ellochelon vaigiensis* (Quoy & Gaimard, 1825), *Planiliza macrolepis* (Smith, 1846), *Liza carinata* (Valenciennes, 1836), *Mugil cephalus* (Linnaeus,1758), *Planiliza melinopterus* (Valenciennes, 1836), *Planiliza subviridis* (Valenciennes, 1836), *Rhinomugil corsula* (Hamiltojn 1822), *Chelon parsia* (Hamilton, 1822), *Sicamugil cascasia* (Hamilton, 1822)

Hemiramphidae (Half beaks)

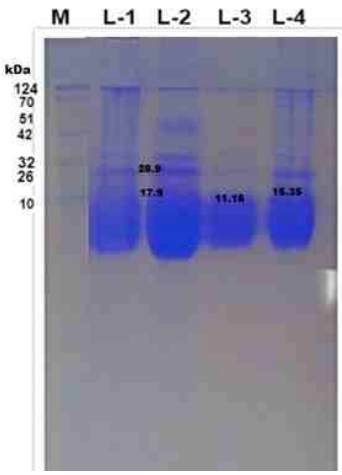
Hemiramphus far (Forsskål, 1775), *Hyporhamphus xanthopterus* (Val. 1847), *Hyporhamphus limbatus*, (Val. 1847), *Rhynchorhamphus malabaricus* Collette, 1976, *Rhynchorhamphus georgii* (Val. 1847)

Exocoetidae (Flying fishes)

Cypselurus naresii (Günther, 1889), *Cheilopogon cyanopterus* (Val. 1847), *C. furcatus* (Mitchill, 1815), *C. nigricans* (Bennett, 1840), C. poecilopterus (Val. 1847), *C. spilopterus* (Val. 1847)

The scales and otoliths of 12 species were studied and 12 species were barcoded.

Four species of mullets could be differentiated based on Molecular weight of lens proteins.



M	L-1	L-2	L-3	L-4
124				
70				
51	51	51		
42	42	42		
32	28.9	28.9	28.9	28.90946
26	17.9	17.98	26	17.98126
10		11.18	11.184	15.349

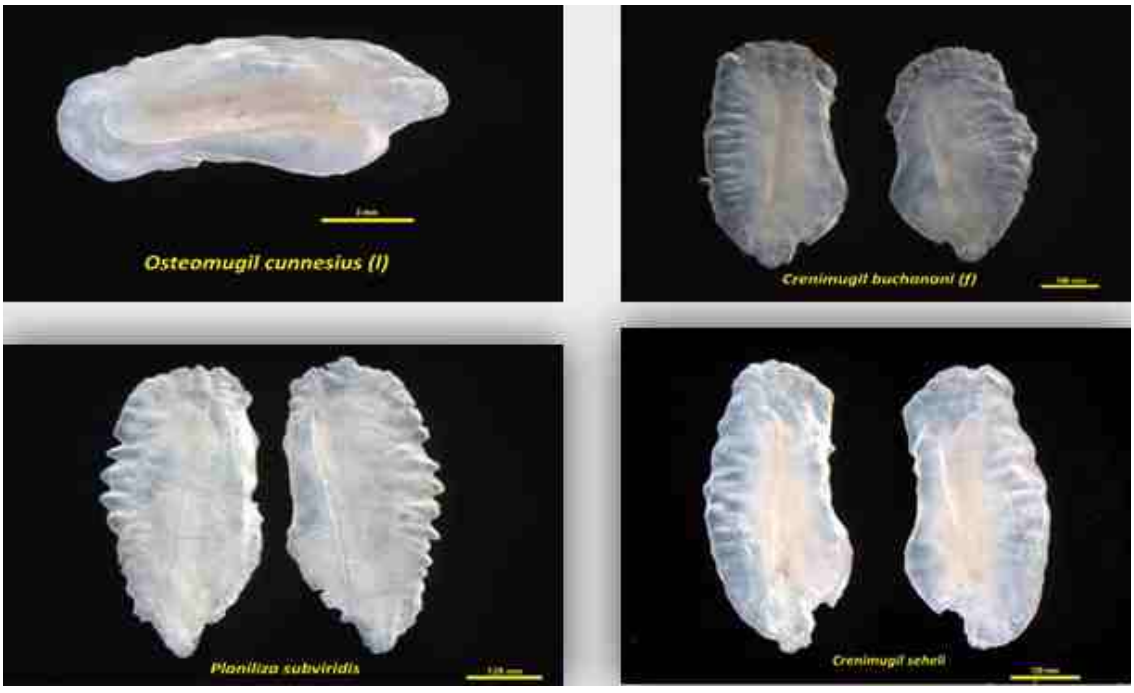
M= Protein ladder

Lane 1: Valamugil buchanani

Lane 2: Liza melinoptera

Lane 3: Moolgarda seheli

Lane 4: Valamugil speigleri



Effect of extraneous factors on trophic chain linked to non-conventional resources for sustainable management

2017- 20

Geetanjali Deshmukhe, Binaya Bhusan Nayak, Latha Shenoy, Ashok K. Jaiswar, Amjad K. Balange, Asha T. Landge, Zeba J. Abidi, Sanath Kumar, Manjusha L, Martin Xavier, Shashi Bhushan, Karan Kumar Ramteke and Layana P.

The primary goal of this research is to evaluate the effects of abiotic and biotic factors on qualitative and quantitative distribution of organisms at trophic levels. In this preliminary investigation, total 32 phytoplankton, 15 zooplankton and 13 benthos species were recorded and 26 species of fish and crustaceans were recorded in the hauls. The fish composition comprised of *Coilia dussurmeiri, Squila, Johniops microrhyms, J. batangeri, J. vogleri, Loligo* sp., *Bregmaceros mcclIandi, T. theraps* and *Harpadon nehereus*. 3 species of prawns and acetes were also recorded.

One of the aims of this project is to study the potential utilization of seaweed as direct food or as additives in fish products. For this, *Ulva fasciata* (green seaweed), *Padina tetrastromatica (*brown seaweed) and *Grateloupia filicina* (red seaweed) were collected from Ratnagiri and were analysed for their biochemical composition for further utilization. Phenolic compounds were extracted from the seaweed *Padina tetrastomatica* using three different solvents namely water, methanol and ethanol. Total phenolic content of the seaweed extract was estimated and expressed as Gallic acid equivalent. Antimicrobial activity of seaweed extract against *Pseudomonas* spp. and *Bacillus* spp. was evaluated by disk diffusion method.

Assessment of meat quality of pacific white shrimp cultured in Inland saline water

2017-19

Binaya Bhusan Nayak, Sanath Kumar H., Amjad Khansaheb Balange and K.A. Martin Xavier

Salient Achievements

The yield and meat quality of shrimps cultured in inland saline water was compared with those cultured in estuarine water. The yield of edible portions was 61% as compared to 58% incase of estuarine shrimps. The proximate composition analyses of edible meat portions from ISW cultured shrimps indicated that the former had moisture content of 77.84% as against 76.04%, and protein content of 18.98 as against 20.91% in estuarine shrimps. The fat content and the ash content did not show any significant difference. Marginally higher pH, NPN and TMA values were also recorded in ISW cultured shrimp. No significant different was observed in peroxide value, free fatty acid value (FFA) and thiobarbituric acid reactive substance (TBARS) values.

Fish Nutrition Biochemistry and Physiology Division

Evaluation of leaf meal as a replacer of De-Oiled Rice Bran (DORB) in the diet of *Labeo rohita*

2015-18

Ashutosh D. Deo, Md. Aklakur, Muralidhar Ande and Manish Jayant

Strategies for the removal of anti-nutritional factors (ANFs) were standardized for sweet potato leaf meal (SPLM). By soaking SPLM for 24, most (20-80%) of the ANFs could be removed without significant loss of nutrients. Further, fermentation with *Chaetomium globosum* improved the nutritional profile along with the significant reduction in ANFs. The crude protein content significantly increased at the end of 120 h fermentation by *Chaetomium globosum* from 23.92 to 30.34%, while no significant changes were recorded in lipid and ash contents. However, fiber and NFE content showed significant reduction from 8.3 to 6.01% and 52.04 to 46.36%, respectively at the end of 120h of fermentation.

The tannin content was reduced from 23.03mg/100gm (raw) to 8.53mg/100gm (62.96%). Trypsin inhibitor did not decrease significantly ($p \geq 0.05$), but the phytate content decreased significantly ($p > 0.05$) from 15.02mg/100gm to 9.08mg/100gm (31.55%). The oxalate content of SPLM decreased by 30.88% from 1.36 % (raw) to 0.94 %. The value of the alkaloid of SPLM decreased by 46.3% from 1.36 mg/g to 0.73mg/g. Hydrogen cyanide content of the SPLM also decreased significantly ($p \leq 0.05$) by 38.16% from untreated value of 38.88mg/100g to 23.04mg/100g.

A feeding trial was conducted with both soaked and fermented sweet potato leaf meal (SPLM) as a replacer of DORB to evaluate growth and metabolic responses of *L. rohita*. Seven iso-nitrogenous (30% CP) and iso-caloric diets were prepared by replacing DORB with 50% or 100% raw (SLM), soaked and fermented SPLM.

Significant improvements were observed in SGR (1.13±0.02), PER (1.82±0.04) and FCR (1.79±0.04) when 100% DORB was replaced by fermented SPLM when compared to other treatment groups.

The protease activities were significantly higher in 100% fermented SPLM fed groups than the other groups; however lipase and amylase activities were comparable to the control group. Other biochemical parameters also

Leaf meal based fish diet

complemented the above result indicating that fermented SPLM using *Chaetomium globosum* can replace 100% of DORB in the diet of *L. rohita* without any detrimental effect on growth and health.

Leaf meal was prepared from *Leucaena leucocephala* (Subabul) and tested. Reduction in anti-nutrients of processed (soaked) leaves (SSLM) when compared with the raw leaf meal (SLM) was observed. The values of tannin (2.41 mg/100 g), phytate (14.15 mg/100 g), cyanide (21.0 mg/100 g), oxalates (81.66 mg/100 g), saponin (1.53%) and mimosine (4.29%), in SLM whereas the values of SSLM were tannin (0.11 mg/100 g), phytate (13.655 mg/100 g), cyanide (2.09 mg/100 g), oxalate (2.05 mg/100 g), saponin (0.08%) and mimosine (1.53%). After soaking, the tannin, oxalates and saponin were significantly reduced by 95.0, 97.0 and 94.0%, respectively.

The crude protein, ash, crude fat, crude fibre and carbohydrate contents of SLM (dried in oven at 45°C for 48 hours) were 29.39, 11.36, 4.53, 18.60 and 36.35%, respectively, whereas the crude protein, ash, crude fat, crude fiber and carbohydrate of SSLM (soaking in water for 48 hours and dried) were 24.11, 8.16, 4.30, 22.16 and 41.02%, respectively. The SLM contains more protein (29.39%) than SSLM (24.11%).

A wet lab trial was conducted with seven experimental groups of iso-nitrogenous and iso-caloric diets including one control with DORB. There was significant difference of growth among all the experimental groups. The highest weight gain (173%), SGR (1.67%) and PER (1.74) and less FCR (1.91) was found in 100% replacement of DORB with soaked SLM group followed by 50% group. The least weight gain, SGR and PER, and high FCR was found in 100% replacement of DORB with SLM treated with ferric chloride group. The present work confirms that 100% DORB can be replaced by water soaked SLM in *L. rohita* diet.

Leaf meal was prepared with *Sesbania bispinosa* (Sesbania) and proximate composition (crude proteins 25%) and anti-nutritional factors were estimated. The anti-nutritional factors were tannin 0.21mg/100g, oxalate 0.65%, saponin 3.01%, cyanide 21.23 mg/100g, phytate 15.26 mg/100g, alkaloid 24.07 % ,TIA 0.45mg/g and mimosine 2.26%.

After fermentation with *Bacillus subtilis* the crude protein was maximum (32%) on sixth day of fermentation. The anti-nutritional factors were reduced significantly like tannin 60%, oxalate 35 %, saponin 61%, cyanide 43%, phytate 56%, alkaloid 54%, TIA 49% and mimosine 31%.

Feeding trial was conducted with raw and fermented sesbania leaf meal. It was found that the dietary inclusion of raw sesbania leafmeal beyond 20% inclusion level had negative impact on FCR, 3.38 at 30% inclusion and 3.74 at 40% inclusion level compared to the control (FCR=3.0).The protein efficiency also followed the same trend, being least in 40% inclusion (0.89), followed by 30% inclusion (0.99). However, 20% and 10% inclusion showed no significant difference in feed efficiency compared to the control. The weight gain was negatively impacted by 30% (115%) and 40% (97%) inclusion of raw sesbania leaf meal compared to the control (135%).

The fermented sesbania leaf meal showed comparable results with control at all the levels of inclusion (10%, 20%, 30% and 40%) in terms of growth (136%, 139%, 150% and 136%),FCR (2.89, 2.95, 2.81,and 3.17), protein efficiency (1.16, 1.13, 1.19 and 1.04) compared to the control.

Salient Achievements

- Strategies for removal of anti-nutritional factors (ANFs) from leaf/leaf meal have been standardized.
- Complete replacement of DORB with fermented sweet potato leaf meal and soaked subabul leaf meal is possible in the carp diet.
- Partial replacement of DORB with fermented sesbania leaf meal is possible in the carp diet.

Green Feed for Carp

2017-18

Narottam P. Sahu, Prem Prakash Srivastava,, Pailan G.H., Parimal Sardar, Subodh Gupta, Munil Kumar, Dasgupta S, Ashutosh Deo, Sujata Sahoo, Md. Aklakur, Sikendra Kumar, Tincy Varghese, Shamna N, Manish Jayant and Dilip Kumar Singh

Leaf meals: Twenty three types of leaves were collected and proximate analysis was done. The

protein contents varied from 11.40 to 31.00%. One non-edible seed (castor seed) was collected, de-hulled, defatted and proximate composition was determined.

Among the 23 types of leaves, 6 leaves *viz*. *Hygrophila spinosa* (Gokulakanta), *Vigna mungo* (Black lentil), *Mentha arvensis* (Corn mint), *Lablab purpureus* (Lablab bean), *Arachis hypogaea* (ground nut leaves) and *Leucaena leucocephala* (Subabul) were selected based on their nutritional quality and anti-nutritional factor content.

LC_{50} of hydrolysable tannin was done and was found to be 76.32 ppm, while LC_{50} of saponin was found to be 69.99 ppm.

Salient Findings

- Soaking the subabul leaf meal for 24 hrs and fermentation of sesbania and sweet potato leaf meals with *Bacillus subtilis* and *Chetomium globosum*, respectively for 72 hrs significantly improved nutritional value with a decrease in ANFs and crude fibres contents. This can be used as a replacer of DORB in the diet of *Labeo rohita.*
- *Hygrophila spinosa and Vigna mungo*can leaf can be successfully used as replacer of DORB in the diet of *Labeo rohita*

Leucaena leucocephala (Subabul)

Mentha arvensis (Corn mint)

Arachis hypogaea (ground nut leaves)

Vigna mungo (Black lentil)

Lablab purpureus (Lablab bean)

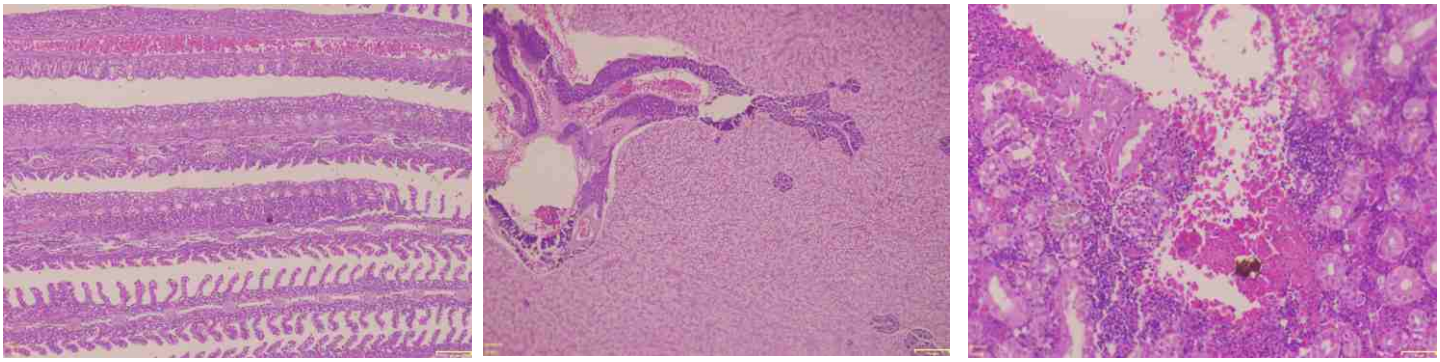
Aquatic Environment and Health Management Division

Disease pattern and health assessment of *Pangasianodon hypophthalmus* in cage culture ecosystem

2017-19

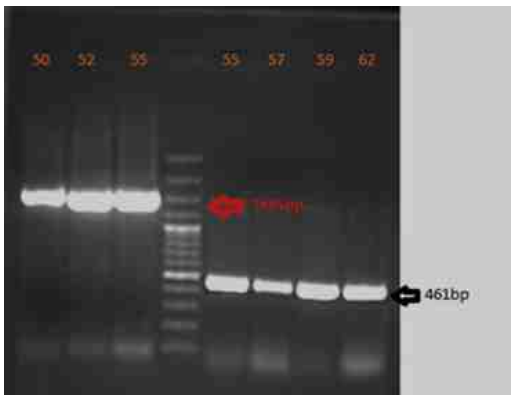
Gayatri Tripathi, Kiran Dube, Rathi Bhuvaneswari, Shashi Bhusan and Husne Banu

The cage cultured *Pangasianodon hypophthalmus* were collected from four reservoirs of Maharashtra namely Manoli, Kaneri, Varasgoan and Panshet during September and October months of 2017. The samples were processed for parasitic, bacterial and histopathological observations. Water and soil samples were also collected to analyse physicochemical parameters in order to assess the disease pattern and health of the ecosystem. Nutrient content and chlorophyll-α content suggests that the water body is oligotrophic in nature. Most of the fishes were found to be in healthy condition whereas some of the noticeable mild clinical manifestations include reddening of mouth region, excess mucus in fins and dropsy condition. Monogenean parasite could be seen prevailing in the gill tissues of fishes collected from Manoli, Kaneri and Varasgaon reservoir. The *Aeromonas jandai*, 2 strains of *A. veronii* and *Pseudomonas stutzeri* were isolated from samples collected from Manoli and Kaneri reservoirs whereas the *A. hydrophila* was isolated from fishes received from Panshet reservoir. The pathogenic bacteria *Citrobacter freundii* could be isolated from fishes collected from Manoli Reservoir. Tissue pieces collected from different vital organs were preserved in 10% neutral buffered formalin and samples were processed as per the routine laboratory protocol. Among all four reservoirs, the histopathological changes were pronounced in the gills, liver, intestine and kidney tissue collected from Varasgaon reservoir. Tissues from Manoli reservoir showed atrophied acinar cells leading to focal necrosis in the liver parenchyma, however, kidney, gills and intestine did not show any marked changes. Extensive degenerative changes were noticed in the intestinal tissues in most of the samples from Varasgaon reservoir.

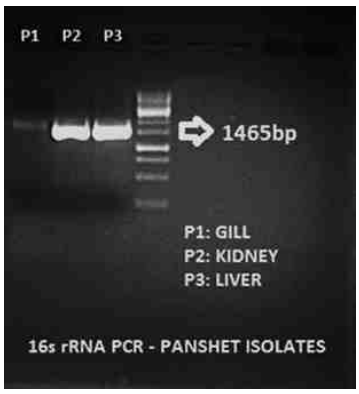


Histopathological changes observed in tissues collected from Varasgaon reservoir (100x)

Sampling in Panshet reservoir



Gradient PCR for 16S rRNA and *Aeromonas* specific 16s rRNA.



16s rRNA for Panshet bacterial isolates.

Different fish pathogenic bacteria were isolated from *P. hypophthalmus* of four reservoirs. These include *Aeromonas jandai,* 2 strains of *A. veronii, A. hydrophila, Citrobacter freundii* and *Pseudomonas stutzeri*.

Parasitological examination revealed heavy Monogenean parasitic infection in Varasgaon, however Manoli and Kaneri reservoirs showed moderate monogenean infection during rainy season. The winter season showed Trichodina infection in three reservoirs.

Among all four reservoirs, the histopathological changes were pronounced in the gills, liver, intestine and kidney tissue collected from Varasgaon reservoir during the first sampling. During second sampling the severity was more in the fishes collected from Kaneri reservoir.

Through histopathological studies it was concluded that the tissue alterations could be a reaction to a combination of bacterial and parasitic infections and can be judged as an adaptive response to prevent the proliferation of pathogens inside the body.

The seasonal pattern of bacterial infection will be assessed after the completion of sampling during summer season.

Performance evaluation and improvement of newly-designed water filtration unit

2016-19

Satya Prakash Shukla, Sanath Kumar, Vidya Shree Bharti, Kundan Kumar, Saurav Kumar, Muralidhar P. Ande and Nalini Poojary

An improved version of wall mounted unit with flow rate of 1000 L/h was designed and fabricated. Wall mounted vertical column unit

Electrically charged horizontal column device

Wall mounted vertical column unit installed in Zebrafish rearing unit

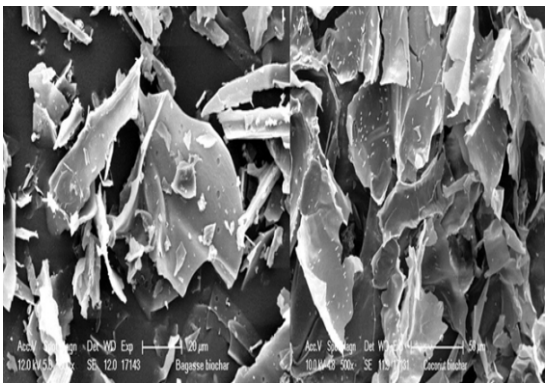
has been installed in the Zebra fish rearing unit, ICAR-CIFE. Field trials on electrically charged column were completed in shrimp hatchery in Kakinada. A second wall mounted unit has been installed in wet laboratory of ICAR-CIFE and trials on WSSV removal through filtration unit are in progress.

Impact of biochar in inland saline aquaculture

2017-2019

Vidya Shree Bharti, Satya Prakash Shukla, Hari Krishna and Vinod Kumar Yadav

Biochar treatment enhanced the availability of potassium and nitrate in the aquatic system compared to the ammonia–N. Further, biochar treatment significantly enhanced the soil organic carbon and decreased the available nitrogen in the inland saline water (ISW) system. Tender coconut shell and sugarcane bagasse biochar were found to be good sources of potassium (K) with 3.04% and 1.3%, respectively and can be used to meet the K requirement in potassium-deficient inland saline water.



Scanning electron microscopy of biochar

Studies on host pathogen interactions and development of nano based diagnostics for betanodavirus infection in *Lates calcarifer* (Bloch)

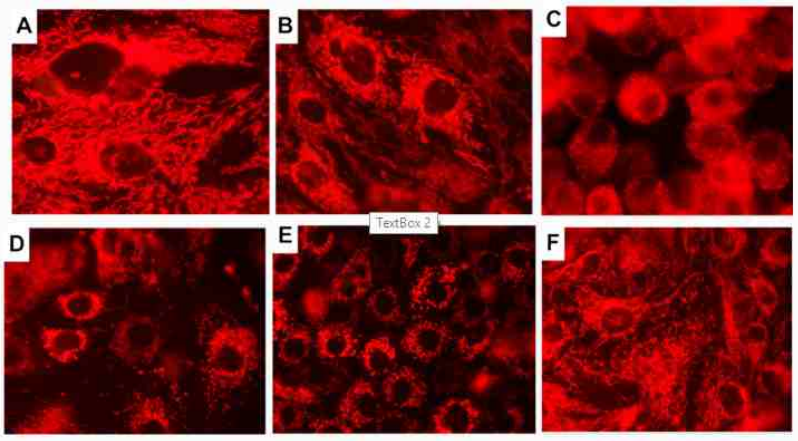
2015-18

Pani Prasad K, Jeena K, Mujahid Khan Pathan and Husne Banu

Betanodavirus is a non-enveloped and icosahedral virus from the family Nodaviridae, with a diameter of 20–30 nm, and two positive-sense RNA strands known as RNA1 and RNA 2 and amino terminal of RNA2 encodes for sub genomic RNA3. At present, approximately 40 species of fish are known to be affected with betanodavirus infection, freshwater guppy and aquarium fish such as gold fish and rainbow shark and is known to cause 100% mortality in 2-3 days. It has been reported from India in *Lates calcarifer*, some fresh water ornamental fish and clown fish. Diagnostic assays for betanodavirus are important to identify any outbreaks of infection and to screening of the broodstock that may act as carriers. Diagnostics available for betanodavirus include microscopy, molecular, immunological and cell culture methods. Ideally, the methods for diagnosis should be rapid, sensitive, specific and reliable because the virus causes acute as well as latent infections in fish.

The bio-barcode assay is a powerful amplification and detection system for nucleic acids and proteins. It involves the use of nanotechnology with serology and /or molecular biology and has the ability to detect the target without the use of enzymes, which PCR and other techniques require and allows detecting seemingly infinitesimal amounts of target DNA or protein in tissue or blood samples (Hampton, 2004). Among the molecular techniques, PCR and Real Time PCR and among the protein based techniques, ELISA is highly sensitive and specific compared to other diagnostics and are considered as gold standards. PCR is an extraordinarily powerful technique. However successful amplification of target nucleic acid sequences is hampered by cost, major multiplexing challenges and high susceptibility to contamination. For protein targets ELISA serves as the standard. ELISA is an extremely general technique that relies on target specific antibody labelling and colorimetric readout based on either flourophores or chromophores. The current assay sensitivities for protein detection are nowhere near the sensitivities achieved with PCR for nucleic acids (tens of copies). Therefore there is much room to improve upon the sensitivity of protein detection. The bio-barcode assay has a sensitivity of 30 attomolar, five orders of magnitude more sensitive than ELISA and for DNA, as little as 10 molecules in minutes. The sensitivity for proteins with bio-barcode amplification is PCR-like. The barcode assay is likely to have its most significant scientific and clinical impact in protein-marker based diagnostics. It is up to 106 times more sensitive than ELISA-based technology.

The screening of ornamental fishes from the market and Lates from different farms was undertaken by PCR for detection of betanodavirus infection. The virus was also propagated in SISS and SIGE cell lines for study of the host pathogen interactions. The amplification of the coat protein of the virus was done. The purified the amplified coat protein of Betanodavirus was cloned in-frame into pRSET A and recombinant protein was produced. The Intracellular dynamics of the virus infection was evaluated in SISS cells. The study revealed the occurrence of oxidative stress during NNV infection by measuring the mitochondrial superoxide (O2−) by MitoSOX staining and confocal microscopy in time course, post NNV



Mitochondrial fragmentation observed in time course post NNV infection in SISS cells.A- 0 hpi, B-6 hpi, C-12 hpi, D-24 hpi, E- 48 hpi and F-control

infection. The role of mitochondrial fission components during NNV infection was studied and it was found that NNV perturbs mitochondrial dynamics by promoting mitochondrial fission. The expression of mitochondrial fission factors were found to up regulate in time course post NNV infection and localization studies revealed their localization on mitochondria; resulting in enhanced mitochondrial fragmentation. In the present study the Drp-1 was silenced to reveal its role in NNV infection. Silencing of Drp1 resulted significant reduction in viral replication showing that NNV uses mitochondrial fragmentation as a way for escaping host innate immune response.

Salient Achievements

- Betanoda Virus was propagated using SIGE and SISS cell lines
- Virus was propagated in susceptible species – Zebra fish
- Intracellular dynamics of NNV infection in SISS cells were evaluated using microscopy, western blotting and qPCR studies
- Coat protein expression was studied in infected cell lines

In silico studies of Betanodavirus proteins was conducted

Development of vaccine delivery system using nanoparticles against *Edwardsiella tarda*: (DNA vaccine project part II)

2015-18

Megha Bedekar, Gayatri Tripathi, Rupam Sharma, Saurav Kumar, Dhamotharan K and Nalini Poojary

The goal of this project was to develop an effective bicistronic DNA construct to protect fish from *E. tarda* infection and to develop an effective, stress free and safe vaccine delivery system for fish. To enhance the efficiency of vaccine uptake, a nanoparticle based DNA vaccine has been developed.

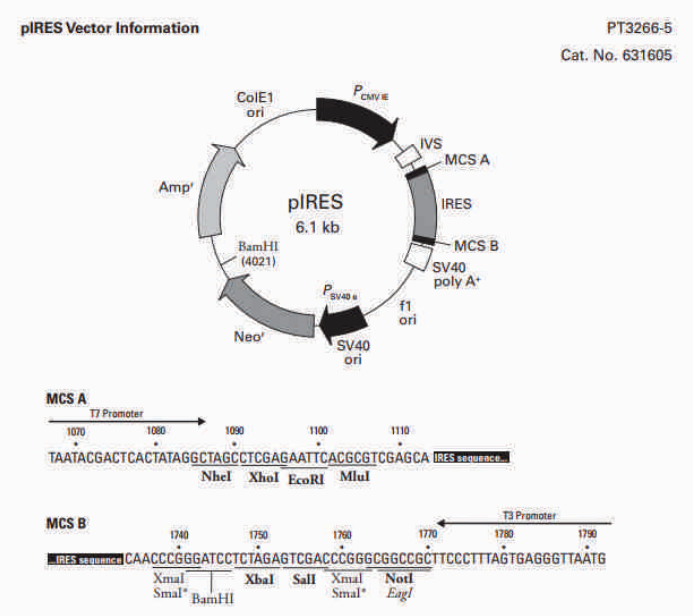
For enhancing the administration of DNA vaccine two nanoparticles Chitosan and PLGA were selected and protocol for conjugation particle with DNA vaccine were optimized.

In vitro assessment of the nanoparticle conjugated DNA vaccine for cell toxicity confirmed that toxicity level of both nano particles is less than 20%, even at high concentration ie 125 ng/μL DNA-Np.

In vivo challenge protection study and specific immune response studies recorded highest protection in orally fed group (80%). But Immersion group also showed significantly high protection 70% in Chitosan NP group and 72% in PLGA group. The protective response of PLGA Vs Chitosan Nps was similar. Considering the cost, chitosan was very economical compared to PLGA.

The amount of DNA required for immersion based vaccination is 10 times less than the feed based vaccine. So the introduction of genetically modified DNA to environment could be reduced by applying vaccine through immersion method. Further economically also it is more suitable.

The *in vivo* study for biodistribution of vaccine showed the presence of the DNA in gill, skin/muscle and gut. No DNA was detected in liver and kidney. The persistence of DNA was highest in muscle i.e. up to 30 days. Through immersion method uptake DNA was recorded only in NP-conjugated vaccine group. Naked DNA group did not show any uptake.



Vaccine DNA was not detected in the soil and environmental bacteria.

Salient Findings

- A procedure of nanoparticle based vaccination through immersion route is standardized for *L. rohita* against *E. tarda*.

- Chitosan nanoparticles have been found to be most suitable vehicle for vaccine delivery considering efficiency, cost, safety and ease of use.
- Immersion route of vaccine administration has been recorded to be an efficient, economic and safe mode of vaccine delivery.
- Vaccine DNA was not found in the experimental environment confirming the safety of the vaccine administration.

Development of phytotherapy against *Argulus* parasite of fish

2017- 19

Ram Prakash Raman, K.V. Rajendran and Saurav Kumar

The methanolic, ethanolic, chloroform, acetonic and petroleum ether extracts of Neem (*Azadirachta indica*) leaf, bark, seeds and petroleum ether extract of Pyrethrum (*Chrysanthemum* sp.) were prepared and their anti-parasitic efficacy against *Argulus japonicus* were tested under *in vitro* conditions. Comparative study was also conducted for different solvent extracts of Neem leaf, bark and seeds to evaluate the best working extract against *Argulus*. Ethanolic extract of Neem leaf and petroleum ether extract of Neem seeds were found to be effective treatments against *Argulus* at 1500 mg/L and 2000 mg/L levels for the period of 4-6 h leading to 100% mortality. The petroleum ether extract of pyrethrum showed 100% mortality against adult *Argulus* @ 200 mg/L in 6 hrs. The results provided evidence that Neem and Pyrethrum extracts could be used as effective treatments for controlling *Argulus*. However, the efficacy under *in-vivo* conditions needs to be evaluated in aquaculture ponds.

Table 1: *In vitro* Median Effective concentration (EC_{50}) of different extracts of *Azadirachta indica* against adult and copepodid stage of *Argulus japonicus*

Sl No.	Experimental fish	Selected Ecto-parasite	Azadirachta indica plant parts	Solvents used for extraction	Mode of application	Maximum exposure of duration	EC_{50} values (gL^{-1})	
							3 h	6 h
1	*Carassius auratus*	Adult Argulus japonicus	Leaf	Ethanol	Bath	6 h	3.3035	1.229
2			Leaf	Methanol	Bath	6 h	4.431	1.325
3			leaf	Chloroform	Bath	6 h	23.28	1.7156
4			leaf	acetone	Bath	6 h	22.83	1.441
5			Leaf	Aqueous	Bath	6 h	2.3749	1.650
6	*C. auratus*	Copepodid stage of Argulus	Leaf	Methanol	Bat h	6 h	1.773	1.113
		Copepodid stage of Argulus	Leaf	Ethanol	Bat h	6 h	1.340	0.9237
7	*C. auratus*	*Adult A. japonicus*	Seed kernel	Ethanol	Bath	6 h	5.706	1.3845
8			Seed kernel	Methanol	Bath	6 h	9.60	1.365
9			Seed kernel	Chloroform	Bath	6 h	9.61	1.556
10			Seed kernel	Petroleum ether	Bath	6 h	3.114	1.039
11			Seed kernel	Aqueous	Bath	6 h	4.66	1.5134

Table 2: Acute toxicity (LC 50) of Azadirachta extract extracts for goldfish (*Carassius auratus*)

Sl No.	Experimental fish	*Azadirachta indica* plant parts	Solvents used for extraction	Mode of application	Maximum Duration of exposure	LC_{50} values (gL^{-1})				
						12 h	24 h	48 h	72 h	96 h
1	*Carassius auratus*	Leaf	Ethanol	Bath	15 h	0.382	-	-	-	-
2	*Carassius auratus*	Leaf	Aqueous	Bath	96 h	3605.4	6.423	4.489	3.632	2.710
3	*Carassius auratus*	Seed kernel	Aqueous	Bat h	96 h	1.496	1.469	1.106	0.843	0.431

Improvement of harvest body weight of *Clarias magur* through genetic selection

2017-22

Shrinivas Jahageerdar, Thongam Ibemcha Chanu, Arun Sharma, Sunil Kumar Nayak, Lenin Singh Angom, Shamna N and Sikendra Kumar

- Collection and assembling of stocks of *Clarias magur* from various geographical locations is in progress

Improvement of harvest body weight of *Clarias magur* through genetic selection

- During the reporting period the selected animals from the first batch were bred
- A total of 34- full/half-sib families were produced
- The final sampling of the second batch animals is over and the data analysis is under progress

Genetic studies on functional traits of common carp (Linnaeus, 1758) cultured inland saline waters

2017- 20

Aparna Chaudhari, Shrinivas Jahageerdar, Angom Lenin Singh, Mujahidkhan Pathan, Pavan Kumar, Gireesh Babu, Harikrishna and Satya Prakash

- Four stocks of common carp were collected from (i) National Fish Seed Farm, Shivamoga (Karnataka), (ii) F.R.I.C., Bengaluru (Karnataka), (iii) F.R.I.C., Bengaluru (Amur carp) (Karnataka) and ICAR-CIFE, Powarkheda (Madhya Pradesh)
- Acclimatization studies for salinity tolerance up to 15 ppt are being conducted and tissue samples have been preserved for expression studies on selected genes
- Ponds of 200 m^2 prepared and maintained at 3 salinity levels - zero, 0-4 and 4-8 ppt
- Polyhouses fabricated in-house using wood and wire frames to survive winter temperature
- Acclimatized fish of all 3 stocks were tagged by fin clipping and stocked in the ponds @ ~200 fish of each stock at each salinity Initial body weight and standard length were measured
- Periodic sampling is being done to record growth traits

Fin clipping

Commercial production, toxicity and field tests of WSSV DNA vaccine

2015- 18

Aparna Chaudhari, Gireesh Babu, Muralidhar P. Ande and A. Pavan Kumar

The endemic shrimp virus WSSV significantly affects productivity and profitability of shrimp aquaculture and replacing tiger shrimp, *Penaeus monodon* with the exotic specific pathogen free *Litopenaeus vannamei* has not put an end to fish farmers' woes. The project was aimed at achieving commercialization of the WSSV DNA vaccine for all shrimp species developed at FGB Division of this Institute after due completion of regulatory requirements. The vaccine provides 70% protection and has the advantages of being a stable, economical, easily administrated molecule. The approval of Review Committee on Genetic Manipulation (RCGM) was obtained for industrial scale production for pre-clinical trials. Upstream processing of the vaccine has been carried out in collaboration with ICT-DBT Bioresouce Centre, Matunga. Good cell growth and copy number observed in in-house designed ICT-CIFE medium in fed-batch culture. Preclinical trials in mice are to be concluded in collaboration with NIRRH, Mumbai. Dose, protection, pharmacokinetics and toxicity studies in shrimp and environmental transmission of the DNA vaccine have been carried out at CIFE. Pharmacokinetics studies indicate quick uptake and distribution of DNA vaccine in dip-treated PL-20. On 25th day, the vaccine was detectable in pleopod & muscle tissues in very low copy number. Studies on environmental transmission showed that the vaccine was not detectable in soil, water, exoskeleton and microbial flora at all time points tested up to 30 days even though 16S rDNA could be PCR amplified from all samples. Field trials can be conducted only after RCGM approval.

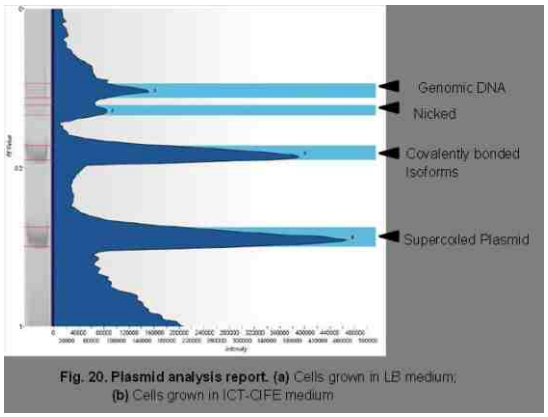
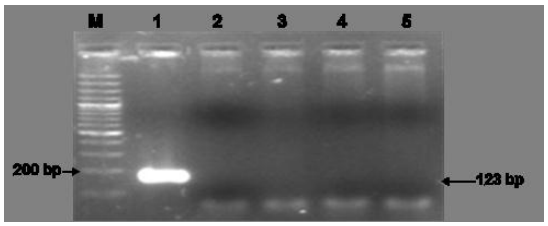


Fig. 20. Plasmid analysis report. (a) Cells grown in LB medium; **(b)** Cells grown in ICT-CIFE medium



- Industrial scale production of the vaccine for pre-clinical trials has been approved by RCGM
- Upstream processing of the vaccine has been carried out in collaboration with ICT-DBT Bioresouce Centre, Matunga
- Preclinical trials in mice are to be concluded in collaboration with NIRRH, Mumbai
- Pharmacokinetics, toxicity studies in shrimp and environmental transmission of the DNA vaccine have been studied.

Development of inbred lines of zebrafish and assessment of inbreeding depression

2015- 18

Gopal Krishna, Mujahidkhan Pathan, Shrinivas Jahageerdar and Aparna Chaudhari

Inbreeding depression is associated with increased homozygosity and genealogically-based F-values are reliable indicators of reduced heterozygosity. Polymorphic DNA markers like microsatellites can also be used to predict inbreeding coefficient. Here, we used zebrafish as a model to produce known levels of inbreeding and estimated inbreeding coefficient by genealogical and molecular methods. Two thousand microsatellite loci reported earlier were individually traced to their genome coordinates to record the type & structure of repeats and location with respect to genes & linkage groups. Of the 1781 loci screened, 55% were genic, while 45% were in the noncoding regions of the zebrafish genome. Among the genic loci 39% were in introns, 2% in exons and 14%, on exon-intron junctions. Three wild stocks of zebrafish were collected from rivers of North East India and mated to produce known level of inbreeding. Growth traits like body weight and standard length along with fecundity and sex ratio were recorded. Mt D-loop studies were also conducted

to study genetic diversity of zebrafish and results delineate that zebrafish population is sub structured with Fst value of 0.675. Heritability estimates by applying animal model for body weight and standard length were 0.43 ± 0. 057 and 0.36 ± 0.049, respectively. Strong positive genetic correlation of 0.87 ± 0.05 was observed between traits. For calculation of molecular F primers were designed and tested for 42 loci of which 20 were selected for genotyping 30 individuals based on their genomic location. The microsatellite loci located in exonic regions were found to be highly affected by inbreeding. Larger number of microsatellites will have to be used for genotyping to obtain a more reliable estimate of molecular F. The zebrafish facility created during the project is being developed into a National Resource Centre for supplying pedigreed and inbred zebrafish for biological research across the country.

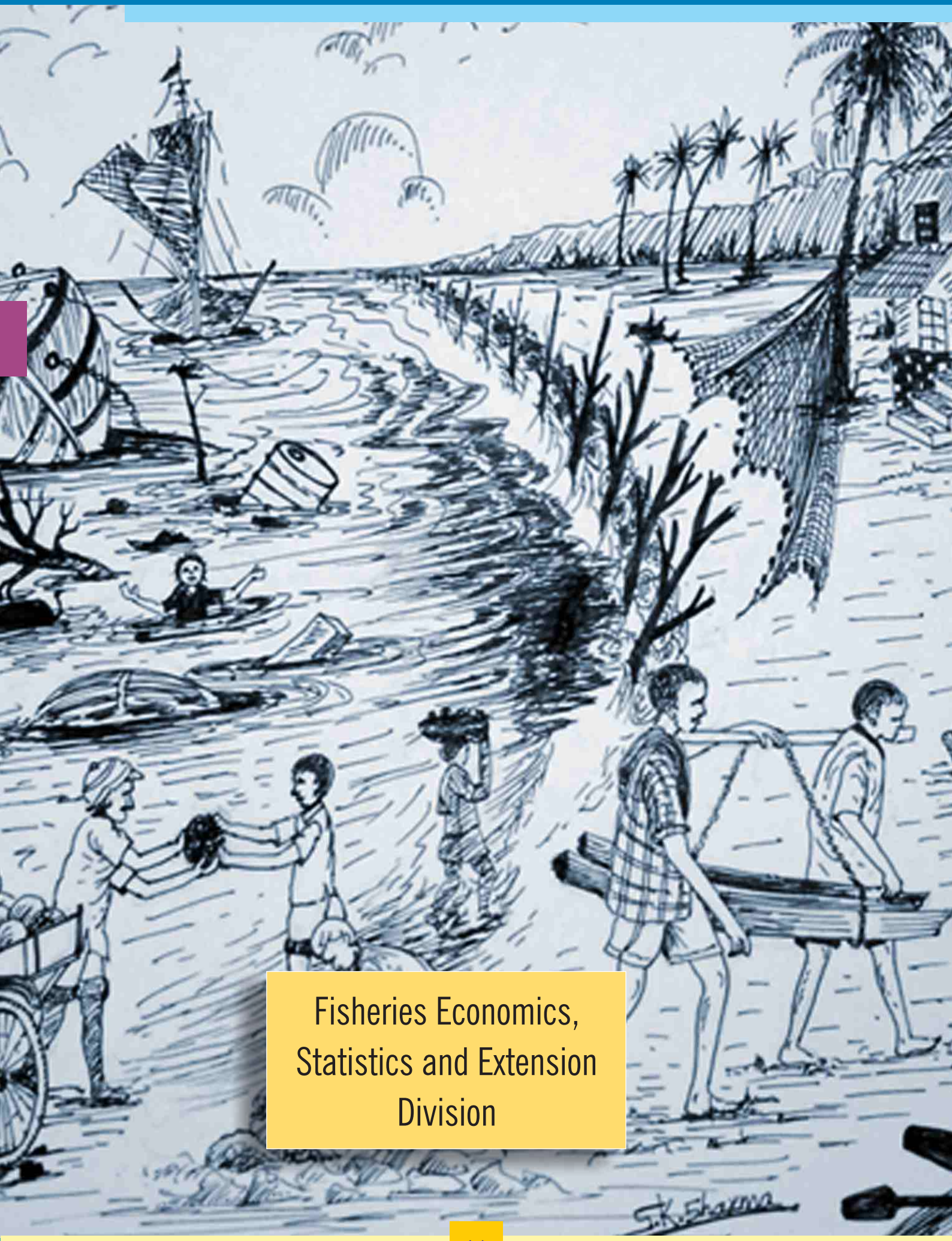
- Establishment of CZeBraG- Centre for Zebrafish Breeding and Genetics Research: A National Centre for Zebrafish Breeding and Genetics Research.
- Inbred Zebrafish F3 population developed using nested mating design
- Wild stocks of Zebrafish characterized using mit D loop and microsatellite markers
- Created new database on Zebrafish microsatellites

CIFE-Academic Management System (CIFE-AMS)

2015- 18

Shrinivas Jahageerdar, N.P Sahu, P.P. Srivastava, Ashok Kumar Jaiswar and Sudeep Marwaha

- Online registration of Masters students for first semester of batches 2015-17, 2016-18, and 2017-19 completed
- Master's degree course allocation to faculty for first semester by HoDs completed
- An analysis of the course allocation for the year 2016-17 suggests that a total of 295 courses were offered during the academic year.
- A user manual is under preparation
- A module to prepare CIFE Alumni directory is complete



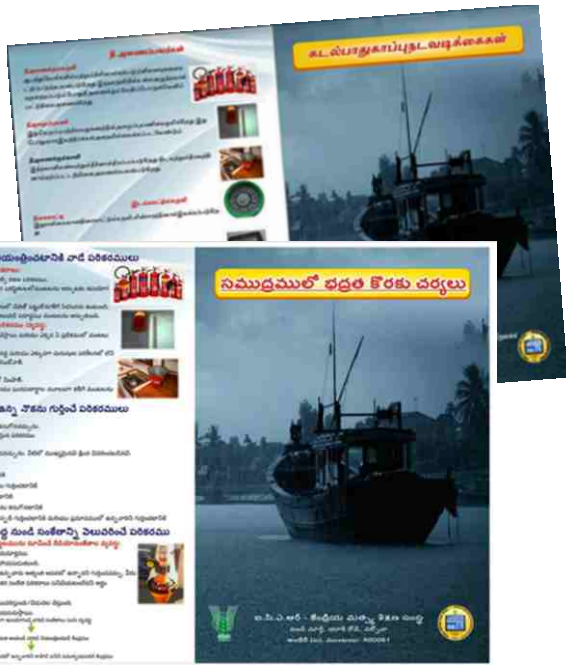
Fisheries Economics, Statistics and Extension Division

Capacity building of stakeholders to integrate fisheries and aquaculture in emergency response and preparedness

2015- 18

Arpita Sharma, B.K. Mahapatra and Muralidhar P. Ande

Disasters can have destructive impacts on the environment and fisheries dependent livelihoods affecting all actors of the value chain. For loss/damage and needs assessments, short, medium and long term recovery planning with a focus on phasing of activities back into normal development towards building back better should be emphasized. For this it is necessary, to develop the capacities of relevant stakeholders to integrate fisheries and aquaculture in emergency response and preparedness. Accordingly this research project was undertaken. For capacity development of stakeholders, 3 workshops on Fisheries and Aquaculture Response in Emergencies 2 workshops on Sea Safety Measures, 1 lecture on Earthquake and its Pre and Post Disaster Management Measures, 1 lecture on Mainstreaming Disaster Management (DM) in fisheries were conducted for diverse group of participants. Participants were fishers, fish farmers, officials from Department of Fisheries (DoF), Coast Guard, National Disaster Response Force (NDRF), Marine Police, NGOs, students, academicians and researchers. To test the effectiveness of the workshops, pre and post workshop knowledge scores were collected from participants to test their knowledge on issues related to core content areas of the workshop. For contents related to 'standards underpinning humanitarian actions', 'fisheries and aquaculture interventions assessing damage and loss in disaster situations and 'improving the quality of the assessments undertaken' an increase in the scores was reported. This increase was found to be statistically significant at 5% level of significance. Workshops resulted in increased awareness about the vulnerability of the sector, current frameworks for response and the need to be better prepared among participants. Workshop course structure was designed and tested in the field and based on the workshops, inputs were given for the validation of the guidance books on Emergency Response by FAO during their writeshop. Workshops reports were covered by FAO, local newspapers and newsletters. Assessment of occupational hazards (OH) faced by fishers and usage of Sea Safety Devices (SSDs) was done in six coastal districts of Kerala and Versova and Bhati fishing villages in Mumbai and Andhra Pradesh. Realizing that awareness on SSDs needs to be increased,



leaflets on 'Sea Safety Measures' in 10 languages of coastal India were prepared. A leaflet was also prepared on cyclone. An android mobile app which provides information on Cylcone has been also made and is being refined. Study on potential effects of disasters i.e., cyclone, drought, floods on livelihood of fishers was also studied. From field studies it was found that fisheries loss assessments in case of a disaster are usually limited to compensation for crafts and gears. Thus study was done to locate the determinants of physical capital losses across the fisheries value chains. To know about the use of technology like mobile phones, mapping of mobile apps in the field of Disaster Management

was done. A new methodology Virtual Product Snowball Sampling (VPSS) was devised and used for this. A total of 68 apps could be located which provided information on disaster. Among 68 apps there were 10 apps were from India. Context of fisheries was located in the Disaster Management Plans (DMPs) of centre, state and fisheries plans/frameworks. Based on the findings it was found that there is a need that within the fisheries policies disaster management needs to be mainstreamed like Odisha and Tripura. Within the disaster management plans of the states, fisheries need to be mainstreamed like in case of Odisha. Based on the overall project findings, it is recommended that all states should have their own Fisheries Sector DMPs based on the potential disasters they face or may face. The findings of the project have been published in form of papers and presented to international audience.

Salient Achievements

- Capacity development workshops to integrate fisheries and aquaculture in emergency response were organized for diverse stakeholder groups resulting in increased awareness about vulnerability of the sector, current frameworks for response and need to be better prepared. Workshop course structure was tested in field and inputs were given for validation of the FAO Guidance Books on Emergency Response.
- ssessment of occupational hazards faced by fishers and usage of Sea Safety Devices (SSDs) was done. Realizing that awareness on SSDs needs to be increased, leaflets on 'Sea Safety Measures' in 10 languages were prepared. An android mobile app which provides information on cyclone was designed.
- Context of fisheries was located in the Disaster Management Plans (DMPs) and it was highlighted that DM should be mainstreamed in fisheries policies and context of fisheries need to be mainstreamed in the DM plans along with the recommendation that all states should have their own fisheries sector DMPs.

Knowledge for S-VaISA: Developing & sharing knowledge resources for sustainable *L. vannamei* aquaculture in inland saline areas

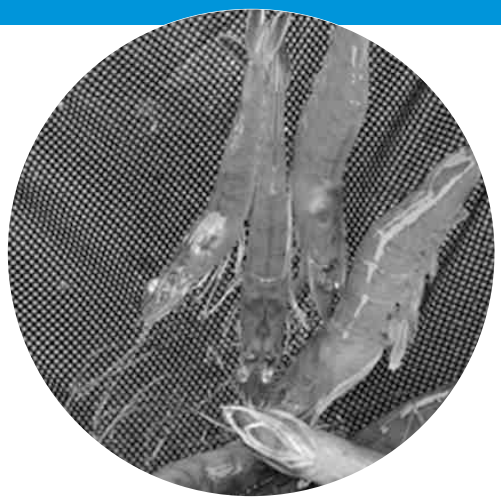
Ananthan, P.S, Hari Krishna, K. V. Rajendran, Pankaj Kumar, Neha Qureshi, A. K. Reddy

Technical Assistants: Ashok Kumar, Satyendra Singh, S. K. Sharma, D. Bhoomaiah and Raj Moitra

L. vannamei farming scenario in Inland Saline Areas: The area and production under white-leg shrimp farming in Haryana and Punjab has doubled from about 90 ha in 2016 to 185 ha during 2017 while the total production increased from 475 tons to about 900 tons. However, as production grew, the unit price at farm gate in Haryana-Punjab dropped from Rs.350 to Rs.280 for 40 count due to limited demand and resultant supply-demand mismatch on one hand, and the lack of development of supply chain to connect the buyers from coastal regions to Haryana-Punjab farmers. For instance, the farm gate price in Andhra Pradesh for 40 count at that time was about Rs.320-340/ kg.

In order to bridge information asymmetry, a comprehensive mobile App for aquaculture farmers in inland saline areas is proposed to be developed. Several existing Apps in the domain especially IFFCO Kisan, Kisan Suvidha, AgriMandi, Pusa Krishi, Krishi Mitr, CIBA Vanami Shrimp App were reviewed comprehensively in terms of design and interface, ease of use, language(s), target group, services offered, no. of downloads, main features, user feedback, etc. as well as requirements / expectations of farmers were obtained so as to design a farmer-friendly App. About 69 existing BMPs/GAPs, grouped under 11 broad sections, relevant to both tiger shrimp and L. vannamei culture in inland saline areas were compiled and reviewed. These practices would be validated, customised and contents (print/visual) developed for mobile App. Further activities of this sub-project will be taken up as part of funded NEHAP-CAAST mega program on "Development of Energy Efficient and Environment Protective Aquaculture Technologies for Degraded Soils".

ICAR-CIFE Centres



Technology refinement of zero water exchange system in *Litopenaeus vannamei* farming through commercial probiotic and bioremediator intervention.

2015-18

Thongam Ibemcha Chanu, N.K. Chadha, Chandra Prakash, Muralidhar P. Ande, Karthireddy Syamala, Arun Sharma, P. Srinivasa Rao, R.R.S Patnaik, V.N Acharyulu and J.K. Prasad

In this study, technology refinement of zero water exchange system in *Litopenaeus vannamei* farming through commercial probiotic and bioremediator intervention was attempted. The project was carried out in three phases. In the first year, a preliminary survey was conducted to identify commonly used probiotics and bioremediators in *L. vannamei* farms in East Godavari District, Andhra Pradesh. The survey revealed that "Eco-Pro" was the most commonly used probiotic, whereas "MultiBact" was the most commonly used bioremediator. Based on the survey, Eco-Pro and MultiBact were used for the experimental trials. In the second phase, a comparative performance analysis of commercial probiotic singly or in combination with the bioremediator in organic waste management and production of *L. vannamei* was performed in the brackish water fish farm of ICAR- CIFE, Kakinada centre in Andhra Pradesh.

The experiment was conducted for 80 days in six uniform sized earthen ponds (20 mx10 mx1 m) by following completely randomized design in duplicates. The experiment was conducted for 80 days in six uniform sized earthen ponds (20 mx10 mx1 m) by following completely randomized design in duplicates. The experiment was divided into three treatment groups, i) control group (without probiotic and bioremediators, ii) water probiotic treated group and iii) combination of probiotic and bioremediator treated group. Bioremediators (Eco-Pro™ -*Rhodopseudomonas palustris* @ $1.2x10^9$ CFU/ml and *Rhodobacter capsulatus* @ $1.2x10^8$ cfu/ml) and probiotic were applied to the ponds (T2) and control ponds without treatment (control). Specific pathogen free ten days old post larvae (PL-10) of Pacific white shrimp (*Litopenaeus vannamei*) were procured from a CAA approved commercial hatchery and stocked at the rate of 55 numbers/m^2. The larvae were fed with commercial Balanca™ sinking pelleted shrimp feed containing 32% crude protein. Results of the Water quality and soil parameters showed no significant difference among the treatments and control during the culture period. *Vibrio* colony count showed no significant difference in water, soil and shrimp among treatment and control groups throughout the culture period. No disease outbreaks occurred uring the culture period in all the three treatments. Total heterotrophic bacterial counts were not significantly different in treatment groups and the control, as wells as in soil and water. Growth performance in terms of average weight (g), percentage weight gain, FCR, SGR were not statistically significant different among the treatment groups and control. However, highest growth performances (AW-13.19 g, FCR-1.35, SGR-2.56) and survival rate (93.5%) were observed in probiotic treated group. Overall production performance (kg/ha/cycle) showed no significant difference compared to the

control. The highest production performance (6580 kg/ha/cycle) was recorded in probiotic treated group. In the third phase, the performance of commercial probiotic at different salinities in organic waste management and production of *L. vannamei* was studied. Experimental trial was conducted at farmer's field for 80 DOC to investigate the growth, water quality and bacterial load through probiotic intervention, either alone or in combination with bioremediators at different salinity levels (0, 5, 10, 15 ppt). The results showed that the average weights (g) of shrimp in probiotic treated pond with 0‰, 5‰, 10‰ 15‰ were 14.105±0.12, 14.59±0.28, 13.19±0.22, 13.65±0.26, respectively. The average weight of probiotic and bioremediators treated group were 13.77±0.15, 13.995±0.13, 13.13±0.08 and 14±0.016 g, respectively. The survival rate was significantly higher in probiotic treated pons with 10‰ salinity. However, in both probiotic and bioremediator combination group, survival rate showed no significant differences at different salinity levels. Overall production (kg/ha/cycle) was found to be better in 15‰ , but no significant difference was observed between probiotic treated versus probiotic and bioremediator treated groups. Water quality parameters (TAN, NH_3Nitrite) were significantly different in 0‰ salinity pond compared to other salinities. Total *Vibrio* count in water, sediment and shrimp were significantly lower at 0% compared to 5% 10% or 15%.

Salient Achievements:

- Technology was assessed for Zero water exchanged farming system of *L. vannamei* for 80 DOC in farm level in three ways *probiotics and bioremediators, either individually or in combination*
- Technology was refined for Zero water exchanged farming system of *L. vannamei* without probiotic and bioremediator input in low (10 ppt) saline water.
- Front line demonstrations of Zero water exchange *L. vannamei* farming at three Aqua farms were conducted through probiotic and bioremediator intervention at different salinities (0 ppt, 5 ppt and 15 ppt).

Isolation and characterization of pathogenic bacteria associated with *L. vannamei* farming.

2015-18

Arun Sharma, Muralidhar P. Ande, Karthireddy Syamala, Thongam Ibemcha Chanu, P. Srinivasa Rao, J. K. Prasad, V.N. Acharyulu and R.R.S. Patnaik

Litopenaeus vannamei samples were collected from different farms of Amlapuram, Kakinada, Mandapeta, G. Mamidada, Yanum, Dhaksharama, Anaparthi in East Godavari District of Andhra Pradesh. Bacteria were isolated from the shrimp samples and were identified by biochemical tests, followed by PCR amplification and sequencing of 16S rDNA. The 16S rDNA sequences derived in this study have been submitted to NCBI (Table.1). A total of 8 bacteria were isolated and characterized which included. *Vibrio alginolyticus* AMLA01, *V. parahaemolyticus* KKD 02, *Bacillus safensis* MMD 02, *Shewanella amazonensis* kkd-1, *V. cholerae* KKD 03, *Pseudomonas aeruginosa* mmd23, *V. alginolyticus* ATM03 and *Vibrio parahaemolyticus* Yunm09. The bacteria were screened for different virulent genes such as *toxR, tdh* (thermostable direct hemolysin) and *trh* (thermostable direct hemolysin-related hemolysin). Among the isolated bacteria, a *V. parahaemolyticus* KKD 02 and a *V. alginolyticus* AMLA01 were positive for all the three virulence genes.

Challenge study was conducted through both IP injection and bath challenge methods, and LD_{50} values were determined for respective strains

(Table 2). *V. alginolyticus* ATM03, *V. parahaemolyticus* Yunm09, *V. cholerae* KKD 03, *V. alginolyticus* AMLA01, and *V. parahaemolyticus* KKD 02 were found to be pathogenic to shrimp. Similar study conducted at different salinities of 0, 5, 10, 15, 20 and 25 ppt showed that at 5 to 10 ppt salinities, *L. vannamei* were more resistant to bacterial infections.

Salient Achievements

- Eight bacterial strains were isolated and characterized from *L. vannamei* farms.
- Two bacterial stains, *V. parahaemolyticus* KKD 02 and *V. alginolyticus* AMLA01 were positive for three virulence genes namely *toxR, tdh* and *trh*.
- The study showed that *L. vannamei* can resist bacterial resistance more efficiently when reared at 5 ppt to 10 ppt salinities.

Table 1: Isolated bacteria and Gen Bank accession no.

Sl. No.	Name	Strain	Genbank Accession No.
1.	*Vibrio alginolyticus*	*Vibrio alginolyticus* AMLA01	KY494863.1
2.	*Vibrio parahaemolyticus*	*Vibrio parahaemolyticus* KKD 02	KY495224.1
3.	*Bacillus safensis*	*Bacillus safensis* MMD 02	KY495152.1
4.	*Shewanella amazonensis*	*Shewanella amazonensis* kkd-1	KY355733.1
5.	*Vibrio cholerae*	*Vibrio cholera* KKD 03	KY508341.1
6.	*Pseudomonas aeruginosa*	*Pseudomonas aeruginosa MMD23*	MG930064.1
7.	*Vibrio alginolyticus*	*Vibrio alginolyticus ATM03*	MG952585.1
8.	*Vibrio parahaemolyticus*	*Vibrio parahaemolyticus Yunm09*	MG952582.1

Table 2: Challenge study (both IP injection and bath challenge) method and determined LD_{50} of the respective strains.

Sl. No.	Strain	Pathogenicity/LD_{50}
1.	*Vibrio alginolyticus* AMLA01	Bath Treatment: $3.26x10^4$CFU/shrimp IP injection: $3.161x10^3$CFU/shrimp
2.	*Vibrio parahaemolyticus* KKD 02	Bath Treatment: $2x10^5$CFU/shrimp IP injection: $3.151x10^4$CFU/shrimp
3.	*Bacillus safensis* MMD 02	Non Pathogenic
4.	*Shewanella amazonensis* kkd-1	Non Pathogenic
5.	*Vibrio cholera* KKD 03	Bath Treatment: $3.14x10^4$CFU/shrimp IP injection: $1.15x10^3$CFU/shrimp
6.	*Pseudomonas aeruginosa* mmd23	Non-Pathogenic
7	*Vibrio alginolyticus* ATM03	Bath Treatment: $3.14x10^4$CFU/shrimp IP injection: $1.15x10^3$CFU/shrimp
8	*Vibrio parahaemolyticus* Yunm09	Bath Treatment: $4.16x10^5$CFU/shrimp IP injection: $1.52x10^4$CFU/shrimp

CIFE Centre Kolkata

Captive maturation, breeding and culture of Indigenous ornamental fish *Botia dario* and *Colisa lalia*

2015-18

B. K. Mahapatra, G. H. Pailan, Subhendu Datta, Parimal Sardar, S. Munilkumar and S. Dasgupta

Captive breeding trial of *Colisa. lalia* was successfully conducted in aquarium under laboratory conditions. For rearing of *C. lalia*, ideal

water temperature is 18 to 27°C and the pH is 6 to 8. During captive rearing, fish fed with diet containing spirulina powder as carotenoid source at 3% level showed increasing trend in body colouration. Nutritional evaluation on captive maturation of *Botia dario* and *Colisa lalia* were carried out. Study revealed that gonad was not developed in *B. dario* during this feeding period, but it was developed in *C. lalia*. Effects of enriched Tubifex and mixed zooplankton on growth of *B. dario* were evaluated. For breeding *C. lalia*, male builds bubble nest and the female lays eggs in it. The male guards the nest and the eggs in it. Eggs are hatched out after 36-48 h. *Colisa lalia* exhibits two distinct batches of oocytes at a time in ovary indicating the asynchronous type of ovarian development. Male and females mature at different times, showing clearly the preferential differences in the environmental clues between sexes. Advancement of gonad development in captivity can be done through proper photo-thermal manipulation at the appropriate season for both male and females separately to extend spawning period and enhance seed production. Rearing of *C. lalia* larvae was conducted with small sized zooplankton along with liquid larval feed with or without green algae. It was observed that larvae pass over the first feeding stage with algal density (*Chlorella* sp.) of 0.05-0.10 million cells/ml.

Evaluation of flesh quality of *Pangasianodon hypophthalmus* and development of value added products

2015-18

Dilip Singh

Moringa leaf extract was used as an antioxidant for feeding of *Pangasius*. Significantly higher fillet yield was obtained in an antioxidant supplemented fish. Low cost feed was formulated along with the supplementation of Moringa leaf extract & feeding trial is being conducted. Fish fillet was used for preparation of different types of value added products like fish cutlet, fish balls, fish pickle, fish finger, fish nuggets, fish sausage, fish butter fry etc.

Training programmes were conducted for students and women self help groups of west Bengal on fish processing and value added fish products.

Search for suitable alternative of organic manure to reduce production of greenhouse gases from aquaculture

2017-2019

Subhendu Datta, G.H. Pailan, S.P. Shukla and Sreedharan Krisnan

Efficacy of 3 organic manures viz. cow dung, humic acid and fermented boiled rice with molasses and yeast were tried at varying doses at different salinities of 0, 2.5, 5 ppt in the reduction of GHGs from aquaculture systems. Ten common carp fingerlings were stocked in 500 litre tanks treated with organic manures. After 60 days of experiment, it was observed that ammonia and nitrite concentrations were the lowest.

CIFE Centre Rohtak

Profiling of pathogen of *Penaeus (Litopenaeus) vannamei* farmed in inland saline waters

2017-2019

K. Sreedharan, H. Hari Krishna, Satya Prakash, K. V. Rajendran, H. Sanath Kumar

Significant Findings

The major objective of the project is to isolate and characterise potential pathogens associated with farmed *Litopenaeus vannamei* cultured in inland saline waters. To start with the project, we investigated occurrence of diseases in several *L. vannamei* farms situated in the states of Haryana and Punjab. We found that *L. vannamei* farmed in saline affected areas were affected with several health related issues such as growth retardation, antennal cut, muscle cramp, yellowing of leg, red body, black gill, whiteness of the muscle and white gut disease. Mass mortality of *L. vannamei* was noticed in few farms which were suspected to be running mortality syndrome. Pathogenic vibrios could be isolated on TCBS (Thiosulfate-citrate-bile salts-sucrose) agar from different samples. Moreover selected samples were preserved in RNA later (for detecting RNA viruses), 70% ethyl alcohol (for screening DNA viruses and the protozoan parasite, *Enterocytozoon hepatopenaei* (EHP) and Davidson's fixative (for histopathological analysis). Water quality parameters of affected farms were determined. Characterisation of different bacterial isolates, testing for both DNA and RNA viruses, and histopathological analysis of selected samples is under progress. Some of the samples showing retarded growth were tested for EHP and found negative.

Antennal cut

Antennal cut with yellowing of legs

Growth retardation

Muscle whitening

List of Externally Funded Projects

World Bank-ICAR funded project (NAHEP)

1. Development of energy efficient and environmental protective aquaculture technologies for degraded soils.
   Gopal Krishna

Department of Biotechnology (DBT), Govt. of India

2. Novel molecular approaches for advancing prediction and mitigation of disease outbreaks in aquaculture for small scale farmers
   K.V. Rajendran, Megha K. Bedekar and Sanath Kumar H.
3. Molecular screening, cell culture based isolation and characterization of finfish and shellfish viruses and establishment of National Repository
   K.V. Rajendran and K. Pani Prasad
4. Biomass production and downstream processing of *Spirulina (Arthrospira) platensis* for high-purity colorant grade phycocyanin extraction
   Satya Prakash Shukla and Rathi Bhuvaneswari
5. Three months national training in molecular biology and biotechnology for fisheries professionals
   Gopal Krishna (National coordinator), Aparna Chaudhari, Gireesh Babu P.
6. Identification of most suitable population of pearl producing freshwater bivalves of North East India through a molecular approach
   Gopal Krishna and Annam Pavan Kumar
7. Protein expression profiling of *Labeo rohita* using quantitative proteomics
   Mukunda Goswami, Sanjeeva, Mujahid K. Pathan, M. Gandhi
8. Molecular and genetic characterization of selected important ornamental fishes of North East India
   Mukunda Goswami, A. Pavan Kumar, R. Nath and R. N. Bhuyan
9. Captive maturation, breeding and culture of some indigenous ornamental fishes of Assam
   B.K. Mahapatra, Parimal Sardar, Subhendu Datta
10. DNA barcoding and domestication of ornamental fishes of the Chindwin and Barak Surma Meghna river basins of Northeast India
    S. Munilkumar, B.K. Mahapatra, A. Pavan Kumar
11. Utilization of the detoxified rubber seed cake in aquafeed
    Narottam Sahu and Asim K. Pal
12. Development of pelleted diet for *Catla catla* and *Clarias batrachus* using *Achyranthes aspera* and evaluation of its immunostimulatory properties in pond culture system
    Rina Chakrabarti, J.G. Sharma, V. Harikrishna

ICAR-CRP on vaccines and diagnostics, New Delhi

13. Development of dual vaccine for protection of *Labeo rohita* to bacterial pathogens *Flavobacterium columnare* and *Edwardsiella tarda*
    Megha Kadam Bedekar, Kundan Kumar, Saurav Kumar

ICAR, New Delhi

14. Network project on fish health
    Pani Prasad K and Swadesh Prakash Tiwari

NFDB, Hyderabad

15. National surveillance programme for aquatic animal diseases
    Pani Prasad K. and Ram Prakash Raman
16. Fisheries enhancement in Maharashtra (District Thane) through seed production and pen culture in rivers Vaitarna and Bhatsa for livelihoods and nutritional security among the tribal community
    Neelam Saharan, D. N. Thakur, A. K. Reddy, Kiran Dube Rawat, Chandra Prakash, Ajit Kumar Verma, Chandrakant M.H. and Raju K.D.

DST-SERB (Science and Engineering Board), New Delhi

17. Conservation of Indian Megafish: molecular taxonomy and phylogeography of Mahseer fishes of India.
    Annam Pavan Kumar

National Centre for Sustainable Coastal Management (NCSCM), Chennai

18. Development of DNA barcodes for Indian marine crustaceans with commercial and conservation significance
    Annam Pavan Kumar and Ashok Kumar Jaiswar

NASF, ICAR, NEW DELHI

19. Stock characterization, captive breeding, seed production and culture of hilsa (*Tenualosa ilisha*)
    S. Dasgupta and G.H.Pailan

Rajiv Gandhi Science and Technology Commission (RGSTC), Mumbai

20. Pilot scale demonstration of value added products from surimi
    Amjad K. Balange and Martin Xavier

ICAR-Education Division, Govt. of India and World Bank

National Agricultural Higher Education Project

"Development of energy efficient and environment protective aquaculture technologies for degraded soils"

2018-21

Principal Investigator: Dr. Gopal Krishna

Budget: Rs. 1994.80 Lakhs

In order to strengthen the flagship program on inland saline aquaculture (ISA) from a long-term sustainability perspective, ICAR-CIFE has initiated a mega project under the ambit of National Higher Education project (NAHEP)-Centre for Advanced Agricultural Science and Technology (CAAST). The major activities of NAHEP will be carried out at CIFE-Rohtak Centre, with the aim of developing it into a Centre of Excellence in ISA. The project has got multidisciplinary teams comprising a total of 32 Scientists (CO-PIs) from different specialised areas.

Long-term goal of the project

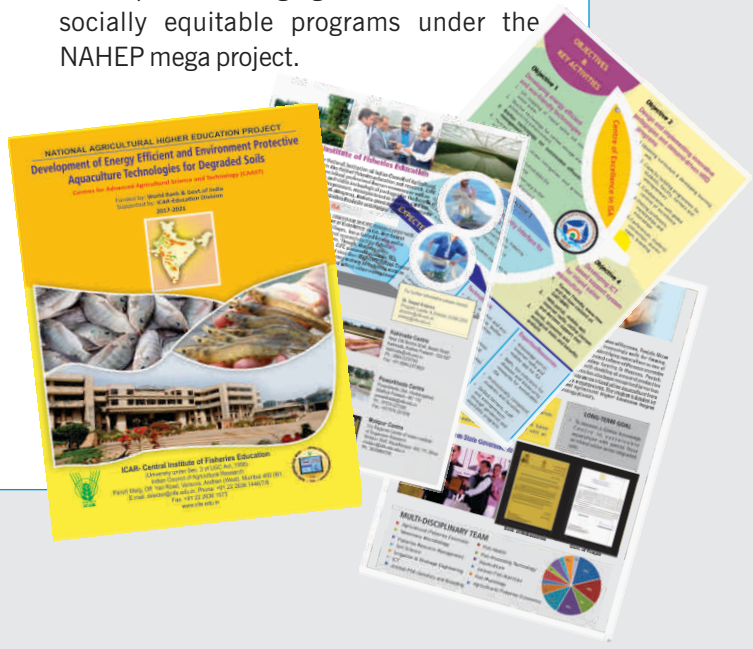
- To make ICAR-CIFE a Global Knowledge Centre in sustainable aquaculture with the special focus on inland saline areas/degraded soils

Short-term goals of the project

- To generate professionally competent human resources in specialised areas of aquaculture and fisheries
- To establish a Centre of Excellence in Inland Saline Aquaculture at CIFE-Rohtak Centre through cutting-edge research with an objective to 'create wealth from waste'

Expected Outcome

The project will create a full-fledged Centre of Excellence in Inland Saline Aquaculture. Knowledge portal, internet radio, mobile app, online courses and a decision support tool will cater the needs of today's aquaculturist. Among technologies, energy efficient and eco-friendly biochar, biofloc and bioremediation technologies will be transferred to aqua-farmers and related industries. An anti-stress formulation and eco-friendly feed, as well as post-harvest technologies for reducing waste and value-added fish products, will also be delivered to aquapreneurs. Identified bio-indicators of disease risks, specific biosecurity measures and related BMPs for sustainable ISA will also be catalogued under this project. The Institute will yield various services like GIS-based thematic resource maps integrated with farmer's knowledge, policy, and framework with specific guidelines for promotion of sustainable ISA. The project is expected to generate professionally competent students and faculty in the specialised disciplines. Skilled farmers and enriched entrepreneurs are also expected through gender sensitive and socially equitable programs under the NAHEP mega project.



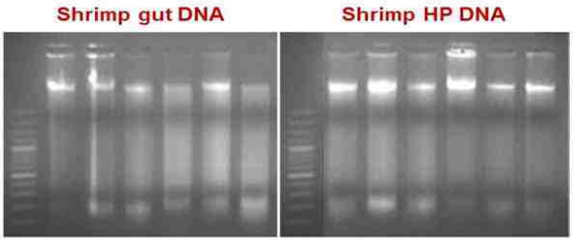
Department of Biotechnology (DBT), Govt. of India

Novel molecular approaches for advancing prediction and mitigation of disease outbreaks in aquaculture for small scale farmers

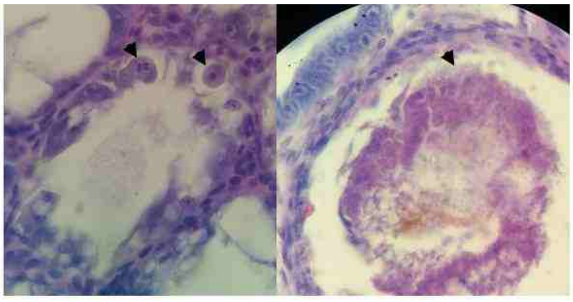
2016-2019

K.V. Rajendran, Megha K. Bedekar and Sanath Kumar H.

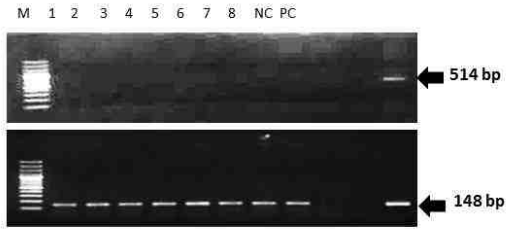
Rs. 113.45 Lakhs



Shrimp genomic DNA extracted using standardised CTAB-EDTA protocol



Histological section of hepatopancreas showing presumptive EHP developmental stages in the tubular epithelial cells. EHP spore like structures in lumen of hepatopancreas tubules



PCR testing (nested-PCR) of shrimp samples for *Enterocytozoon hepatopenaei* (EHP) using SWP primers

PCR detection of Vibrio from different samples

The goal of this research project is to understand the factors responsible for dysbiosis in *Penaeus (Litopenaeus) vannamei* that lead to disease outbreaks using metagenomic sequencing and analysis and other molecular and histological tools. Two shrimp farms located in the west coast of India (Maharashtra) were selected for the study. During the course of the regular sampling, one of the farms experienced white spot syndrome virus (WSSV) outbreak and another encountered slow/retarded growth. Samples (shrimp, water and sediment) from these farms were collected and various analyses have been carried out. For metagenomic sequencing, DNA extracted from shrimp gut was used. Different DNA extraction protocols have been employed to extract DNA from different tissues and specific procedures for different tissues have been standardized. Library construction and sequencing were performed using Illumina Nextseq 500 PE sequencing platform. The metagenomic sequence data generated from the samples are being analyzed to understand the microbial taxonomic composition, functional diversity and the key differences in metagenomic contents of healthy and diseased shrimp. Additionally, the shrimp samples were also tested for *Enterocytozoon hepatopenaei* (EHP) and selected known viruses using PCR and histology. Regular histology of shrimp samples, especially hepatopancreas and gut tissues, are being carried out. Bacterial isolates obtained from the samples have been biochemically identified, and confirmed by PCR. The isolates are being screened for virulence genes commonly associated with shrimp pathogenic bacteria.

Molecular screening, cell culture based isolation and characterization of finfish and shellfish viruses and establishment of National Repository

2017-2020

K.V. Rajendran and K. Pani Prasad

Budget: 98.683 lakh

Details of known shrimp and fish viruses in India have been compiled. The PCR protocols have been standardized and PCR screening was carried out for the viruses infecting shrimp such as white spot syndrome virus (WSSV), infectious hypodermal and hematopoietic necrosis virus

(IHHNV), monodon baculovirus (MBV), hepatopancreatic parvo virus (HPV) and covert mortality nodavirus (CMNV). PCR screening was performed for Mud crab parvovirus, reovirus and shrimp mouryllian virus (MoV). The finfish viruses screened include tilapia lake virus (TiLV), megalocytivirus, tilapia larvae encephalitis virus (TLEV), nervous necrosis virus (NNV), cyprinid herpes virus-2 (CyHV-2). Two cell lines (IEK-NRFC-041, ICG-NRFC-021) and positive controls for PCR detection of TiLV, CMNV and NNV were procured. Farmed as well as wild crustaceans are being screened for the viruses along with selected ornamental fish such as guppy, angel fish and goldfish. An investigation carried out on a disease outbreak reported from cage-cultured Tilapia revealed the presence of TiLV using PCR and confirmed through sequencing.

Biomass production and downstream processing of *Spirulina (Arthrospira) platensis* for high-purity colorant grade phycocyanin extraction

2017-20

Satya Prakash Shukla and Rathi Bhuvaneswari G

Rs. 38.92 Lakhs

Closed bioreactors for semi- outdoor cultivation of *S. platensis* have been designed in this study. The conditions for enhanced production of *S. platensis* biomass have been standardized. Further, a single step process for bulk phycocyanin production has been developed and optimised. Since the purity of extracted phycocyanin is critical, a process for enhancement of purity of extracted phycocyanin has also been developed in this study. Currently, research is in progress for the development of products with phycocyanin as an ingredient and development of a complete protocol for biomass production and colorant grade phycocyanin extraction.

Three months national training in molecular biology and biotechnology for fisheries professionals

2015-18

Gopal Krishna (National coordinator), Aparna Chaudhari, Gireesh Babu P.

Rs. 66.85 Lakhs

This human resource development project is a unique initiative to promote application of molecular biology and biotechnological tools and techniques by fisheries professionals. This multi-institutional project was run simultaneously at CIFE, Mumbai (Nodal Centre), CIFA, Bhubaneswar and CMFRI, Kochi. The total training period of 90 days is divided into 45 days of theory and practical classes on basic and specialized topics of molecular biology and biotechnology, and 45 days of short project work. In addition to basic molecular biology and genetic engineering techniques, 'Molecular Biology, Genomics and Transgenics' was the specialization offered at CIFE. Total 24 participants from various ICAR institutes, CAUs and SAUs were trained in 5 batches at CIFE over the project period. The areas of short project work included genetic engineering, development and application of molecular markers, gene expression studies, bioprospecting of genes, genotoxicity, DNA barcoding, disease diagnosis, nutrition, etc. Some trainees could also present their research outputs at seminars/ symposia. Some participants have submitted project proposals to DBT, NASF and NFDB and have been granted projects. This project included post-training mentoring and the same has been provided. Three trainees were awarded DBT funding for their proposals and others are using their skills in teaching. The trainees rated the program as excellent and highly relevant.

Salient Achievements

- 24 participants trained in 5 batches conducted over the project period
- Training manual compiled
- Program rated excellent and highly relevant
- Post-training mentoring provided

Identification of most suitable population of pearl producing freshwater bivalves of North-East India through a molecular approach

2017- 19

Gopal Krishna and Annam Pavan Kumar

Rs. 22.00 Lakhs

- A total of 55 samples of *Lamellidens marginalis* were collected from different locations along Damring River (25° 30 'N, 90°30' E), Garro Hills District, Meghalaya
- About 50 cross-species microsatellite loci were screened in *L. marginalis* and 23 loci could be successfully amplified of which 11 are polymorphic
- Genetic variation among the stocks is being studied

Protein expression profiling of *Labeo rohita* using quantitative proteomics

2017-20

Mukunda Goswami, Sanjeeva (IIT, Bombay), Mujahid K. Pathan, M. Gandhi (IIT Bombay)

Rs. 100.55 Lakhs

- Collected tissue samples from *Labeo rohita*
- Extracted protein from muscle, gill, brain, liver, kidney & heart and carried out PAGE with the help of collaborating institute IIT, Bombay

Molecular and genetic characterization of selected important ornamental fishes of North East India

2017-20

Mukunda Goswami, A. Pavan Kumar, R. Nath and R. N. Bhuyan (St. Anthony's College, Shillong)

Rs. 87.41 Lakhs

- Fish tissue samples (n=115) were collected from Meghalaya and Assam with the help of collaborating institute St. Anthony's College, Shillong, Meghalaya
- Samples are being processed for DNA isolation and PCR

Captive maturation, breeding and culture of some indigenous ornamental fishes of Assam

2017- 20

B.K. Mahapatra, Parimal Sardar, Subhendu Datta

Rs. 31 Lakhs

Pethia gelius (5000 nos) were procured from wetlands of Assam and transported to ICAR-CIFE, Centre Kolkata. After procuring, fishes were disinfected by giving bath treatment with 5 ppm $KMnO_4$ until fishes show the symptoms of stress. After discarding dead and weak fishes the bath treated fishes were transferred to fiber tanks

of 1000 litre capacity with continuous aeration. Fishes were acclimated for 15 days in laboratory conditions before start of the experiment. The fish were stocked in 3 different systems after acclimatization. i.e., RAS (flow through system with the dimension of 160 cm length × 60 cm height × 90 cm width; water volume – 50 lit); Cement (confined system) with the dimension of 75 cm length × 30 cm height × 30 cm width (water volume – 450 lit) and fiber tank with dimension of 160 cm length × 100 cm height × 120 cm width (water volume – 100 lit). The average size of stocking was about 1 cm with the body weight of around 150 mg. The habitat for fish were made with the help of sandy bottom,

gravels, stones along with plantation of some of the ornamental plants like Amazon, Vallisnaria, Hydrilla in RAS system while apart from above the Pistia, Cabomba, Ceratophyllum, Jussia and Salvinia were planted in the cement tanks and fiber tanks. The different indoor and outdoor habitat was created for comparative study of growth and survival. The depth of water was maintained about 1 ft. in the cement tank. The fish were fed with plankton, Artemia naupli, tubifex and chlorella twice a day. The optimum water quality was maintained throughout the period with the temperature ranging between 18-22^{0}C.

DNA barcoding and domestication of ornamental fishes of the Chindwin and Barak Surma Meghna river basins of North-East India

2017-20

S. Munilkumar, B.K. Mahapatra, A. Pavan Kumar

Rs. 24.65 Lakhs

DNA barcodes (COI sequences) were generated for 16 specimens representing 2 orders, 4 families and 7 species. High divergence values were observed between species than conspecific individuals. It shows the presence of DNA barcode gap to delineate the present study species. NJ tree showed clustering of conspecific specimens into a single cluster for domestication, fishes comprising 23 spp have been collected from 20 locations in the hill and plain districts of Manipur. The species which could be acclimatised in wet lab conditions in Imphal are *Garra lissorhynchus, Garra manipurensis, Opsarius barna, Devario aequipinnatus, Schistura fasciata, Schistura chindwinica and Neolissochilus hexagonolepsis, Neolissochilus stracheyi, Lepidocephalichthys guntea*, *Lepidocephalichthys berdmorei.* The location identified for species collection are Iyei river, Noney, Haotelkhong (Pangei), Liangti river, Dailong Village Tamenglong, Tamnalok, Awangkhul, Manipur. Water samples have been analysed. pH ranged between 7.27 -7.65, DO 6.5- 7.5 mg/l, Hardness 136 – 154 mg/l, alkalinity 170-250 mg/l, ammonia 0.122-0.136 mg/l, nitrite 0.0019 mg/l, nitrate 0.0318 -0.0524 mg/l, phosphate 0.017–0.0318 mg/l. 150 nos of *Lepidocephalichthys berdmorei* have been reared to study developmental stages towards maturity and breeding.

Utilization of the detoxified rubber seed cake in aquafeed

2014-17

Narottam Sahu and Asim K. Pal

Rs. 19.92 Lakhs

The protein concentrate and isolate prepared from rubber seed cake contained 70.12 and 90.8% crude protein, respectively. The dry matter recovery was 17%. Further, it was observed that the prepared protein isolate had lower amount of anti-nutritional factors, tannin and phytate, respectively than the raw rubber seed cake. Among anti-nutritional factors, trypsin inhibitor content was found to be increased and HCN content was reduced to the extent of 64%.

A 60-days growth study was conducted to investigate the toxic effects of RPI (Rubber Protein Isolates), wherein graded levels of RPI (0, 25, 50, 75 and 100%) were included in the diet by replacing SPI (Soy protein isolates). The weight gain % of different groups varied from 23 to 34%. There was no significant variation ($P>0.05$) among different groups, indicating RPI is safe to use without having any detrimental effects on rohu. The survival rate of different groups was between 93% to 100%, indicating no toxic effect of rubber protein isolates on rohu.

Salient Achievements

- The anti-nutritional factors of rubber seed cake can be reduced significantly through preparation of the protein concentrate and isolate.
- The crude protein of rubber seed isolate and concentrate were found as 90.8 and 70.12% respectively with dry matter recovery of 17 and 18% respectively.
- The rubber protein isolate was found to be well compared with soy protein isolate and no adverse effect was found on growth and survival of *Labeo rohita,* confirming its safe use in feed.

Development of pelleted diet for *Catla catla* and *Clarias batrachus* using *Achyranthes aspera* and evaluation of its immunostimulatory properties in pond culture system (DBT multi institutional project)

2015-2018

Rs. 10.00 Lakhs (CIFE share)

Rina Chakrabarti (University of Delhi),
J.G. Sharma (Delhi Technological University),
V. Harikrishna (ICAR-CIFE Centre Rohtak)

Three experiments were conducted to evaluate the immunostimulatory and disease resistance properties of *Achyranthes aspera* in the pond conditions. *Labeo rohita* fry (2.02 g±0.23) were fed with three test diets containing either 0.5% seeds or 0.25 or 0.5% leaves of *Achyranthes aspera*; diet without seeds and leaves served as control. Three replicates were used for each feeding scheme. Fish were immunized with c-RBC (20 µl) after 45 days of feeding. Tissue and blood samples were collected on day 7,14 and 21 post immunization. The average weight was significantly ($P < 0.05$) higher in 0.5% seeds and leaves supplemented diets fed rohu during immunization (i.e. after 45 days of culture) compared to the other two feeding regimes. There was no significant ($P > 0.05$) difference between the first two feeding regimes. The average weight was significantly ($P < 0.05$) higher in seeds supplemented diet fed rohu compared to the fish cultured in other three feeding regimes on day 7, 14 and 21 after immunization. Average weight of rohu showed an increasing trend with the culture period regardless of feeding regime. Specific growth rate also showed the similar trend. Highest SGR was found in 0.5% seeds supplemented diet fed rohu in all days of sampling. Among these four different feeding regimes, myeloperoxidase level was significantly ($P < 0.05$) higher in 0.5% seeds supplemented diet fed rohu compared to the other three feeding 24 regimes throughout the study period. In 0.5% seeds and leaves supplemented diets fed rohu, highest myeloperoxidase levels were found of day-21 after immunization, whereas in 0.25% leaves supplemented diet and control diet fed rohu highest activity were found on day-7 after immunization. The activity reduced (14-42%) on day-14 after immunization in all feeding regimes, except 0.5% seeds supplemented diet fed group. In this treatment, the activity gradually increased after immunization.

ICAR-CRP on Vaccines and Diagnostics, New Delhi

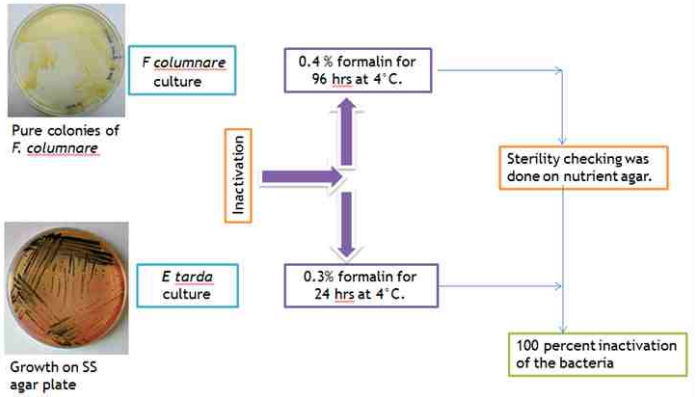
Development of dual vaccine for protection of *Labeo rohita* to bacterial pathogens *Flavobacterium columnare* and *Edwardsiella tarda.*

2015-20

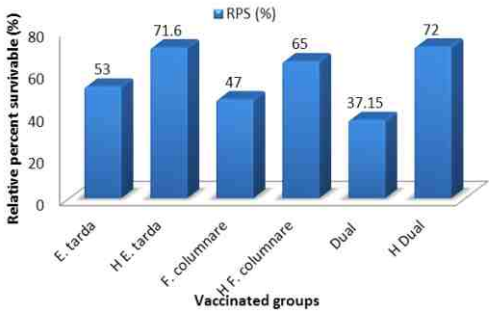
Rs.145.55 Lakhs

Megha Kadam Bedekar, Kundan Kumar, Saurav Kumar

Protocol for inactivation of bacteria (*Flavobacterium columnare* and *Edwardsiella tarda*) was optimized using formaldehyde with respect to required concentrations and incubation time. 0.3% of formaldehyde for 24 h at 4° was found suitable for inactivating *F. columnare* and *E. tarda*. Sterility was confirmed by streaking the incubated bacterial culture on TYES/ SS agar. The inactivated bacterial cultures



Optimization of Protocol for inactivation of Bacteria



were used to perform *in-vivo* study on the effect of vaccine (single and dual) and effect of hyperosmotic treatment on vaccine uptake.

Experiment for vaccination of fish, 150 fish (20.3 g ±3.0) were maintained in five groups ie. T1 (*E. tarda* vaccinated group); T2 (*F. columnare* vaccinated group); T3 (*E. tarda* and *F. cloumnare* dual combination vaccinated group) T4 (T3+hyperosmotic treatment) and T5 (control, without vaccination). Experimental fishes were vaccinated through immersion mode with inactivated *F. columnare* and *E. tarda* bacteria @ 10^8 CFU per ml formalin killed bacteria for 1 hr. whereas group T4 was exposed to 4% salt concentration prior to vaccination (dual). Booster dose was given on 14 days with inactivated bacterin to all first groups and experimental fishes were challenged on 35th days with live bacteria (based on LD50 of respective bacteria) including control. Mortalities of challenged fish were monitored and relative percent survivable was estimated for all vaccinated group. Significantly higher RPS (72%) was recorded in T4 in comparison to all other vaccinated groups. The vaccine uptake enhanced the RPS (72%).

Indian Council of Agricultural Research, New Delhi

Network Project on Fish Health

2015-20

Pani Prasad K and Swadesh Prakash Tiwari

Rs. 65.00 Lakhs

Information from various districts on antibiotics and other drugs used in aquaculture in different states was collected. Farms in various districts of Maharashtra, Goa, Telangana, Andhra Pradesh, Punjab and Haryana were surveyed with respect to different disease outbreaks. Interactive sessions were organized with farmers and information on their farms and on various problems faced by them during aquaculture farming. MIC of OTC against *A. hydrophila* and *A. caviae* was determined by the micro plate dilution method using Mueller Hinton Broth (MHB). The MICs for *A. hydrophila* and *A. caviae* were 250 µg/ml and 100 µg/ml, respectively.

National Fisheries Development Board, Hyderabad

National surveillance programme for aquatic animal diseases

2013-18

Pani Prasad K and Ram Prakash Raman

Rs. 149.70 Lakhs

A total of 44 farms were covered for sample collection and the two species *L. vannamei* and *P. monodon* were collected under this programme. During the period from April to September 2017, farms in Safale, Dahanu and Vasai of Maharashtra state and Saras of Gujarat were found affected by the EHP. Clear size variations in individual shrimp length and growth retardation

were notable features of the diseased shrimps. In the subsequent stocking period during July to September 2017, farms from 4 different districts of Maharashtra were sampled and 6-12 pools were made from different farms for screening of virus. In all, 390 post larvae, 210 juveniles and 898 adult shrimp of 2 different species (*L. vannamei and P. monodon*) were collected and screened for different viral diseases.

During monsoon period, WSSV, HPV and EHP were detected. Early detection of EHP and WSSV was made in grow out ponds. Whenever WSSV was detected while screening, farmers were advised to harvest the crop. All the data have been uploaded on NSPAAD website provided by ICAR-NBFGR.

Fisheries enhancement in Maharashtra (District Thane) through seed production and pen culture in rivers Vaitarna and Bhatsa for livelihoods and nutritional security among the tribal community

2015–18

Neelam Saharan, D. N. Thakur, A. K. Reddy, Kiran Dube Rawat, Chandra Prakash, Ajit Kumar Verma, Chandrakant M.H. and Raju K.D.

Rs. 41.27 Lakhs

A carp hatchery complex comprising of a nursery tank along with CIFA circular FRP breeding pool and hatching pool was designed and built in this program. Breeding of common carp was done using 3 female fish weighing an average 1.5 kg and 6 male fish weighing an average 0.5 kg.. Following hatching, the spawn were collected in the nursery tank. Two Pens were erected on Vaitarna river in Ajnup village and stocking was done with 40,000 fry of common carp. Feeding of fish is being done twice daily with rice bran, ground nut oilcake and formulated feed.

DST-SERB (Science and Engineering Board), New Delhi

Conservation of Indian Megafish: molecular taxonomy and phylogeography of Mahseer fishes of India.

2015- 18

Annam Pavan Kumar

Rs.25.80 Lakhs

Complete mitochondrial genomes of *Tor putitora*, *Tor mahanadicus* and *Tor malabaricus* were amplified and sequenced by Ion Torrent sequencing platform and comparative analysis has been carried out

Contract Research Projects

National Centre for Sustainable Coastal Management (NCSCM), Chennai

Development of DNA barcodes for Indian Marine Crustaceans with Commercial and Conservation Significance

2016-17

Annam Pavan Kumar and Ashok Kumar Jaiswar

Rs. 9.5 lakhs

DNA Barcodes have been developed for 36 species including shrimps (Penaeidae: 14 no.; Solenoceridae: 2; Sergestidae: 7), crabs (Portunidae: 8; Matutidae: 1, Xanthidae: 2) and lobsters (Panulidae: 2)

National Agricultural Science Fund, ICAR, New Delhi

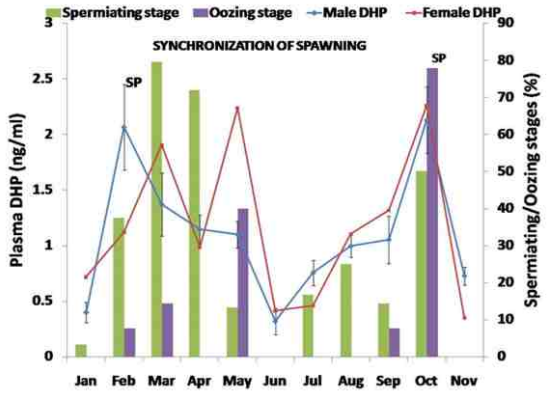
Stock characterization, captive breeding, seed production and culture of hilsa (*Tenualosa ilisha*)

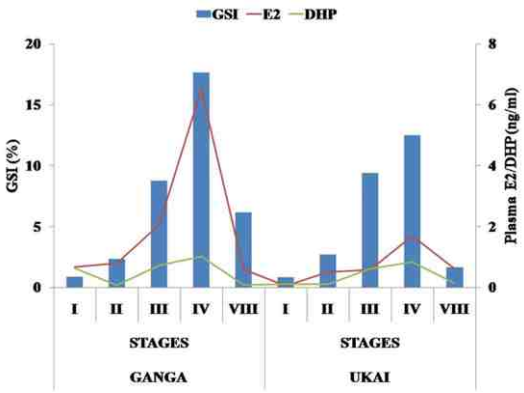
2012-17

S. Dasgupta and G.H.Pailan

Rs. 139.08 Lakhs

Involvement of key branchial ion transporters such as the sodium potassium ATPase and sodium potassium 2-Chloride cotransporter in maintaining physiological homeostasis is elucidated in hilsa during spawning migration across salt barriers. Changes in organization of





branchial ion transporters occur in hilsa gill in response to various environment salinities. Alterations in ion transporters expression manifest pre-adaptive changes take place in young hilsa while they live in freshwater and prior to seaward journey. Synchronous development of oocytes leads to maturation and spawning, which commence for extended period with two peaks annually. Androgen like 11-keto testosterone plays differential roles in spermatogenesis and oogenesis in hilsa. Hilsa in Ukai reservoir, Gujarat, show lower plasma hormone amplitude and spawning fecundity compared to migratory hilsa.

Rajiv Gandhi Science and Technology Commission (RGSTC), Mumbai

Pilot scale demonstration of value added products from surimi

2014-17

Amjad K. Balange and Martin Xavier

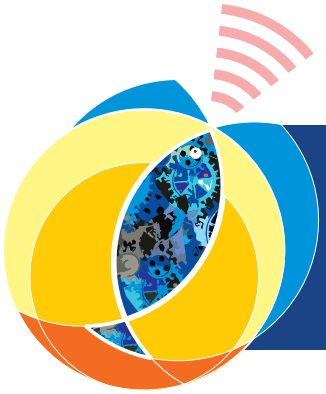
Rs. 44.84 Lakhs

As per the suggestion in RGSTC review meeting, trained 160 no of women self-help group through

13 no of trainings in Raigad, Sindhudurga & Mumbai. Total number of women beneficiaries was 1079 and the total number of men beneficiaries were 12. All together, 1091 individuals benefitted from the trainings. Surimi from *Pangasius* mince was standardised and several value added products like *fish sev, chakli, fish cutlet* and patties were developed and conditions for their preparation have been standardised.

Salient Achievements

- Total number of demonstrations- 24
- Total number of beneficiaries: 952 (894 Women and 58 Men)
- As per the suggestion in RGSTC review meeting, trained 160 no of women self-help groups through 13 no of trainings in Raigad, Sindhudurga and Mumbai
- Total beneficiaries: 1091 (1079 women and 12 Men)
- Entrepreneurship development: 10
- Publications: Published one research paper, 1 Manual (Marathi)
- Exhibitions: Participated in 2 exhibitions



Chapter 6

Extension Achievements

6.1. Skill Development Programme (SDP)/Refresher Course Organised

ICAR-CIFE, Mumbai

Title	Date	No. of participants	State/region
Value Added Products Preparation from Freshwater Fish	3 June, 2017	100	Palghar, Maharashtra
Demonstration and Preparation of Ornamental Fish Feed	5-9 June, 2017	12	Maharashtra, Uttar Pradesh, Gujarat
Ornamental Fish Feed	6-9 June, 2017	18	Bihar
Value Added Products Preparation from Freshwater Fish	17 June, 2017	62	Dahanu, Maharashtra
Value Added Products Preparation from Freshwater Fish	17 June, 2017	86	Dahanu, Maharashtra
Value Added Products Preparation from Freshwater Fish	8 August, 2017 9 August, 2017 10 August, 2017 11 August, 2017 12 August, 2017	113 135 133 140 183	Raigad, Maharashtra
Value Added Products Preparation from Freshwater Fish	16 August, 2017	9	Sindhudurg, Maharashtra
Value Added Products Preparation	17 August, 2017	23	Raigad, Maharashtra
Value Added Products Preparation from Freshwater Fish	1-7 October, 2017	2	Powarkheda, Madhya Pradesh
PCR Based Disease Diagnosis	23-27 October, 2017	5	Kerala, Maharashtra
Freshwater Pearl Culture	7-9 November, 2017	23	Pune, Raigad, Thane Maharashtra
Health Management in Freshwater Fish Culture	1-7 December, 2017	7	Maharashtra, Bihar
Hygienic Handling and Value Addition of Freshwater Fish	2-6 December, 2017	21	Powarkheda, Madhya Pradesh
Value Added Products Preparation from Freshwater Fish	8 December, 2017	5	Versova, Mumbai
Value Added Products Preparation from Freshwater Fish	28 December, 2017	63	Raigad, Maharashtra
Value Added Products Preparation from Freshwater Fish	29 December, 2017	39	Raigad, Maharashtra
Basics of Ornamental Fish Keeping	29-31 January, 2018	30	Ahmednagar, Maharashtra
Development and Characterization of Fish Cell Lines for Biotechnological Applications	1-10 February, 2018	12	Jammu and Kashmir, Kerala, Tamil Nadu and Karnataka

Kakinada Centre

Title	Date	No. of participants	State/region
Fish and Prawn Culture	2-11 May, 2017	25	Siwan, Bihar
Fish and Prawn Culture	22-31 May, 2017	24	Nalanda, Bihar
Fish and Prawn Culture	5-14 June, 2017	16	Sitamarhi, Bihar
Fish and Prawn Culture	19-28 June, 2017	19	Vaisali, Bihar
Fish and Prawn Culture	10-19 July, 2017	24	Darbhanga, Bihar
Fish and Prawn Culture	22-31 July, 2017	24	Samasthipur, Bihar
Fish and Prawn Culture	2-11 August, 2017	25	Purnia, Bihar
Fish and Prawn Culture	14-23 August, 2017	23	Begusarai, Bihar
Fish and Prawn Culture	21-27 November, 2017	28	Purnia, Bihar
Fish and Prawn Culture	23-29 November, 2017	25	Patna, Bihar
Short Term Training Programme for Department Officers	4-9 December, 2017	29	SIFT, Kakinada Andhra Pradesh
Short Term Training Programme for Department Officers	11-16 December, 2017	28	SIFT, Kakinada Andhra Pradesh
Fish and Prawn Culture	16-22 December, 2017	26	Begusarai, Bihar
Refresher Course for District Fisheries Officers	8-11 January, 2018	22	Hyderabad, Telangana
Fish and Prawn Culture Training	22-31 January, 2018	22	Vaisali, Bihar
Fish and Prawn Culture Training	2-8 February, 2018	29	Sitamarhi, Bihar
Fish and Prawn Culture Training	19-25 February, 2018	30	Samasthipur, Bihar
Exposure cum Training of Fish Farmers	13-15 March, 2018	15	Godhra, Gujarat
Fish and Prawn Culture	19-28 March, 2018	21	Nalanda, Bihar
Exposure/Inplant Training			
Exposure cum Training Programme for Final year B.F.Sc. Students	27 March-3 April, 2017	11	Jabalpur, Madhya Pradesh
Training Cum Exposure Visit Programme for State Fisheries Officers	16-19 December, 2017	25	Udaipur, Gomati, Tripura
Training cum Exposure Visit Programme for III Year B.F.Sc. Students	28-29 December, 2017	23	Kawardha, Chhattisgarh
In Plant Training for Final Year B.F.Sc. Students	9-18 February, 2018	22	Lembucherra, Tripura

Kolkata Centre

Title	Date	No. of participants	State/region
Advances in Freshwater Aquaculture Maharashtra	11-17 July, 2017	5	Bihar, West Bengal,
Entrepreneurship Development in Ornamental Fish Breeding and Culture	4-10 August, 2017	13	Bihar, West Bengal, Maharashtra
Mithe Pani Me Machhli Palan	17-23 August, 2017	16	Aurangabad, Bihar
Biotechnological Application in Aquaculture	4-8 September, 2017	4	Andra Pradesh, Assam, West Bengal, Maharashtra
Mithe Pani Me Machhli Palan	12-18 September, 2017	30	Supaul and Purnia, Bihar
Feed and Feeding Strategies in Aquaculture	6-7 October, 2017	26	Lower Debang Valley, Arunachal Pradesh
Modern Aquaculture Techniques and Management	9-11 October, 2017	20	Bhagalpur, Bihar
Management of Soil, Water and Fish Diseases in Aquaculture	24-30 October, 2017	6	West Bengal
Fish Processing Technology and Development of Value Added Products	7-13 November, 2017	13	West Bengal and Bihar
Modern Method of Fish Culture	16 November, 2017	115	Sunderban, West Bengal
Mithe Pani Me Machhli Palan	16-22 November, 2017	31	Katihar and Banka, Bihar
Modern Methods of Aquaculture	28-29 November, 2017	30	Aizwal, Mizoram
Mithe Pani Me Machhli Palan	1-7 December, 2017	20	Araria & Kishanganj, Bihar
Fish Nutrition and Fishing Strategies	12-18 December, 2017	10	West Bengal and Bihar
Mithe Pani Me Machhli Palan	3-9 January, 2018	32	Jehanabad and Gaya, Bihar
Culture of Food Organism for Fish	4-10 January, 2018	26	Uttar Pradesh, Bihar, Odisha Jharkhand, New Delhi Madhya Pradesh & Haryana
Freshwater Aquaculture	12-16 January, 2018	26	Tripura
Mithe Pani Me Machhli Palan	17-23 January, 2018	21	Madhepura, Bihar
Modern Method of Fish Culture	27 January, 2018	100	South 24 Parganas, West Bengal
Quality Improvement in Ornamental Fish	30 January - 5 February, 2018	8	Dehri-on-Sone, Bihar
Advances in Freshwater Aquaculture	6-12 February, 2018	7	Dehri-on-Sone, Bihar
Modern Method of Fish Culture	22-24 February, 2018	14	Amravati, Maharashtra
Modern Methods of Ornamental Fish Culture	24-26 March, 2018	25	Sunderban, West Bengal
Field Training Programmes			
Field Training Programme for B.F.Sc. Students	20-25 September, 2017	35	Chalk Garia, West Bengal
Inter State Field Study Tour of In-Service Trainees of Fisheries Training Institute	21-24 December, 2017	23	Udaipur, Tripura

Powarkheda Centre

Title	Date	No. of participants	State/region
Fish and Prawn Culture	2-11 May, 2017	19	Kaimur, Bihar
Fish and Prawn Culture	26 June-5 July, 2017	20	West Champaran, Bihar
Magur Breeding and Hatchery Management	10-15 July, 2017	8	Maharashtra, Madhya Pradesh and Rajasthan
Carp Breeding and Hatchery Management	17-22 July, 2017	8	Etawah, Uttar Pradesh and Maharashtra
Carp Breeding and Hatchery Management	31 July-5 August, 2017	18	Madhya Pradesh
Carp Culture Practices and Recent Advances	21-26 August, 2017	14	Bhopal, Indore Hoshangabad, Madhya Pradesh
Fish and Prawn Culture	4-13 November, 2017	19	Madhubani, Bihar
Fish and Prawn Culture	4-13 December, 2017	17	Kaimur, Bihar
Fish and Prawn Culture	14-23 December, 2017	20	Vaishali, Bihar
Fish and Prawn Culture	6-15 January, 2018	18	Rohtas, Bihar
Fish and Prawn Culture	31 January-9 February, 2018	15	Rohtas, Bihar
Fish and Prawn Culture	14-23 February, 2018	14	Sitamarhi, Bihar
Fish and Prawn Culture	5-14 March, 2018	12	Saharsa, Bihar
Fish and Prawn Culture	17-26 March, 2018	15	Nawada, Bihar

Rohtak Centre

Title	Date	No. of participants	State/region
Production Risks and Better Management Practices of Pacific White Shrimp (*Litopenaeus vannamei*) Farming using Inland Saline Water	10-14 April, 2017	10	Haryana (Rohtak, Bhiwani, Jind, Hissar, Rewari)
Shrimp Culture Practices using Inland Saline Water	15-19 May, 2017	13	Haryana (Rohtak, Sirsa, Hissar, Fatehabad, Jhajjar, Gurgaon), Punjab (Firozpur, Bahadur Khera, Fazilka, Ferozpur, Bhatinda, Sri Muktsar Sahib) and M.P. (Hoshangabad)
Inland Saline Aquaculture Management Practices	12-16 June, 2017	8	Haryana (Rohtak, Jhajjar, Panipat, Sirsa) and Maharastra (Bandra East)
On-Farm Feeding and Disease Management in Inland Saline Shrimp Farms	10-14 July, 2017	12	Haryana (Jhajjar, Gurgaon, Fatehabad, Sirsa, Rohtak, Hissar) and Rajasthan (Jaipur, Sri Ganganagar)

Disease Management and Better Management Practices in Inland Saline Water Shrimp Farming	21-25 August, 2017	11	Haryana (Bhiwani, Fatehabad, Sirsa, Gurgaon, Jind, Jhajjar) and Rajasthan (Jhunjhunu)
Inland Saline Aquaculture Practices	9-13 October, 2017	12	Haryana (Sirsa, Jhajjar, Rohtak)
Shrimp Culture Practices using Inland Saline Water	8-10 November, 2017	17	Haryana (Hissar)
Litopenaeus vannamei Farming using Inland Saline Water	13-17 November, 2017	17	Haryana (Rohtak, Bhiwani, Hissar, Panipat, Rewari), Punjab (Firozpur, Fazilka), Delhi (Noida), U.P. (Kheri) and Rajasthan (Kota)
Shrimp Culture Practices using Inland Saline Water	20-22 December, 2017	12	Haryana (Hissar)
Shrimp Culture Practices using Inland Saline Water	15-17 January, 2018	7	Haryana (Mewat, Jhajjar, Gurgaon)
Shrimp Culture Practices using and Inland Saline Water	22-27 January, 2018	4	Harayana (Jhajjar, Sirsa) Punjab (Sri Muktsar Sahib)
Inland Saline Fish and Shrimp Farming	29-31 January, 2018	8	Rajasthan (Hanumangarh)
Inland Saline Fish and Shrimp Farming	6-8 February, 2018	13	Rajasthan (Hanumangarh, Sri Ganganagar, Suratgarh) and Haryana (Sirsa)
Management Practices in Inland Saline Shrimp Farming and Disease Prevention	12-17 February, 2018	7	Punjab (Faridkot, Firozpur, Sri Muktsar Sahib)
Shrimp Culture Practices using Inland Saline Water	26-28 February, 2018	20	Haryana (Jhajjar, Rohtak, Gurgaon)
Shrimp Culture Practices using Inland Saline Water	5-9 March, 2018	12	Haryana (Sirsa) and Punjab (Mansa, Fazilka, Bhatinda, Sri Muktsar Sahib)
Shrimp Culture Practices using Inland Saline Water	14-19 March, 2018	8	Haryana (Bhiwani, Rohtak, Jhajjar, Gurgaon)
Shrimp Culture Practices using Inland Saline Water	20-24 March, 2018	6	Haryana (Bhiwani, Jind) and Punjab (Fazilka, Mansa, Bhantinda)
Shrimp Culture Practices using Inland Saline Water	26-28 March, 2018	6	Rajasthan (Hanumangarh)

6.2. Exhibitions Organised

Event	Date	Venue
Krishi Mela and Exhibition for Farmers	15-19 April, 2017	Gandhi Maidan, Motihari, Bihar
International Symposium on "Aquatic Health and Epidemiology for Sustainable Asian Aquaculture (ISAAE)"	20-22 April, 2017	ICAR-National Bureau of Fish Genetic Resources, Lucknow, Uttar Pradesh
29th All India Congress of Zoology (29th AICZ)	9-11 June, 2017	ICAR-CIFRI, Barrackpore, Kolkata
21st National Agriculture Exhibition	24-27 August, 2017	Agradut Krirangan, Barrackpore, Kolkata
Pashu Arogya Mela	28-29 October, 2017	Motihari, Bihar
11th Fisheries and Aquaculture Forum (11th IFAF) on "Fostering Innovations in Fisheries and Aquaculture–Focus on Sustainability and Safety."	21-24 November, 2017	Le Meridian Hotel, Kochi, Kerala
National Agricultural Education Day	3 December, 2017	Taraporewala Aquarium, Marine Drive, Mumbai
22nd Agriculture-Industry-Tourism and Science Festival	6-11 January, 2018	Baruipur Science Fair campus, Dist. Purba Medinipur, West Bengal
Versova Mahotsav-2018	19 January, 2018.	Versova Metro Ground, 4 Banglows, Mumbai
Versova Koli Sea Food Festival-2018	26-28 January, 2018	Versova, Koliwada, Andheri (W), Mumbai
14th Subhash Mela	27 January, 2018	Taldi, 24 Parganas, Dist. West Bengal

6.3. Farmers' Meet /Awareness Programmes Organised

Event	Date	No. of farmers	Venue
Congress on "Social Entrepreneurship in Aquaculture"	27-28 April, 2017	200	ICAR-CIFE, Mumbai
Stakeholder Workshop on "Development of Sustainable Coastal Livelihoods Through Integrated Mangrove Fishery Farming Systems (IMFFS) and Value Chain Development of Honey in Sundarban"	22 May, 2017	60	ICAR-CIFE, Kolkata
National Fish Farmers Day	10 July, 2017	60	ICAR-CIFE, Kolkata
Orientation cum Awareness Programme on "Ornamental Fish Culture for Tribal Women"	8 August, 2017	48	Warungshi village, Ahmednagar, Maharashtra
Scientific Fish Culture for Enhancing Farmers' Income	22 September, 2017	80	ICAR-CIFE, Kakinada Centre
Farmers Meet on "Modern Method of Fish Culture"	16 November, 2017	115	Moukhali, Amtoli, Gosaba, South 24 Parganas, West Bengal
Awareness Program on "Fish and Prawn Culture"	30 November, 2017	21	Jabalpur, Madhya Pradesh
Farmers Meet on "Feed Based Carp and Prawn Polyculture"	6, December 2017	23	Nafarganj, Basanti Island, Sunderban, South 24 Parganas, West Bengal
Mera Gaon Mera Gaurav Programme	8 January, 2018	15	Gillerchat, Nimpith, Jaynagar, West Bengal
Farmers Meet on "Modern Method of Fish Culture"	27 January, 2018	100	Taldi, Canning, South 24 Parganas, West Bengal
Training Programme "Basics of Ornamental Fish Keeping"	29-31 January, 2018	30	Warungshi village, Ahmednagar, Maharashtra
One Day Farmers' Expert Interactive Workshop on "Prospects and Constraints of Aquaculture Practices"	19 February, 2018	70	ICAR-CIFE, Kolkata
Estuarine Fisheries Management and Fish Utilization	13 March, 2018	60	Karanja Machimar, Karanja, Maharashtra
Awareness cum Workshop on "Soil and Water Quality Management for Aquaculture Systems"	19-20 March,2018	70	Dibrugarh, Assam
Farmers Meet Organized in Connection with the Visit of Shri Radha Mohan Singh, Hon'ble Union Minister for Agriculture & Farmers' Welfare	25 March, 2018	100	ICAR-CIFE Rohtak Centre

6.4. Programmes Under Tribal Sub Plan (TSP)

Programme Director: Dr. Gopal Krishna
Nodal Officers: Dr. Kiran Dube Rawat and Dr. Martin Xavier

Under the TSP component, ICAR-CIFE, Mumbai has undertaken tribal related activities for community development in Maharashtra, West Bengal, Nagaland, Assam and Mizoram. Eleven training programmes were conducted during 2017-18 and the details are given below.

1. Orientation Programme on "Ornamental Fish Culture for Tribal Women" at Warungshi, Maharashtra

Coordinator: Dr. Paramita Banerjee Sawant

ICAR-CIFE, Mumbai conducted a one day onsite orientation programme on "Ornamental Fish Culture for Tribal Women" at Warungshi, Dist Ahmednagar, Maharashtra on August 8, 2017. Forty eight tribal women from the above district participated in the programme. Most of these women get free time after assisting their family in farming. They were sensitized about the opportunity of achieving economic independence

through ornamental fish culture and aquarium keeping. The orientation programme consisted of demonstration on "Introduction and Identification of Common Ornamental Fishes" and "Introduction to Aquarium Fabrication" during which the tribal women were asked to recognise several common ornamental fish and they expressed their interest in aquarium making. They were appraised about how to set up an aquarium and the possibilities of setting up small enterprises related to ornamental fish keeping, culture and selling of aquarium accessories. Tribal women showed keen interest in the same and wished to set up their own small units with the help of microfinance from leading public sector organizations.

2. Skill Development Training Programme on "Modern Method of Fish Culture" at Moukhali, South 24 Parganas, West Bengal

Coordinators: Dr. G. H. Pailan and Dr. S. Dasgupta

One-day skill development training programme on "Modern Methods of Fish Culture" was held on 16th November, 2017 for tribal fish farmers at Moukhali Flood Relief Centre, Moukhali, Sunderbans, South 24 Parganas, West Bengal. The objective of this training programme was to emphasize the importance of feed in aquaculture practices and utilization of locally available cheap ingredients for making feed to reduce the feed cost for sustainable fish production. Dr. S. Dasgupta, Principal Scientist delivered a lecture about pond

management practices and importance of water quality analysis for fish production. As part of the hands on training programme, Dr. G. H. Pailan, demonstrated the pH kit and DO kit developed by ICAR-CIFE to fish farmers and emphasized its importance in aquaculture practices. A total number of 115 fish farmers participated in this training programme. The local organizer thanked ICAR-CIFE for organizing the much needed training programmes for local tribal fish farmers and desired that more such training programmes should be conducted in different locations of the Sunderbans for overall development of fish production and improvement of livelihood of the fish farmers of Sunderbans.

3. Demonstration Programme on "Livelihood Improvements Through Value Addition of Fisheries" at Morbe, Panvel, Maharashtra

Coordinators: Dr. K. A. Martin Xavier and Dr. B.B. Nayak

Under the Tribal Sub Plan (TSP) scheme, CIFE, Mumbai conducted a demonstration programme at Morbe, Panvel, Maharashtra on 21 December 2017. During this programme, preparation of different value added products from freshwater fishes like rohu, and catla were demonstrated. Thirty three tribal persons, including 3 women had participated in this programme. Based on the feedback from the participants, a detailed programme will be arranged by the institute for the initiation of small production units at Panvel, Maharashtra. All scientists from Post-harvest section of CIFE participated in the training programme.

4. Orientation Programme on "Code of Conduct for Responsible Fisheries (CCRF) at Morbe, Panvel, Maharashtra

Coordinators: Dr. K. A. Martin Xavier and Dr. Latha Shenoy

CIFE, Mumbai organised an orientation programme on 'Code of Conduct for Responsible Fisheries (CCRF)' in Panvel district of Maharashtra under Tribal Sub Plan activity on 21 December, 2017. A total of thirty three tribal individuals participated in the programme. Dr. Latha Shenoy, Dr. Geethanjali Deshmukhe and Dr. A. K. Jaiswar delivered the lectures to create awareness of the code and interacted with the participants. All scientists from Harvest and Post-Harvest section participated in the orientation programme to prioritize the long term activities in this area.

5. Cage Aquaculture of *Labeo rohita* in Dimbhe Reservoir, Pune, Maharashtra

Coordinator: Dr. Kiran Dube Rawat

ICAR-CIFE, Mumbai in association with Shashwat, NGO and Dimbhe Jalashay Shramik Adivasi Macchimar Sahakari Sanstha Maryadit, Digad, undertaken culture of stunted rohu (*Labeo rohita)* in floating net cages at Dimbhe reservoir for their grow out culture. Culture initiated in the month of October 2017. Regular monitoring, feeding and maintenance was done. Existing cages were repaired and feed inputs for rearing the fishes were provided under this scheme. Ten

tribal fisher men from this area are actively participating in this activity.

6. Training Programme on "Basics of Ornamental Fish Keeping" at Warungshi, Ahmednagar District, Maharashtra

Coordinator: Dr. Paramita Banerjee Sawant

ICAR-CIFE, Mumbai organised a training programme on "Basics of Ornamental Fish Keeping" for tribal women of Warungshi in Ahmednagar District of Maharashtra under Tribal Sub Plan (TSP) during 29-31 January, 2018. A total of 30 tribal women were trained in the programme followed by a field visit to the ornamental fish cages in Dimbhe reservoir, Pune, on 31 January, 2018. The training programme covered theory and practical aspects of rearing live bearers, fabrication and setting of aquariums, water quality management in aquariums, aeration and filtration in aquariums, role of feed and feeding habits of common ornamental fish as well as beautification of the aquarium using accessories and aquarium plants.

7. Training Programme on Cage Culture for the Farmers of Nandurbar, Maharashtra

Coordinator: Dr. Kiran Dube Rawat

A training programme on cage culture for the farmers of Nandurbar in Maharashtra was conducted during 18-20 January, 2018. A total of 22 participants attended the training program. The training programme covered both theory and practical aspects of cage culture. The topics included importance of cage culture: Indian scenario, cage culture - a CIFE experience, materials for cage construction and installation, demonstrations of different cage material,

importance of water quality in cage culture, fish species cultured in cages, cage aquaculture: site selection, construction and installation of cage, selection of species, stocking and maintenance, food and feeding in cage and demonstration of cage models. During field visit to Dimbhe

reservoir, the participants had interactions with Dimbhe community doing cage culture. They also learned how to calculate daily feeding to the fish, monitoring fish growth, cleaning cages and their maintenance etc.

8. Awareness-cum-Hands on Training on "Farm Management of Fish Feed and Feeding : Rightful Use of Chemicals and Drugs" at Aizwal, Mizoram

Coordinator: Dr. Subodh Gupta

Two days awareness-cum-training programme was organized by ICAR-CIFE, Mumbai on "Farm Management of Fish Feed and Feeding: Rightful Use of Chemicals and Drugs" by ICAR-Central Institute of Fisheries Education, Mumbai at the Fisheries Department Headquarter, Aizawl, Mizoram during 19-20 January, 2018. The programme was inaugurated by the Secretary, Fisheries and Sericulture, Govt. of Mizoram, Shri Thlamuana. The programme was attended by more than 60 farmers, technical personnel, entrepreneurs and fisheries development officers. The Director of Fisheries, Mizoram, Shri Lalhmangaiha elaborated the details of the programme and appreciated the interest of farmers in the development of aquaculture in Mizoram state, especially feed based aquaculture to enhance the production to meet out the shortfall of per capita fish consumption. The Secretary, Shri Thlamuana, emphasized that development of cage culture of fisheries can grow only with the major input through application of fish feed. He also emphasised on use of local feed ingredients to prepare on-farm feed. This would help to reduce the cost of feed and fresh feed can be given to grow out fish.

9. Skill Development Training Programme on "Modern Method of Fish Culture" Taldi, Canning, South 24 Parganas, West Bengal

Coordinator: Mr. Dilip Kumar Singh

A skill development training programme on "Modern Methods of Fish Culture" was conducted on 27th January, 2018 for tribal fish farmers at Taldi, Canning, South 24 Parganas, West Bengal. The objective of the training programme was to give emphasis on importance of feed in aquaculture practices and utilization of locally available cheap ingredients for making feed while reducing the feed cost for sustainable fish production. Dr. B. K. Mahapatra, Principal Scientist, delivered a lecture on "Pond management practices & importance of water quality analysis for fish production". As hands on training programme, Mr. Dilip Kumar Singh, Scientist and Mr. P. K. Patra, Technical Officer, demonstrated the pH kit & DO kit developed by ICAR-CIFE to fish farmers and discussed about its importance in aquaculture practices. A total number of 100 fish farmers participated in this training programme.

10. Skill Development Programme on "Modern Techniques in Aquaculture" at Dimapur, Nagaland

Coordinator: Dr. Sujata Sahoo

A skill development training programme on "Modern Techniques in Aquaculture" was organized during 8–9 March, 2018 in Nagaland under TSP programme by ICAR-CIFE, Kolkata Centre in collaboration with Department of Fisheries, Government of Nagaland, Kohima. The main objectives of the programme was to impart knowledge on pond preparation, water quality monitoring, feeding strategies and disease management for polyculture fish production systems. The venue for the training programme

was Brooders fish farm, Half Nagarjan, Dimapur. A brief meeting was conducted with Dr. Vimezo Kire, Assistant Director of Fisheries, Department of Fisheries, Government of Nagaland, Kohima at this training place. The training was attended by 26 participants, including farmers and field level extension officials from different districts.

11. Skill Development Programme on "Water and Soil Quality Management for Aquaculture Systems" at Dibrugarh, Assam

Coordinator: Dr. Kiran Dube Rawat

ICAR-CIFE, Mumbai in collaboration with Department of Fisheries, Govt. of Assam and Jeeva-Suraksha, Sivasagar Assam organised a skill development programme on "Water and Soil Quality Management for Aquaculture Systems" at DHSK College, Dibrugarh, Assam, for the farmers of NEH region including Assam, Meghalaya, and Arunachal Pradesh, during 19- 20 March, 2018. A total of 70 participants, including the State Department officials, entrepreneurs and progressive farmers from different states of North - East participated in the programme. A booklet on "Wetland Shrinkage of Assam and the Conservation Needs" authored by Ranjita Bania, Nipen Nayak, S. P. Biswas and Gopal Krishna, was published and released during the inaugural function. The participants were given directions regarding collection of soil and water samples. The participants were also acquainted with the favorable water and soil quality parameters for aquaculture through lectures and demonstrations. The resource persons also addressed the queries related to various challenges and problems faced by the progressive farmers. The session included address by progressive farmers regarding their success stories to rest of the participants.

6.5. Programmes Under NEH Region

Programme Director: Dr. Gopal Krishna
Nodal Officer : Dr. P. P. Srivastava

Under the NEH region programmes 7 training programmes were conducted at Arunachal Pradesh (3), Mizoram (1), Meghalaya (1) and Assam (2)

1. Awareness-cum-Workshop on 'Fish Health Management in Aquaculture for Fish Farmers' at Sonitpur, Assam

Coordinator: Dr. Megha Bedekar

An Awareness-cum-Workshop on 'Fish Health Management in Aquaculture for fish farmers' was organized at Sonitpur, in collaboration with Department of Fisheries, Assam; Jeeva-Suraksha, Shivsagar and Angling Association, ABACA, Potasali, Nameri, Assam during 3-4 May, 2017. Sixty three farmers and officials from state fisheries attended the programme.

2. Workshop on 'Needs of Human Resource Development in Fisheries and Aquaculture in NEH States

Coordinator: Dr. Gopal Krishna

A workshop on 'Needs of Human Resource Development in Fisheries and Aquaculture in NEH States' was organized by ICAR-CIFE, Mumbai at Sonitpur, Assam on 5 May, 2017 in collaboration with Department of Fisheries, Assam; Jeeva-Suraksha, Shivsagar and Angling Association, ABACA, Potasali, Nameri, Assam. Program was inaugurated by Shri Padma Hazarika, MLA, Sootea, Assam and graced by Shri B.B. Hagjer, MLA, Haflong, and Dr. Atul Borgohain, Professor and Head Extension, College of Veterinary Sciences, Khanapara, Guwahati, Assam. Directors of Fisheries from various NE States including Assam, Arunachal Pradesh, Mizoram, Nagaland and Manipur attended the workshop. More than 50 officials and progressive farmers from Assam participated and discussed the issues related to human resources development and expressed their views. They expressed shortage of human resource in specific areas of fisheries and aquaculture. It was also pointed out to undertake specific and need based program in different states of NEH region.

3. Training Programme on "Feed and Feeding Strategies in Aquaculture" at Dibang Valley, Arunachal Pradesh

Coordinators: Dr. G. H. Pailan and Mr. Dilip Kumar Singh

A skill development training programme on "Feed and Feeding Strategies in Aquaculture" was organized during 6-7 October, 2017 in Arunachal Pradesh under NEH programme of ICAR-CIFE, Mumbai. The programme was conducted by ICAR- Central Institute of Fisheries Education, Kolkata Centre in collaboration with Krishi Vigyan Kendra, Lower Dibang Valley District, Arunachal Pradesh. The training was attended by 26 farmers and field level extension officials from different districts. The knowledge gap analysis of farmers was made through questionnaire method. Technical literatures developed on composite fish culture, catfish farming and Anabas seed production were provided to all the participants. An animation film show on "Composite Fish Culture" was made for fish farmers for easy understanding of scientific fish farming for sustainable fish production. Dr. G. H. Pailan, Principal Scientist & Officer In-Charge, ICAR-CIFE, Kolkata Centre delivered lectures on "Pond Preparation and Management" as well as "Fish Feed and Feeding Strategies". He also discussed the relevance of integrated fish farming in the state. Mr. Dilip Kumar Singh, scientist, ICAR-CIFE, Kolkata Centre presented a lecture on "Importance of Water Quality Monitoring and Maintenance for Suitable Fish Farming". The practical demonstration on water quality testing using the kits developed by ICAR-CIFE, Kolkata was conducted

4. Training Programme on "Value Added Products Preparation from Freshwater Fishes" at Papumpare Dist, Arunachal Pradesh

Coordinator: Dr. Amjad Balange

A two-day training programme was conducted at Emchi, Doimukh Circle, Papumpare Dist, Arunachal Pradesh on "Value Added Products Preparation from Freshwater Fishes" during 15 Nov-16 Nov 2017. Total 25 participants registered for the said training programme The programme was inaugurated by Mr Dayum Davi, District Fisheries Officer, Papumpare Dist., Arunachal Pradesh. A training manual on "Value added products preparation from fresh water fish" was released and distributed to all the trainees. During the 2 days training, trainees were informed about the importance of fish in

human diet, hygienic handling of fish, quality aspects of fish, traditional and advanced methods of fish processing. Preparation of different value added products like fish cutlet, fish pickle, prawn pickle, fish chakli, fish shevu, fish ball and fish papad was carried out by the trainees under the supervision of resource persons. They were also trained in packaging and labeling of the fish products.

5. Training Programme on "Value Added Products Preparation from Freshwater Fishes" at Ziro, Arunachal Pradesh

Coordinator: Dr. Amjad Balange

A training programme was conducted at Ziro, Lower Subansari Dist, Arunachal Pradesh. Total 21 participants registered for the said training programme during 17-18 November, 2017. The programme was inaugurated by Mr Tubin, Senior Fisheries Officer, Ziro, Lower Subansari Dist, Arunachal Pradesh. A training manual on "Value Added Products Preparation from Freshwater Fishes" was released and distributed to all the trainees. They were trained in various aspects of fish handling and quality aspects of fish processing. Certificates were given to all the trainees for participation in the programme.

6. Training Programme on "Modern Methods of Aquaculture" at Aizwal, Mizoram

Coordinators : Dr. G. H. Pailan and Dr. S. Munilkumar

A skill development training programme on "Modern Methods of Aquaculture" was organized during 28–29 November, 2017 in Mizoram under NEH programme of ICAR-CIFE, Mumbai. The programme was conducted by ICAR-CIFE, Kolkata Centre in collaboration with Department of Fisheries, Aizwal, Mizoram. The training was attended by 30 farmers and field level extension officials from different districts. The farmers were trained in various aspects of aquaculture practices including catfish and anabas farming.

7. Training Programme on "Disease Diagnosis and Fish Health Management" at Shillong, Meghalaya

Coordinators : Dr. Gayatri Tripathi, Dr. Saurav Kumar and Mrs. Rathi Bhuvaneshwari

The NEH region programme on "Disease Diagnosis and Health Management" was organised by the Aquatic Environment and Health Management Division of ICAR-CIFE, Mumbai in coordination with Department of Fisheries, Meghalaya at Meghalaya state Fisheries Research and Training Centre, Mawpun, Shillong during 16-17 January 2018. A total of 70 participants from different parts of Meghalaya state attended the NEH training programme. The participants were from diverse professions including entrepreneurs, aquaculturists, farmers, senior research assistants, state department personnel, students and MSPs. The course design was very comprehensive and covered all fundamental aspects of fish diseases, diagnosis, feed management and water quality management. Special emphasis was given on the theoretical and practical aspects of disease diagnosis and various health management measures. The programme was concluded on 17 January 2018 and the training certificates were presented to the trainees by Dr. Gopal Krishna, Director/Vice-Chancellor, ICAR-CIFE, Mumbai and Dr. Brahma Deo Ram Tiwari, IAS, Secretary (Fisheries), Govt. of Meghalaya.

6.6. Fishery Advisory Services

Technical guidance was given to the farmers in the states of Haryana, Punjab, Rajasthan, Delhi and U.P. on various aspects of fish and shrimp farming.

6.7 Agri-Business Incubation Center (ABI)

Funding Agency: ICAR-NAIF, New Delhi

Programme Investigator (PI): Dr. B. B. Nayak

Co-PIs: Dr. V. K. Tiwari, Dr. Arpita Sharma and Dr. A. K. Balange

The ABI center of CIFE, Mumbai has initiated the process of incubating the budding entrepreneurs in the field of processing and aquaculture. In the last financial year, 2 incubates have registered under the ABI as they wanted to start their start-up project for fresh fish retail and value added fish products preparation. They were given a special training of 5 days on "Hygienic Handling, Packaging and Quality Control of Fresh Fish" during 16-20 October, 2017. A training program on "Preparation of Value Added Fish Products" was conducted for the women representing Premdaya Agro Pvt Ltd, Mumbai in the month of November 2017. A meeting was also conducted with the chairman of Premdaya Agro Pvt Ltd, Mumbai on 13 November, 2017 regarding MoU for technology transfer. ABI was instrumental in organising an Industry meet on 28 February, 2018 on the theme "Student Ready Enterpreuneship in Fisheries: A Way Forward". One day demonstration program on "Preparation of Value Added Fish Products" was conducted for the Fishermen Community of Gorai, Vasai, Mumbai on 19 February, 2018 as a part of ABI activity and 70 trainees were benefitted out of this.

6.8. Print Media

1.Title: Skill Training for Tribal Fish Farmers
News Paper: Echo of Arunachal, First newspaper of the state
Date 07 October, 2017

2.Title: Skill Development Training on Modern Methods of Aquaculture
News Paper: The Mizoram Post
Date 28 November, 2018

3.Title: Training on Aquaculture Underway in Dimapur
News Paper: Eastern Mirror
Date 09 March, 2018

4.Title: Training on Modern Techniques in Aquaculture
News Paper: Nagaland Post
Date 09 March, 2018

5.Title: Shri Radha Mohan Singh, Hon'ble Union Minister for Agriculture & Farmers' Welfare, visited ICAR-CIFE Rohtak Centre
News Paper: Dainik Kranti, Amar Ujala
Date 27 March, 2018

Print media coverage about ICAR-CIFE Centre Kakinada activities

6.9. Visits Coordinated

ICAR-CIFE, Mumbai

Date	Organization / University / College / Category of Visitors	No. of Visitors
1 April, 2017	Suyash Classses, Joseph Wadi, Opp. Meena Apt., Seven Bungalows, Andheri West, Mumbai -61	33
6 April, 2017	University Dept. of Life Science , University of Mumbai, Vidyanagari	12
8-12 April, 2017	Department of Zoology, Udai Pratap College, Varanasi, Uttar Pradesh	18
14 April, 2017	Project Director Joint Director of Agriculture, Agricultural Technology Management Agency, Virdhunagar District, Tamil Nadu.	20
19 April, 2017	Indian Institute of Crop Processing Technology	40
20-21 April, 2017	College of Fishery Science, Hajaripahad Road, Seminary hills, Nagpur	36
22 April, 2017	Academy of Climate Change Education and Research (ACCER), Thrissur, Kerala	37
25 April, 2017	Kerala Agriculture University, College of Agriculture, Vellayani	60
30 April, 2017	Chirstian College, Chengannur, Angadical, Kerala, India	30
5 August, 2017	Department of Zoology, Rizvi college, Mumbai	50
9 September, 2017	Vidyavardhini's Annasaheb Vartak College of Arts, Kedarnath Malhotra College of Commerce & E.S. Andrades College of Science	84
14 September, 2017	Veterinary College and Research Institute, Ramayanpatti, Tirunelveli, Tamil Nadu	38
31 October - 1 November, 2017	College of Fisheries, G.B. Pant University of Agriculture & Technology, Uttarakhand	18
13 November, 2017	Kerala University of Fisheries & Ocean Studies (KUFOS), Panagad, Kochi	52
28 November, 2017	Tamil Nadu Agricultural University, Home Science College and Research Institute, Madurai, Tamil Nadu	28
30 November, 2017	Fisheries College and Research Institute, Tamil Nadu Fisheries University , Thoothukudi	37
2 December, 2017	Karnataka Veterinary, Animal and Fisheries Sciences University, Mangalore	31
9 December, 2017	College of Fisheries Shirgoan, Ratnagiri, Maharashtra	37
15 December, 2017	Karnataka Veterinary, Animal and Fisheries Sciences University, Bidar	40
28 December 2017 -3 January 2018	CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur, College of Basic Sciences	90
29 December, 2017	Tamil Nadu Fisheries University, Fisheries College and Research Institute, Ponneri	22
3-7 January, 2018	Fisheries Training Institute, Nagaon, Dist- Chhattarpur, Madhya Pradesh,	18
8 January, 2018	Veer Narmad South Gujarat University, Surat, Gujarat	31
10 January, 2018	College of Fisheries, Guru Angad Dev Veterinary and Animal Sciences University	12
13 January, 2018	Central Agricultural University, Lembucherra, Tripura	22

24 January, 2018	LIL Wonders Fun School, Versova, Mumbai	35
31 January, 2018	SKS CARS, Rajnandgaon, IGKV, Raipur, Chhattisgarh	20
12 February, 2018	Officials from Superintendent of Fisheries, Godhra, Gujarat	17
6 March, 2018	KUFOS, Panangad, Kochi, Kerala,	48
15 March, 2018	Indian Institute of Food Processing Technology (IIFPT), Thanjavur, Tamil Nadu	36
19 March, 2018	C.G. Bhakta Institute of Biotechnology, Uka Tarsadia University, Surat, Gujarat	50
22-23 March, 2018	Assistant Director of Fisheries, Department of Fisheries, Bhuj-Kachchh	15

ICAR-CIFE Centre Kolkata

Date	Organization / University / College / Category of Visitors	No. of Visitors
4-6 April, 2017	SKUST, Kashmir	45
6 April, 2017	Farmers from Karbi-Anglong District of Assam	21
6 April, 2017	Pandu College, Guwahati, Assam	7
4 May, 2017	APC College, Kolkata, West Bengal	16
19-22 May, 2017	Progressive Fish Farmers from Tripura	19
20-23 June, 2017	IFTC, Lamphel, Manipur	20
29-31 July, 2017	Dibrugarh University, Assam	3
2 August, 2017	One-day Training programme on Feed Formulation and Feeding Strategies for Students from DRCSC, Kasba, Kolkata	18
5-8 August, 2017	Farmers from Sri Venkateswar Veterinary University College of Fisheries, Muthukur, Andhra Pradesh	26
1 November, 2017	Farmers from Burdwan	48
8 November, 2017	One day Orientation Training Programme of Newly Joined Scientists At CIFRI, Barrackpore	48
15 November, 2017	Progressive Fish Farmers from Dakhin Dinajpur, West Bengal	17
2-4 December, 2017	College of Fisheries, Ratnagiri, Maharashtra	35
20 December, 2017	Fisheries College & Research Institute, Ponneri, Tamil Nadu	20
1 January, 2018	College of Fisheries, GADVASU, Ludhiana, Punjab	12
2 January, 2018	College of Fisheries (CGKV), Kawardha, Chhattisgarh	23
10 January, 2018	Dept. of Fisheries Science, St. Anthony College, Shillong	13
3 February, 2018	Dept. of Fisheries Science, Hazarika Prasad College, Seminary Mills, Nagpur	17
9 February, 2018	Uday Pratap college, Varanasi	19
9 March, 2018	Exposure visit of different National Bank Officers under guidance of RBI	17
13 March, 2018	Exposure visit of PG students from Lady Brabourne College on Fish Breeding & Culture	15
15 March, 2018	Exposure visit of students, College of Fisheries CAU, Lembucherra, Tripura	10
24 March, 2018	Exposure visit of students from Kerala University and Ocean Studies, Kochi, Kerala	48

ICAR-CIFE, Rohtak Centre

Date	Organization / University / College / Category of Visitors	No. of Visitors
8 August, 2017	G. V. M. Girls College, Sonepat, Haryana	70
19 August, 2017	Hindu Girls College, Sonepat, Haryana	28
24 January, 2018	Suraj Degree College, Mahendergarh	06
12 February, 2018	Office of Superintendent of Fisheries, Godhra, Govt. of Gujarat	17
18 February, 2018	Vaish College, Rohtak	22
23 February, 2018	Director of Fisheries, Haryana	10
13 March, 2018	National Centre for Nanosciences and Nanotechnology, University of Mumbai (NCNNUM).	4
25 March, 2018	Shri Radha Mohan Singh, Hon'ble Union Minister for Agriculture & Farmers' Welfare at ICAR-CIFE Rohtak	100

6.10. TV/ Radio Talks Delivered

Faculty delivered radio talks in regional languages

TV Channel

Bengali

Dr. B.K. Mahapatra

"*Aquarium e Rongin Maach Chase Udviter Gurutto* "
Annadata, ETV Bangla News, Kolkata
29 May, 2017

'*Chirngri chaase khadyer Byabosthopana*'
Annadata, ETV Bangla News, Kolkata
3 December, 2017

"Amur Fish Culture"
Annadata, ETV Bangla News, Kolkata
6 January, 2018

"*Pukurer Jale Khanchay Kankra Chaas"*
Annadata, ETV Bangla news, Kolkata
19 January, 2018

"*Ilish ki Mitha Jaler Maach Hoye Jachhe?"*
BBC News Bangla
23 January, 2018

"*Unnato Projuktite Punti Maacher Krithim Projonon*"
Annadata, ETV Bangla News, Kolkata
19 February, 2018

Hindi

Dr. Sunil Kumar Nayak

"*Machli Palan Byabasaya*"
Live Phone in Krishi Darshan,
Bhopal Doordarshan
4 September, 2017

Shri. Satya Prakash

"*Culture of Indian Magur*"
Hello Kisan, Doordarshan (DD Kisan) Channel
30 July, 2017

Dr. R. K. Upadhyay

"Aquaculture and Integrated farming System
Krishi Darshan, Bhopal Doordarshan
19 May, 2017

All India Radio

Bengali

"Barshar Paroborti Maach Chaser Porichorja"
Krishi Kothar Asor in Prasar Bharati, AIR, Kolkata
26 September, 2017

"Pukure Galda Chingrir Chaas"
Krishak Bandhuder Jonno in Prasar Bharati, AIR, Kolkata.
6 November, 2017

"Pukure Galda Chingrir Bacha Toiri o Chaas"
Krishak Bandhuder Jonno in Prasar Bharati, AIR, Kolkata
15 November, 2017

6.11. Transfer/ Demonstration of Technology

Name of the technology : *L. vannamei* culture in salt affected Inland Saline Water

Demonstrated at : Haryana, Punjab, Rajasthan, Western UP region

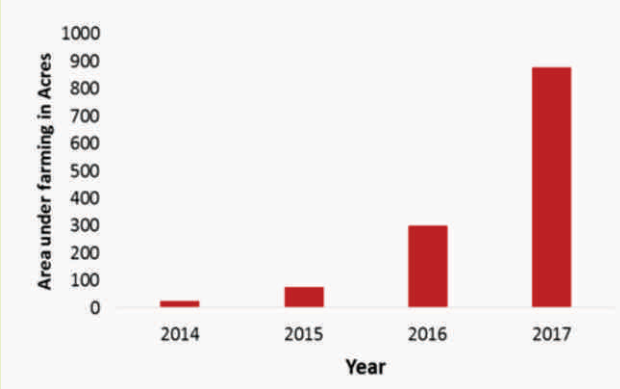
Beneficiaries : Farmers & stakeholders

Impact : Intensive technology demonstrations and trainings were given to farmers in the three extensively salt-affected states of Haryana, Punjab and Rajasthan in collaboration with their respective State Fisheries Departments. In addition, continual technical guidance and monitoring of each farm by ICAR-CIFE throughout the culture period gave enough confidence to farmers and the lure of big profit resulted in widespread adoption of shrimp farming in 2017.

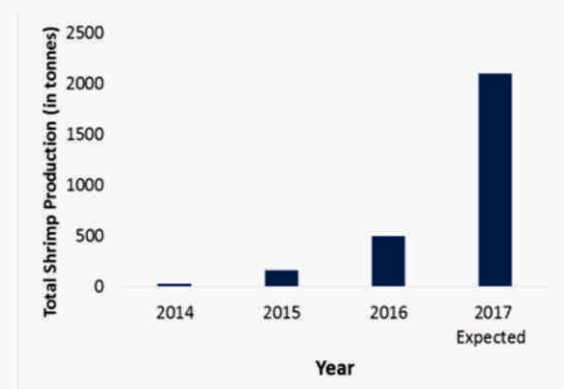
District wise details of commercial inland saline shrimp farms demonstrated by ICAR-CIFE Rohtak centre in 2017

State	Total Area in Acres	Major districts covered
Haryana	800	Rohtak, Jhajjar, Bhiwani, Jind, Hisar, Fatehabad, Sirsa, Sonipat and Gurugram
Delhi	10	
Punjab	45	Muktsar, Fazilka
Rajasthan	20	Churu

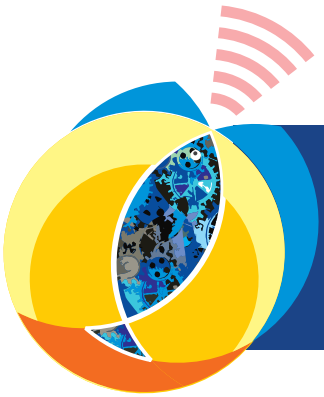
Shrimp farming is spreading very fastly in salt affected inland saline soil.



Progressive increase in area under *L. vannamei* farming using inland saline ground water (ISGW)



L. vannamei production (in tonnes) achieved using the technology developed at ICAR-CIFE Rohtak Centre (ISGW)



Chapter 7

Honours and Awards

Director, ICAR-CIFE, Mumbai recieving a letter of appreciation from Hon'ble Chief Minister of Maharastra

ICAR- CIFE Mumbai received an 'Appreciation Letter' from Hon'ble Chief Minister of Maharashtra Shri Devendra Fadnavis on 19 January 2018, for the great services rendered by CIFE, Mumbai towards developing self-help group and women Entrepreneurs.

Honorary Fellowship

Dr. Gopal Krishna, Director and Vice-Chancellor received Honorary Fellowship from the Zoological Society of India for his contributions in the fisheries sector, during the National Symposium on Biodiversity and Natural Resources for Sustainable Development and 37th Annual Session of the Academy of Environmental Biology on 9 June, 2017

International Awards

Netaji Subash ICAR-International Fellowship

Mr. S. Arun Sudhagar, Scientist, was awarded the Netaji Subash ICAR-International Fellowship for pursuing Ph.D. at University of Veterinary Medicine, Vienna, Austria from May 2017.

Invited Indian Delegate

Dr. Gayatri Tripathi, Principal Scientist, was selected by the Bureau of Indian Standards' Ministry of Consumer Affairs, Food & Public

Distribution, Government of India to represent the country as a Member of Indian Delegation to attend the 10th Plenary Meeting of ISO/TC 234 "Fisheries and Aquaculture" held on 23 November, 2017 at Oslo, Norway.

Best Presentation Award

Dr. Megha Bedekar, Senior Scientist, received the Best Presentation Award for the research paper on "Evaluation of Two DNA Vaccine Constructs in *Labeo rohita* against *Edwardsiella*

tarda" during the International Conference on "Molecular Virology and Microbiology" held at World Academy of Science, Engineering and Technology, Bangkok on 18 December 2017. She also chaired one of the technical sessions in the Conference.

Certificate of Appreciation

Dr. K. Pani Prasad, Prinicipal Scientist, received Certificate of Appreciation (Plenary Speaker)

during the International Conference on "Advances in Fish Health", University Putra, Malaysia on 6 April, 2017

National Awards

Prof. D. K. Belsare Medal

Dr. P. P. Srivastava, was awarded the Prof. D. K. Belsare Medal for outstanding research and academic contribution in the field of fish and fisheries by the Zoological Society of India , during the National Symposium on Biodiversity and Natural Resources for Sustainable Development and 37th Annual Session of the Academy of Environmental Biology

Fellow of the Academy of Environmental Biology

Dr. B. K. Mahapatra, Prinicipal Scientist, was awarded the Fellow of the Academy of Environmental Biology (FAEB) for his significant

contribution in Fishery Science and Environmental Biology by the Academy of Environmental Biology, Department of Zoology, Chaudhary Charan Singh University, Meerut on during the 24 November, 2017.

Appreciation Award

Dr. Gayatri Tripathi, Principal Scientist received an Appreciation letter for her excellent contributions to the ICAR-World Bank Project,

"National Agriculture Higher Education" from ICAR-Education Division, New Delhi on 30 January, 2018.

Dr. B. K. Mahapatra, Principal Scientist, received an 'Appreciation Award' for his outstanding contribution towards Country's Blue Revolution in the country by Duron Agro Industries, Kolkata, West Bengal on 14 September, 2017.

Dr. B. K. Mahapatra, Principal Scientist, received an 'Appreciation Award' for his outstanding contributions in fisheries and aquaculture during the 13th Konnargar Science Fair held at Konnargar, Hooghly West Bengal on 15 January 2018.

Felicitation by 11 IFAF

Mr. Dasari Bhoomaiah was felicitated by 11th Indian Fisheries & Aquaculture Forum, Kochi in

recognition of graphic design services for the International Seminar on " Fostering Innovations in Fisheries and Aquaculture" on 24 November 2017.

Best Hindi Article

Best ten hindi articles for Jalchari Special issue 23rd Edition, 2017 were selected through National level competition in ICAR-CIFE CIFE, Mumbai on 2 January, 2017 and the following articles from CIFE, Mumbai were among the ten Best Hindi Article

- **Dr. Gayatri Tripathi** for the paper titled "*Matsya Vigyan Mein Embroyonic Stem Cell Anusandhan Ke Paripeksh*".
- **Dr. V. K. Tiwari,** Shamna, N. and Babitha Rani A.M. for the paper titled "*Jaliya Krishi Mein Eco Friendly Matsya Aahar*".
- **Dr. Paramita Banerjee Sawant**, N. K. Chadha, Chandra Prakash, A.K. Jaiswar and Bhawesh Sawant for the paper titled "*Powai Jheel Ke Prakritik Tatha Jaivik Vividhta Ki Navikaraniyabahali*".
- **Dr. Paramita Banerjee Sawant**, N.K. Chadha for the paper titled "*Sajavati Machchli Paalan : Ek Upyogi Vyavsay*".

Best Paper Award

Dr. Muralidhar P. Ande, Senior Scientist won the Best Paper Award for his article published in Aquaculture Times, 3 (2): 6-9 pp in April, 2017 issue: 'Marine nutraceuticals' authored by Muralidhar, P.A., Syamala, K., Srinivasa Rao, P., Murali Mohan, K. and Somu Sunder Lingam.

Dr. S. Dasgupta, Principal Scientist, won the Best Paper Award during the 29th All India Zoology Congress at ICAR-CIFRI, Barrackpore on 11 June, 2017:Hormonal changes in maturing wild hilsa (*Tenualosa ilisha*) during spawning migration' authored by Dasgupta, S., Ray, S.K., Dutta, S., Pailan, G.H.

Dr. S. Dasgupta, Principal Scientist won the Best Paper Award during the 11th Indian Fisheries & Aquaculture Forum, Kochi ICAR-CIFT on 24 November, 2017: 'Branchial NKA and NKCC protein expression limits endurance of river stay of migrating hilsa (*Tenualosa ilisha*)' authored by Dasgupta, S., Dutta, S., Ray, S.K., Pailan, G.H.

Dr. Babitha Rani, Scientist, won the Best Paper Award during the 11th Indian Fisheries & Aquaculture Forum, Kochi ICAR-CIFT on 24 November, 2017: 'Gonadal maturation and physiological response of *Cyprinus carpio* in biofloc system fed with varying dietary lipid content'.

Ms. Chanu, T. I., Scientist, won the Best Paper Award for her article on 'Vermicompost production technology for organic aquaculture' published in the Aquaculture Times,3(6): 24-28 pp. December, 2017 issue: Chanu, T.I., Sharma, A., Muralidhar P.A., Prasad, J.K. and Patnaik, R.R.S. 2017. Vermicompost production technology for organic aquaculture.

Dr. S. Munilkumar won the Second Best Paper Presentation Award in Hindi on "*Antarsthaliye Matsya Palan Par Jal Vidyut Pariyognayon Ka Door Gaami Prabhav*" during the Platinum Jubilee Hindi Workshop on "Current Scenario of Inland Fisheries" held at CIFRI-Barrackpore, on 12 December, 2017

Dr. Parimal Sardar, Principal Scientist, won the Best Paper Presentation Award during the International Conference on "Recent Trends in Agriculture, Veterinary and Life Sciences", Carmel College, Goa, India on 28-30 December, 2017. He also chaired one of the session in the Conference.

Adjunct Faculty

Dr. Gayatri Tripathi, Principal Scientist has been awarded the Adjunct Faculty by the Tamil Nadu Fisheries University, Nagapattinam, Tamil Nadu, on 6 February, 2018

External Expert

Dr. Gayatri Tripathi, Principal Scientist has been selected as an external expert for the syllabus review, for the course on 'Fish Disease Diagnosis' under the programme of B.Tech (Biotechnology) from Tamil Nadu Fisheries University, Nagapattinam, Tamil Nadu.

Certificate of Appreciation for Reviewing

The following scientist received 'Certification of Appreciation' for outstanding contributions in reviewing articles for various journals

- **Dr. K. A. Martin,** Scientist for the 'Bioresource Technology Journal', 'LWT Food Science and Technology (Elsevier)' and 'Journal of the Science of Food and Agriculture'.
- **Dr. S. Dasgupta,** Prinicipal Scientist for 'Aquatic Toxicology', Elsevier, Netherlands.
- **Dr. Saurav Kumar,** Scientist for 'Fish and Shellfish Immunology', Elsevier.
- **Dr. Rupam Sharma,** Principal Scientist for 'Aquaculture', Elsevier.

Institutional Awards

Best Scientist
Dr. K. Pani Prasad

Best Young Faculty
Mr. Saurav Kumar

Best Teacher
Dr. V. Ramsubrahmaniyan

Best Extension Scientist
Dr. Arpita Sharma

Best Division
Fish Genetics & Biotechnology Division

Best Division
Aquatic Environment & Health
Management Division

Best Technical Staff
Mr. Avinash Sable

Best Supporting Staff
Mr. Sambhaji S. Shelke

Award for Institutional Building
Dr. B. K. Mahapatra

Best Young Scientist
(Field oriented work)
Dr Muralidhar P. ande

Letter of Appreciation for
Outstanding Services
Dr Aparna Chaudhari

Award for Best Publication of
the year (Highest Impact Factor)
Arun, V.V.

Best Administrative
Staff
Mrs. Anagha U. Joshi

Award for Best
M.F.Sc.
Dissertation
Mr. Vignesh D.

Award for Best
Ph.D. Thesis
Dr. Naresh Mehta

Releasing Marathi extension booklet on 6 June 2017

ICAR West Zone Sports Meet

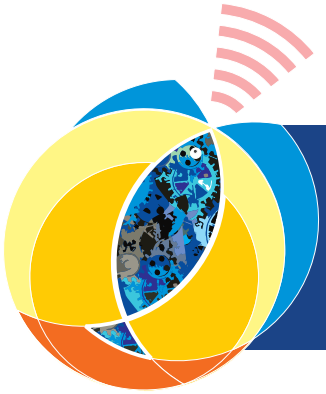
ICAR-CIFE, Mumbai won 9 gold and 2 silver medals in the ICAR Zonal Sports Tournament 2017 during 16-20 January, 2018 held at ICAR-CAZRI, Jodhpur. Ms. Jeena K. was adjudged as the Best Women Athlete of ICAR West Zone.

Sr. No.	Winners	Events	Medal
1	Dr. A. K. Verma Dr. A. Balange Dr. Kundan Kumar Dr. Lenin Singh Mr. Rahul Kumar	Badminton (Men)	Gold
2	Dr. Megha Kadam Bedekar Dr. Nalini Poojary	Badminton (Women Double)	Silver
3	Ms. F. G. Fernandes Ms. Chandralekha Khundol	Table Tennis (Women's Double)	Gold
4	Ms. Chandralekha Khundol	Table Tennis (Women's Single)	Silver
5	Ms. K. Jeena K.	100 M (Women's) race	Gold
6	Ms. K. Jeena K.	200M (Women's) race	Gold
7	Ms. K. Jeena K.	Long Jump (Women's)	Gold
8	Ms. K. Jeena K.	Shot put Throw (Women's)	Gold
9	Ms. K. Jeena K.	Javelin Throw (Women's)	Gold
10	Ms. K. Jeena K.	Discuss Throw (Women's)	Gold
11	Dr. Nalini Poojary	High Jump (Women's)	Gold
	Total	**11(9 Gold and 2 Silver)**	

ICAR Inter Zonal Sports Meet

ICAR-CIFE, Mumbai participated in the ICAR-Inter Zonal Sports Meet during 21-25 February, 2018 at NAARM, Hyderabad

S. No.	Participants	Events	Medal
1	Dr. A. K. Verma Dr. Kundan Kumar Dr. A. Dr. Lenin Singh Dr. V. K. Tiwari	Badminton (Men)	Silver (Runner)
2	Ms. Chandralekha Khundol	Table Tennis (Women's Single)	Gold (Winner)
3	Ms. F.G. Fernandes Ms. Chandralekha Khundol	Table Tennis (Women's Double) Silver (Runner)	



Chapter 8

Linkages & Collaborations

8.1. Linkages

The Institute maintains linkages and collaborations with various national and international institutions and agencies for education, research and development.

Government of India Organizations r

- Fishery Survey of India, Mumbai
- Central Institute of Fisheries Nautical and Engineering Training, Kochi
- Marine Products Export Development Authority, Kochi
- Zoological Survey of India, Kolkata
- Indian Institute of Technology, Kharagpur
- Department of Earth Sciences, New Delhi
- Department of Science and Technology, New Delhi
- Department of Biotechnology, New Delhi
- Indian National Center for Ocean Information Services, Hyderabad
- Satellite Application Centre, Ahmedabad
- Bhabha Atomic Research Centre, Mumbai
- Tata Cancer Research Center, Mumbai
- Indian Institute of Foreign Trade, Kolkata
- Tata Institute of Fundamental Research, Mumbai
- Krishi Vigyan Kendra, Banswara, Rajasthan
- Nuclear Power Corporation of India Limited, Mumbai
- National Bank for Agriculture and Rural Development, Mumbai

ICAR Institutes r

- Central Marine Fisheries Research Institute, Kochi
- Central Institute of Brackishwater Aquaculture, Chennai
- Central Institute of Freshwater Aquaculture, Bhubaneshwar
- Central Inland Fisheries Research Institute, Barrackpore
- Central Institute of Fisheries Technology, Kochi
- National Bureau of Fish Gentic Resources, Lucknow
- Directorate of Coldwater Fisheries Research, Bhimtal
- ICAR - Central Coastal Agricultural Research Institute, Goa
- ICAR Research Complex for Eastern Region, Patna
- ICAR Research Complex for North Eastern Hill Region, Barapani
- ICAR-Indian Agricultural Research Institute, New Delhi
- ICAR-Central Institute of Agricultural Engineering, Bhopal

CSIR Institutes r

- Industrial Toxicology Research Centre, Lucknow
- Central Drug Research Institute, Lucknow
- Central Institute of Medicinal and Aromatic Plants, Lucknow
- Central Food Technological Research Institute, Mysore
- National Institute of Oceanography, Goa
- Centre for Cellular and Molecular Biology, Hyderabad
- National Botanical Research Institue, Lucknow
- Institute of Genomics and Integrative Biology, New Delhi
- Indian Institute of Integrative Medicine, Jammu
- Indian Institute of Chemical Biology, Kolkata

International r

- University of Idaho, Idaho, USA
- University of Kentucky, Lexington, KY, USA
- Curtin University, Australia

Universities r

- Cochin University of Science and Technology, Kochi
- Annamalai University, Chidambaram
- Adikavi Nannaya University, Rajahmundry
- University of Goa, Goa
- Acharya N. G. Ranga University, Guntur
- B. S. Konkan Krishi Vidyapeeth, Dapoli
- Maharana Pratap University of Agriculture and Technology, Udaipur
- Jawaharlal Nehru University, New Delhi
- Mangalore University, Mangalore
- Bhartiyar University, Coimbatore
- West Bengal University of Animal & Fishery Sciences, Kolkata
- Mumbai University, Mumbai
- Bidhan Chardra Krishi Viswa Vidyalaya, Nadia, West Bengal
- Kalyani University, Kalyani, West Bengal
- Barkatullah University, Bhopal
- Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur
- Chhattisgarh Kamdhenu Vishwavidyalya, Chhattishgarh
- Babasaheb Bhimrao Ambedkar University, Lucknow
- Centre of Agriculture University, Imphal

State Governments r

Department of Fisheries of the following states: Maharashtra, Haryana, Uttar Pradesh r Bihar, Tamil Nadu, Andhra Pradesh,Tripura r Arunachal Pradesh, Madhya Pradesh, Meghalaya, Nagaland, Assam, Manipur, Mizoram, Sikkim, Punjab and Telangana r

NGOs: r

- Shashwat, Manchar, Pune, Maharashtra
- Yusuf Meherally Centre, Kutch, Gujarat
- United Artists' Association, Ganjam, Orissa r
- Friends of Nature Association, Talegaon , Maharastra

Other Organizations r

- Haryana Kishan Ayog, Chandigarh
- State Institute of Fisheries Technology, Kakinada
- Action Aid International, Port Blair
- M. S. Swaminathan Research Foundation, Chennai
- The Seafood Exporters Association of India, Kolkata
- Nezami Rekha Sea Foods Pvt. Ltd., Kolkata
- IFB Agro Industries Ltd., Aquatic & Marine Products Div., Kolkata
- Shimpo Exports, Kolkata
- Coreline Exports, Kolkata
- Digha Sea Food Exports, Kolkata
- NSZA Sea Food Pvt. Ltd, Kolkata
- Central Calcutta Science and Culture Organization for Youth, Kolkata
- APC Nutrient, Mumbai
- Godrej Agrovet Pvt. Ltd., Vijayawada
- Maharashtra Machimar Kriti Samiti, Mumbai
- Akhil Bhartiya Machimar Sanghatna, Mumbai
- Madhya Pradesh Fish Federation
- CPWD, Bhopal, M.P.
- CPWD, Hoshanagabad, M.P.
- Telecom Department, M.P.
- State Electricity Board, M.P.
- Saguna Baugh Farm, Neral
- Tata Power Co. Mahseer Farm, Lonavla
- Govt. Fish Farm, Khopoli
- Arrey Fish Farm, Mumbai
- Shramajivi Janata Sahayyak Mandal, Mahad, Raigarh, Maharashtra

8.2. Collaborations

CIFE has signed or renewed MoUs with the following universities and government and private organizations to enhance collaboration in fisheries research and academics and to provide technology consultation.

1. Tamil Nadu Jayalalitha Fisheries University, Nagapattinam, Tamil Nadu
2. Maharashtra Animal and Fishery Science University, Nagpur, Maharashtra
3. MoU signed with ICAR-IISR, Lucknow
4. Department of Fisheries, Uttar Pradesh
5. Pavan Green Biotechnologies Pvt. Ltd., Navi Mumbai
6. West Coast Frozen Foods Pvt. Ltd.Mumbai
7. Ramkrishna Ashram KrishiVigyan Kendra, Nimpith, South 24-Paraganas
8. Institute of Livelihood Research and Training, Hyderabad
9. Department of Fisheries, Government of Haryana for Technology of Transfer
10. Department of Fisheries, Government of Punjab for Technology of Transfer of Inland Saline Shrimp Farming

11. Linkages under DBT-funded project

- National Centre for Aquatic Animal Health, Cochin University of Science and Technology, Cochin
- OIE Reference Laboratory, Department of Zoology, C. Abdul Hakeem College, Vellore Dt., Tamil Nadu
- Central Institute of Freshwater Aquaculture (CIFA), Bhubaneswar India
- Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir

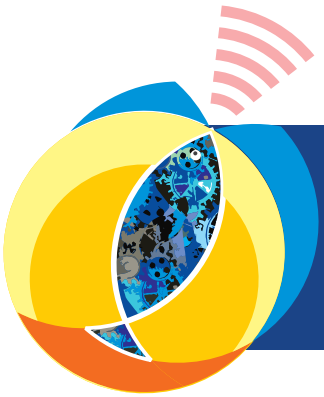
MoU signed with ILRT, Andhra Pradesh

MoU signed with West Coast Frozen Foods Pvt. Ltd Mumbai

MoU signed with Department of Fisheries, Uttar Pradesh

MoU signed with IISR, Lucknow

MoU signed with TNJFU, Tamil Nadu



Chapter 9

Publications


ICAR-CIFE
2017-18
TRAINING MANUAL
Development and Characterization of Fish Cell Lines for Biotechnological Applications
1st -10th February, 2018
NATIONAL AGRICULTURAL HIGHER EDUCATION PROJECT
Development of Energy Efficient and Environment Protective Aquaculture Technologies for Degraded Soils
ICAR-Central Institute of Fisheries Education
शोभिवंत माशांचे रोगनिदान व स्वास्थ्य व्यवस्थापन
RATIONALE
SHORT-TERM GOALS
LONG-TERM GOAL
Appreciation from State Governments
MULTI-DISCIPLINARY TEAM
जागरूकता सह व्यावहारिक प्रशिक्षण
"रोग निदान एवं मत्स्य स्वास्थ्य प्रबंधन"
Awareness cum hands-on-training on
"Disease Diagnosis and Fish Health Management"
16-17th January, 2018
Demonstration and Preparation of Ornamental Fish feed
CAFT
Advances in Nano-Biotechnological Tools in Fisheries
04-13 December, 2017
SETTING UP OF YOUR AQUARIUM
Cell Culture Techniques
शोभिवंत माशांचे संवर्धन
एक उपयोगी व्यवसाय
DESIGNING AND FABRICATION OF AN AQUARIUM
AQUARIUM PLANTS

9.1. Peer Reviewed Publications

Acharya AP, Pavan Kumar A, Joshi CG, Namrata P, Gireesh Babu P, Chaudhari A, Krishna G (2018) Development and characterization of 15 novel polymorphic microsatellites for Giant river-catfish *Sperata seenghala* (Sykes, 1839) using next generation sequencing approach. *Journal of Applied Ichthyology* doi: 10.1111/jai.13683.

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9.2. Book Chapters

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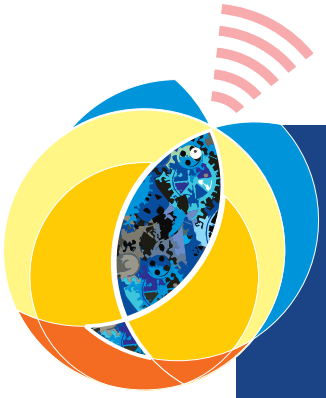


Chapter 10

Participation in Workshops/ Conferences/Symposia/ Meetings/Farmers' Meet

10.1. Participation in Workshops/Conferences/Symposia/Meetings /Farmers' Meet

Participation by Dr Gopal Krishna, Director, ICAR-CIFE

S. N.	Meetings	Venue	Date	Organized by
1.	Finalization of EFC and cadre review of Scientists/ Officers	KAB II, Pusa, New Delhi	6-7 April, 2017	DDG (Fisheries Science), New Delhi
2.	Online Examination System (Chairman)	KAB I, Pusa, New Delhi	11 April, 2017	ASRB, New Delhi
3.	Krishi Mela	Motihari, Bihar	13-14 April, 2017	Agriculture Department, Bihar
4.	International Symposium on "Aquatic Animal Health and Epidemiology for Sustainable Asian Aquaculture"- Session Chair	ICAR-NBFGR, Lucknow	20-21 April, 2017	Director, NBFGR, Lucknow
5.	Draft Bill and Cabinet Note on 'National Council For Higher Agricultural" Education'	Krishi Bhavan, ICAR, New Delhi	25April, 2017	DG, ICAR, New Delhi
6.	Foundation Day Program	ICAR-CIFT, Kochi	29 April, 2017	Director, ICAR-CIFT, Kochi
7.	Expert Member of Selection Committee for Professors and Dean	MCAER, Pune	2 May, 2017	Maharashtra Council of Agricultural Education and Research, Pune
8.	Expert Member of Selection Committee for Professors and Dean	MAFSU, Nagpur	12 August, 2017	Maharashtra Animal & Fishery Sciences University, Nagpur
9.	Workshop on 'Needs of Human Resource Development in Fisheries and Aquaculture in NEH States'	Sonitpur, Assam	5 May, 2017	Director, ICAR-CIFE, Mumbai
10.	Meeting with Principal Secretary (Fy.) and Director Fisheries, Madhya Pradesh, regarding land acquisition for ICAR-CIFE, Powarkheda	Secretariat, Bhopal	8 May, 2017	DoF, Bhopal
11.	Delivered guest lecture on "Strategies for enhancement of quality education for Agriculture/Animal Husbandry and Fisheries Sectors"	4th Foundation Course for Faculty of Agricultural Universities	18 May, 2017	NAARM, Hyderabad
12.	Follow-up meeting with Secretary (Fy) and Director of Fisheries, M.P.	Secretariat, Bhopal	21 May, 2017	DoF, Bhopal
13.	Regional Policy Workshop for "National Inland Fisheries and Aquaculture Policy of India"	Vijayawada, Andhra Pradesh	30 May, 2017	Director, ICAR-CIFE, Mumbai
14.	Invited Guest at Inaugural Function of ZoologicalSociety of Indiaand International Symposium on "Culture Based Fisheries in Inland Open Waters"	ICAR-CIFRI, Barrackpore	9-10 June, 2017	ICAR-CIFRI, Barrackpore
15.	Regional Policy Workshop for Formulation of National Inland Fisheries &Aquaculture Policy	Guwahati, Assam	16 June, 2017	Director, ICAR-CIFE, Mumbai
16.	Institute's EFC meeting	Krishi Bhavan, ICAR, New Delhi	18 -19 June, 2017	DG, ICAR, New Delhi
17.	Central Joint Staff Council Meeting	AP Shinde Auditorium, NASC, New Delhi	21 - 23June, 2017	DG, ICAR, New Delhi
18.	Follow-up meeting with Secretary (Fy) and Director Fisheries, M.P	Secretariat, Bhopal	22 June, 2017	DoF, Bhopal

19.	Meeting with DG ICAR on various Institutional matters	Krishi Bhavan, ICAR, New Delhi	11 July, 2017	DG, ICAR, New Delhi
20.	ICAR Foundation Day, Award Ceremony and Directors Conference	AP Shinde Auditorium, NASC, New Delhi	16 July, 2017	DG, ICAR, New Delhi
21.	Regional Policy Workshop for Formulation of National Inland Fisheries & Aquaculture Policy	Patna, Bihar	22 July,2017	Director, CIFE, Mumbai
22.	National Workshop on "National Inland Fisheries and Aquaculture Policy of India"	Krishi Bhavan, ICAR, New Delhi	28July, 2017	Joint Secretary (Fisheries), DADF, New Delhi
23.	Controller of Examination, ASRB, for finalization of tender documents	KAB I, Pusa, New Delhi	4 August, 2017	Controller of Examination, ASRB, New Delhi
24.	8th Brain Storming Session on "Expectations from Agricultural Universities, Challenges and Mitigation Strategies"	ITC Hotel, Kolkata	19-20 August, 2017	All India University Association , New Delhi
25.	Fisheries development in India and the status of various sanctioned research projects	Krishi Bhavan, ICAR, New Delhi	4 September, 2017	Secretary DADF, New Delhi
26.	Revised Score Cards for all direct recruitment categories of senior scientific position	Krishi Bhavan, ICAR, New Delhi	8 September, 2017	DG, ICAR, New Delhi
27.	Opening Ceremony of Regional Research and Training Center (RRTC) at Motipur	Motipur, Muzaffarpur, Bihar	10September, 2017	Director, ICAR-CIFE, Mumbai
28.	Special Guest at the"Platinum Jubilee Celebration of the Institute and Hindi Workshop"	ICAR- CIFRI, Barrackpore	15 September, 2017	Director, ICAR-CIFRI, Barrackpore
29.	Expert Group Meeting related to Agriculture and Allied Activities for preparation of Development Agenda	NITI Aayog, New Delhi	21 September, 2017	Member, NITI Aayog, New Delhi
30.	Restructuring and Revamping of ASRB	Committee Room, NASC, New Delhi	3October, 2017	Chairman High Power Committee, New Delhi
31.	Revised Score Cards for all direct recruitment categories of senior scientific positions	KrishiBhavan, ICAR, New Delhi	5 October, 2017	DG, ICAR, New Delhi
32.	Workshop on "Conservation Policies for Hilsa and Mahseer"	NASC, New Delhi	7 November, 2017	NAAS, New Delhi
33.	Mid Term Review Meeting of ICAR Regional Committee No. VII	ICAR-CIAE, Bhopal	10 November, 2017	DDG, NRM, New Delhi
34.	Meeting on Welfare of Other Backward Classes (2016-17) - Examination of the subject "Measures undertaken to secure representation of OBCs in employment and for their welfare in PSUs and other Organizations and Institutions under the Ministry of Agriculture and Farmers Welfare"	Parliament Annex Building, New Delhi	13 November, 2017	The Ministry of Agriculture and Farmers Welfare, New Delhi
35.	Harmonizing the academic rules and education related matters of the students in Deemed Universities	NDRI, Karnal	15 November, 2017	Director, NDRI, Karnal
36.	11th Indian Fisheries & Aquaculture Forum	ICAR-CIFT, Kochi	21-24 November, 2017	Asian Fisheries Society Malaysia and AFSIB and CIFT, Kochi
37.	Director IVRI, regarding mutual collaboration on Academic and Research	IVRI, Izatnagar	25 November, 2017	Director, IVRI, Izatnagar

38.	'Brainstorming Session on 'Strategies of Promoting Fisheries Production, Entrepreneurship and Value Added Fish Products in Madhya Pradesh State'	ICAR-CIFE, Powarkheda, Hoshangabad, MP	1 December, 2017	Director, ICAR-CIFE, Mumbai
39.	Revise/Frame Recruitment Rules for Fishing Vessel Crew for Fisheries Research Institutes of the Council	KrishiBhavan, ICAR, New Delhi	6 December, 2017	DG, ICAR, New Delhi
40.	Meeting with DDG (Edn.), ICAR regarding NAHEP proposal of CIFE	NASC, New Delhi	25 January, 2018	DDG (Education), ICAR, New Delhi
41.	Project Evaluation and Monitoring Committee meeting of NAHEP (Member, Project Management Ccommittee)	NASC, New Delhi	29 January, 2018	DDG (Education), ICAR, New Delhi
42.	Meeting with DDG (Education) & DDG (Fisheries Science)	KAB II, Pusa New Delhi	6 February, 2018	DDG (Education), ICAR, New Delhi
43.	Review committee meeting of the projects under Niche Area of Excellence in Agricultural Sciences	KAB II, Pusa New Delhi	15 February, 2018	DDG (Education), ICAR, New Delhi
44.	Meeting on "Scholarships for foreign nationals studying in India"	KAB II, Pusa New Delhi	16 February 2018	DDG (Education), ICAR, New Delhi
45.	Agricultural Summit at Rohtak	Rohtak	25 March, 2018	Agriculture Department, Haryana

Participation by Faculty of ICAR-CIFE

Name of the faculty	Programme attended	Organized by and Venue	Date
K. Pani Prasad	Meeting for finalization of EFC of CIFE	ICAR, New Delhi	6-7 April, 2017
Ashutosh D. Deo	Workshop on "Introduction to GeM–Government e-Marketplace"	ICAR-CIFE, Mumbai	18 April, 2017
Rajendran K.V.	Annual Review Meeting of National Surveillance Programme for Aquatic Animal Diseases	ICAR-NBFGR, Lucknow, Uttar Pradesh	18-19 April, 2017
Rajendran K.V.	International Symposium on "Aquatic Animal Health and Epidemiology for Sustainable Asian Aquaculture"	ICAR-NBFGR, Lucknow, Uttar Pradesh	20-21 April, 2017
Rajendran K.V.	Strategy Planning Workshop of "National Surveillance Programme for Aquatic Animal Diseases"	ICAR-NBFGR, Lucknow, Uttar Pradesh	22 April, 2017
B. K. Mahapatra, G. H. Pailan, S. Datta, S. Munil Kumar, S. Dasgupta, Sujata Sahoo, Dilip Kumar Singh Ashok Biswas	Workshop on "Genetically Modified Crops-Poses a Greeter risks or Beneficial for India"	Vivekananda Vigyan Mission, Kolkata Unit, ICAR-CIFE, Kolkata Centre, Kolkata, West Bengal	15 May, 2017
G. H. Pailan, B. K. Mahapatra, Sujata Sahoo, S. Dasgupta Paramita B. Sawant	Stakeholder Workshop on "Development of Sustainable Coastal Livelihoods through Integrated Mangrove Fishery Farming Systems (IMFFS) Value Chain Development of Honey in Sundarban"	Shrimp Organisation Europe (SHORE) Bluesensus, Nature Environment and Wildlife Society, ICAR-CIFE, Kolkata Centre, Kolkata, West Bengal	22 May, 2017

G. H. Pailan	23rd Meeting of the ICAR Regional Committee, Zone III	Imphal, Manipur	30-31 May, 2017
K. Pani Prasad, P. P. Srivastava, G. H. Pailan, Gayatri Tripathi, S. Dasgupta, Sujata Sahoo	29th All India Zoology Congress and "International Symposium on Culture Based Fisheries in Inland Open Waters" and "Satellite Symposium on Fish Immunology"	ICAR-CIFRI, Barrackpore, West Bengal	9-11 June, 2017
G. H. Pailan	Meeting with the Shri. Radha Mohan Singh, Hon'ble Union Minister, Agriculture and Farmers' Welfare	ICAR, NIRJAFT, Kolkata, West Bengal	13 June, 2017
All faculty of CIFE, Mumbai	Agriculture Education Day	ICAR-CIFE, Mumbai, Maharashtra	1 July, 2017
V. Hari Krishna	National Consultation Workshop on "Formulation of National Inland Fisheries and Aquaculture Policy"	Department of Fisheries, Government of Himachal, Bilaspur, Himachal Pradesh	3 July, 2017
Gayatri Tripathi	Workshop on "Widefield and Confocal Microscopy"	Dept. of Bioscience and Bioengineering, IIT, Mumbai, Maharashtra	6 July, 2017
Gayatri Tripathi	Mega Launch Workshop of NACP-COALESCE Project under National Carbonaceous Aerosols Program, Ministry of Environment, Forest and Climate Change	IIT, Mumbai, Maharashtra	7 July, 2017
K. Pani Prasad Jeena K.	FAO-ICAR meeting to finalise the Operational Mechanism for Indian Network for Fisheries and Animals Antimicrobial Resistance (INFAAR)	ICAR-CIFE, Mumbai, Maharashtra	14 July, 2017
Sujata Sahoo	Workshop on "How AB Vista and FOSS can Help to Maximize he Profitability Through Nutrition?"	Hyatt Regency, Kolkata, West Bengal	3 August, 2017
K. Pani Prasad	Meeting to conduct Inspection of Post Import Quarantine Facility of Ornamental Fishes	Ministry of Agriculture & Farmers Welfare, GOI, Ameet Industries, Taloja, Navi Mumbai, Maharashtra	18 August, 2017
Gayatri Tripathi	The Sensitization Workshop on "National Agricultural Higher Education Project"	ICAR-Education Division, NASC Complex, New Delhi	23 August, 2017
Rajendran K. V.	Project Initiation Workshop-DBT funded project on "Molecular Screening, Cell Culture Based Isolation and Characterization of Finfish and Shellfish Viruses and Establishment of National Repository"	National Centre for Aquatic Animal Health, CUST, Kochi, Kerala	28-29 August, 2017
Ashutosh D. Deo	Workshop on "Emerging Trends in Information Technology in University Management"	Association of Indian Universities, New Delhi and Department of Computer Science, Shivaji University, Kolhapur, Maharashtra	28-30 August, 2017

Gayatri Tripathi	Meeting on "Prospects of Cage Fish Farming in Maharashtra" with the Hon'ble Minister Shri Mahadev Jagannath Jankar, Minister for Animal Husbandry, Dairy Development & Fisheries Development	Minister's Chamber, Mantralaya, Mumbai, Maharashtra	31 August, 2017
Rajandran K. V.	National Seminar on "Climate Change: Impact on Aquatic Environment and Fish Health"	National Academy of Agricultural Sciences (Bhubaneswar Chapter), ICAR-CIFA & Association of Aquaculturists, ICAR-CIFA, Bhubaneswar, Odisha	6 September, 2017
Sunil Kumar Nayak Dhalongsaih Reang	Meeting to Improve the Productivity and Production in the Reservoir Fisheries of Madhya Pradesh	M.P. Fish Federation, Bhadbhada Road, Bhopal, Madhya Pradesh	12 September, 2017
K. A. Martin Xavier	IDP member for renewing the approval for export license	Export Inspection Council, Mumbai, Maharashtra	15 September, 2017
G. H. Pailan	Hindi Workshop on "Current Scenario of Inland Fisheries"	ICAR-CIFRI, Barrackpore, West Bengal	15 September, 2017
G. H. Pailan	4th meeting of the Scientific Advisory Committee	Sasya Shyamala Krishi Vigyan Kendra, RKMVU, Narendrapur, West Bengal	15 September, 2017
Muralidhar. P. Ande R. R. S. Patnaik	Aquabiz-INDIA, 2017	DoF, Vijayawada Andhra Pradesh	15-17 September, 2017
Sujata Sahoo	National Seminar on "Opportunities and Challenges of Translational Research in The Frontier Areas of Animal Biotechnology and Fifth Annual Convention of SVSBT"	College of Veterinary Science and Animal Husbandry, OUAT, Bhubaneswar, Odisha	22-23 September, 2017
Shamna N., Ashok Kumar Lokesh Kumar	National Seminar on "Strategies Innovations and Sustainable Management for Enhancing Cold Water Fisheries and Aquaculture"	ICAR-DCFR, Bhimtal, Uttarakhand	22-24 September, 2017
Scientists of CIFE, Mumbai	Hindi Sanghoshti	ICAR-CIFE, Mumbai, Maharashtra	28 September, 2017
Chandra Prakash	Water Quality Management in Aquaculture	Madras University, Chennai, Tamil Nadu	5 October, 2017
Paramita B. Sawant	National Conference on "Advancements of Applied Zoology for Sustainable Development – Current Trends and Future Perspectives"	Department of Zoology, Pachalyappa College, Chennai, Tamil Nadu	5-6 October, 2017
G. H. Pailan	Workshop on ICAR-NASF project " Stock Characterization, Captive Breeding, Seed Production and Culture of Hilsa"	ICAR-CIFRI, Barrackpore, West Bengal	24 October, 2017
B. K. Mahapatra	9th International Conference on "Hydro-Gramin Technology, Sustainable Agriculture, Rural Development and Livelihood Improvement"	CUTM, Paralakhemundi, Gajapati, Odisha	28-29 October, 2017

Megha Bedekar	World Congress on "Biotechnology and Biological Studies"	Conference Era, New Delhi	9-11 November, 2017
Muralidhar. P. Ande	Mid-term review meeting of ICAR Regional Committee Zone-II	ICAR-CIFRI, Kolkata, West Bengal	13 November, 2017
Sunil Kumar Nayak	State Level Consultation Workshop on Anti Microbial Resistance (AMR)	Directorate of Health Services, Satpuda Bhawan, MP Hotel Palash, Bhopal, Madhya Pradesh	13 November, 2017
Latha Shenoy	Meeting on "ICAR Accreditation Process for Higher Agricultural Educational Institutions and Role of Regional Centers"	NASC complex, Delhi	14 November, 2017
G. H. Pailan	Scientific Advisory Committee Meeting	Ramakrishna Ashram Krishi Vigyan Kendra, Nimpith, West Bengal	18 November, 2017
Rajandran K. V. V. K. Tiwari K. Pani Prasad Amjad Balange Paramita B. Sawant, Babitha Rani Gireesh Babu Martin Xavier Shamna N. Dasari Bhoomaiah	11th Indian Fisheries and Aquaculture Forum Asian Fisheries Society Indian Branch (AFSIB)	ICAR-Central Institute of Fisheries Technology, Kochi, Kerala	21-24 November, 2017
Babitha Rani. A.M	International Seminar on "Recent Trends in Best Management Practices of Aquaculture"	NAAS Kochi Chapter and World Aquaculture Society Asian Pacific Chapter, KUFOS, Kochi, Kerala	25 November, 2017
B. K. Mahapatra	National Symposium on "Biodiversity and Natural Resources for Sustainable Development"	Department of Zoology, Chaudhary Charan Singh University, Meerut, Uttar Pradesh	24-26 November, 2017
Geetanjali Deshmukhe	TIFAC meeting on "Seaweed Utilization"	CSMCRI, Bhavnagar, Gujarat	27 November, 2017
Rajendran K. V.	The First Steering Committee Meeting for Asian Pacific Aquaculture 2019	Tamil Nadu Dr. J. Jayalalitha Fisheries University & World Aquaculture Society, Hotel Le Royal Meridien, Chennai	4 December, 2017
Husne Banu	Proteomics Bootcamp	IIT-Mumbai	11 December, 2017
Latha Shenoy	Stakeholders Interaction Program (Under TSP scheme) on CCRF and Awareness program on "Livelihood Improvement Through Value Addition of Fish"	Morbe, Raigad, Maharashtra	21 December, 2017
G. H. Pailan	Regional Advisory Meeting for Farms, Farmers' & Rural Areas	NABARD, Kolkata, West Bengal	29 December, 2017

G. H. Pailan	Interactive meeting with Shri Radha Mohan Singh, Hon'ble Union Minister, Agriculture & Farmers Welfare	NBBS & LUP, Nagpur, Maharashtra	30 December, 2017
Parimal Sardar	International Conference on "Recent Trends in Agriculture, Veterinary and Life Sciences-2017"	International Multidisciplinary Research Foundation in collaboration with Carmel College for Women, Nuvem, Goa	28-30 December, 2017
G. H. Pailan	Bengal Fish Fest, 2018	ICAR-CIFE, Kolkata Centre, Kolkata, West Bengal	05 January, 2018
S. Dasgupta	Workshop on "Conservation Strategies for Mahseer and Hilsa Fisheries"	NAAS, New Delhi	07 January, 2018
G. H. Pailan	Regional Review meeting on "Blue Revolution"	ICAR-CIFE, Kolkata Centre, Kolkata, West Bengal	10 January, 2018
Rajendran K. V.	Meeting of the Committee for change of nomenclature for the Departments/Centres of Tamil Nadu Fisheries University	Vice-Chancellor Camp Office, Tamil Nadu Dr. J. Jayalalitha Fisheries University, Chennai, Tamil Nadu	19 January, 2018
S. Dasgupta	Meeting on Hilsa project	ICAR-CIFRI, Barrackpore, West Bengal	24 January, 2018
Neelam Saharan	Program on "Science for Progress in India"	NIAS, Bangalore, Karnataka	22- 26 January, 2018
Ashutosh D. Deo	Symposium on "Aquaculture Nutrition"	Hotel Feathers, Manapakkam, Chennai, Tamil Nadu	1 February, 2018
Parimal Sardar	XVII Biennial Animal Nutrition Conference ANSICON-2018 on "Nutritional Challenges for Raising Animal Productivity to Improve Farm Economy"	Junagadh Agricultural University, Junagadh, Gujarat	1-3 February, 2018
Neelam Saharan	Competence Enhancement Program for Effective Implementation of Training Functions for HRD Nodal Officers of ICAR	ICAR-NAARM, Hyderabad, Telangana	15-17 February, 2018
S. Munilkumar	Workshop on "Developing Multi-Disciplinary Approach in Project Formulations And Innovations in Agriculture and Allied Sectors"	ICAR-CIFRI, Barrackpore, West Bengal	17 February, 2018
G. H. Pailan B. K. Mahapatra Munil Kumar S. Dasgupta Sujata Sahoo, Dilip Kumar Singh	One-day Farmers-Expert Interactive Workshop on "Problems and Constraints of Aquaculture Practices"	ICAR-CIFE, Kolkata Centre, Kolkata, West Bengal	19 February, 2018
All faculty of CIFE, Mumbai	National Science Day, "Student Ready Entrepreneurship in Fisheries: A Way Forward"	ICAR-CIFE, Mumbai, Maharashtra	28 February, 2018
All faculty of CIFE, Mumbai	Industry Meet	ICAR-CIFE, Mumbai, Maharashtra	28 February, 2018

K.A. Martin Xavier, Layana P.	International Workshop on "Indian Food Exports: Understanding Regulatory and Safety Requirements"	USFDA, EIC, EU and CFIA at Gold Finch Hotel, Mumbai, Maharashtra	9 March, 2018
Geetanjali Deshmukhe	Awareness Programme on "Mangrove Fishery Conservation"	Karanja, Maharashtra	13 March, 2018
Gayatri Tripathi	"Fiduciary and Orientation Workshop of NAHEP for Participating Agricultural Universities"	ICAR-Education Division, NASC Complex, New Delhi	14 March, 2018
Kiran Dube Rawat	Brainstorming Session on "Cage Culture in Inland Open Waters"	ICAR-CIFRI, Barrackpore, West Bengal	16 March, 2018
R. R. S. Patnaik	Aquaex India-2018	Society for Indian Fisheries and Aquaculture, Hitech Exhibition Centre, Hyderabad, Telangana	15-17 March, 2018
V. Hari Krishna Pankaj Kumar, Sreedharan K, Satya Prakash	Krishi Unnati Mela-2018	ICAR-IARI, New Delhi	16-18 March, 2018
V. Hari Krishna Pankaj Kumar Sreedharan K Satya Prakash	Agriculture Leadership	Department of Fisheries, Summit-2018 Haryana, Mela Ground, Rohtak, Haryana	24-26 March, 2018
Mukunda Goswami	Application of Fish Cell Line in, *in-vitro* Research: Status and Perspectives	105th Indian Science Congress Manipur University, Imphal	16-20 March, 2018
Annam P. Kumar	International Workshop on Mahseer Conservation	Bournemouth University, UK & KUFOS, Kochi	6 April, 2017
Aparna Chaudhari	Selection Committee Meeting for Netaji Subhas ICAR International Fellowships	Education Division, ICAR, NASC, ICAR, N. Delhi	6 September, 2017
Mukunda Goswami	Targeted Proteomics Workshop	IIT, Bombay	24-27 February, 2018

10.2. Visits Abroad

Name of Faculty	Place of visit and purpose	Date
K. Pani Prasad	Keynote Speaker at the International Conference on "Advances in Fish Health", University Putra, Malaysia	6 April, 2017
Gayatri Tripathi	Indian Delegation to the 10th Plenary Meeting of ISO/TC 234 "Fisheries and Aquaculture" held at Oslo, Norway	23 November, 2017
Megha Bedekar	Invited as Chair for one of the Conference Session in the International Conference on "Molecular Virology and Microbiology", Bangkok, Thailand	18-19 December, 2017
Rajendran K. V.	2nd Annual Meeting and Progress Review Part of the International collaborative project-BBSRC/Newton Fund/DBT Project: "Novel Molecular Approaches for Advancing Prediction and Mitigation of Disease Outbreaks in Aquaculture for Small Scale Farmers", Lilongwe, Malawi	14-16 March, 2018

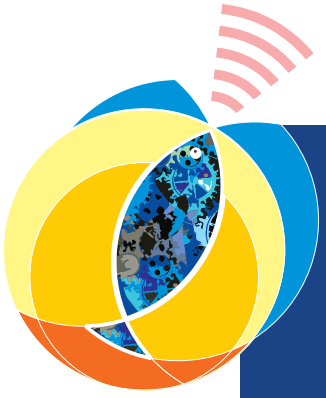
10.3. Training Programmes/Winter schools/CAFT programmes attended

Name of the faculty	Name of the Training Programmes/ Summer school etc.	Venue	Date
Sujata Sahoo	Right to Information Act, Improvement of Records Management, Conduct Rules and Prevention of Sexual Harassment	Airport City Hotel, Kolkata, West Bengal	24-26 April, 2017
Arun Sharma and T.I. Chanu	DBT-HRD sponsored three month National training programme on "Molecular Biology and Biotechnology for Fisheries Professionals"	ICAR-CIFA, Bhubaneswar, Odisha	15 February-15 May, 2017
Karankumar Ramteke	ISRO-sponsored NNRMS Course on "RS & GIS Coastal and Ocean Sciences"	Indian Institute of Remote Sensing, ISRO Dept. of Space, Govt. of India, Dehradun, Uttarakhand	1 May- 23 June, 2017
Aparna Chaudhari	'Management Development Program of Procurement Policy Division' Ministry of Finance, GoI, on Public Procurement	National Institute of Financial Management, Faridabad	15-20 May, 2017
Sujata Sahoo	One day Training Workshop on PFMS	ICAR-NIRJAFT, Kolkata, West Bengal	18 September, 2017
Rupam Sharma	Priority setting, Monitoring and Evaluation (PME) of Agricultural Research Projects"	NAARM, Hyderabad	6-11 October, 2017
Dhalongsaih Reang	Winter school on "Recent Advances in Aquaculture Biotechnology"	College of Fisheries, Lembuchera, Agartala, Tripura	1-21 November, 2017

Sunil Kumar Nayak	CAFT programme on "Advances in Nano-Biotechnological tools in Fisheries"	ICAR-CIFE, Mumbai, Maharashtra	4-13 December, 2017
K. Pani Prasad	Training on "Emotional Intelligence at Workplace for Scientists / Technologists"	Centre for Organizational Development, Hyderabad, Telangana	11-15 December, 2017
Karankumar Ramteke Shashi Bhushan	Winter School Training Programme on "Structure and Function of the Marine Ecosystem: Fisheries"	ICAR-CMFRI, Kochi Kerala	1- 21 December, 2017
Ashutosh D Deo, Jeena K. Saurav Kumar	Training and Awareness Program on J-Gate@CeRA, in association with ICAR-DKMA	ICAR-CIFE, Mumbai, Maharashtra	23 December, 2017
Satya Prakash	CAFT Programme on "Advance Level Training on Soil, Plant and Water Analysis"	ICAR-IARI, New Delhi	8-28 December, 2017
G. H. Pailan	Training-cum-Workshop on "Social Security of Fisher"	ICAR-CIFE, Kolkata Centre, Kolkata, West Bengal	28 December, 2017
Suryakant L. Koli	Training programme on Koha KOHA for library staff at ICAR	NAARM, Hyderabad	5-9 February 2018
Mr. Dhalongsaih Reang	ICAR sponsored STP on "Development and Characterization of Fish Cell Lines for Biotechnological Applications".	ICAR-CIFE, Mumbai, Maharashtra	1-10 February, 2018
Pankaj Kumar	DBT-HRD sponsored three month National training programme on "Molecular Biology and Biotechnology for Fisheries Professionals"	ICAR-CIFA, Bhubaneswar, Odisha	20 November, 2017 -19 February, 2018
K. A. Martin Xavier	Winter school on "Marine Nutrients for Fighting Malnutrition: Recent Advances in Marine Biomolecules for Human Nutrition and Healthcare"	ICAR-CIFT, Cochin, Kerala	1-21 February, 2018
Gireesh Babu P. A. Pavan Kumar	Genome Sequencing: Methods and Applications	ICAR-NBFGR, Lucknow	12-17 March, 2018
Satya Prakash	Revising course for FOCARS: Reflection and Feedback of Trained Scientists	ICAR-NAARM, Hyderabad, Telangana	15-16 March, 2018


राजभाषा निरीक्षण


BOARD OF MANAGEMENT
MEETING



Chapter 11

Meetings/Workshops/ Seminars/Winter Schools Organised

11.1. Symposia/Workshops/ Seminars/ Organised

Title	Date	Venue	In Association with	No. of Participants
Hindi Workshop for Scientists, Officers & Staff Members	29 April, 2017	ICAR-CIFE, Mumbai	ICAR-CIFE, Mumbai	21
Awareness-cum-Workshop on "Fish Health Management in Aquaculture for Fish Farmers"	3-4 May, 2017	Sonitpur, Assam	State Fisheries Dept. of Assam, NGO Jeeva Suraksha, Shivsagar and Angling Association and Bhoreli Angling and Conservation Association, Potasali Nameri, Assam	66
Workshop on "Needs of Human Resource Development in Fisheries and Aquaculture in NEH States"	5 May, 2017	Sonitpur, Assam	State Fisheries Dept. of Assam, NGO Jeeva Suraksha, Shivsagar and Angling Association and Bhoreli Angling and Conservation Association, Potasali Nameri, Assam	50
Workshop on "Genetically Modified Crops-Poses a Greater risks or are Beneficial for India"	15 May, 2017	ICAR-CIFE, Kolkata	Vivekananda Vijnan Mission, Kolkata Unit West Bengal	50
Stakeholder Workshop on "Development of Sustainable Coastal Livelihoods through Integrated Mangrove Fishery Farming Systems (IMFFS) and Value Chain Development of Honey in Sundarban"	22 May, 2017	ICAR-CIFE, Mumbai	Nature Environment Wildlife Society, Kolkata (NEWS)	60
The First Zonal Stakeholders' Consultation on National Inland Fisheries and Aquaculture Policy Workshops(NIFAP)	30 May, 2017	Sub Collector's Office, Conference hall, Vijayawada, Andhra Pradesh	Ministry of Agriculture & Farmers'' Welfare (DADF)	80
56th Annual Day	6 June, 2017	ICAR-CIFE, Mumbai	ICAR-CIFE, Mumbai	400
The Second Zonal Stakeholders' Consultation on National Inland Fisheries and Aquaculture Policy Workshops (NIFAP)	16 June, 2017	Conference Hall, North Eastern RegionalCentre of NationalInstitute of Rural Development and Panchayati Raj, Guwahati	Ministry of Agriculture & Farmers Welfare (DADF)	65
The Third Zonal Stakeholders' Consultation on National Inland Fisheries and Aquaculture Policy Workshops (NIFAP)	3 July, 2017	Hotel Lake View, Directorate of Fisheries, Bilaspur, Himachal Pradesh	Ministry of Agriculture & Farmers' Welfare (DADF)	85
National Fish Farmers' Day	10 July, 2017	ICAR-CIFE, Mumbai and its Centres	ICAR-CIFE, Mumbai	100

The Fourth Zonal stakeholder's Consultation on National Inland Fisheries and Aquaculture Policy Workshops(NIFAP)	22 July, 2017	Conference hall, Bihar Agricultural Management & Extension Training Institute, Patna	Ministry of Agriculture & Farmers Welfare (DADF)	80
Orientiation cum Awareness Workshop on Ornamental Fish Culture for Tribal Women"	8 August, 2017	Warungshi Village, Ahmednagar, Maharashtra	Warungshi village Panchayat, Warungshi	48
Workshop in Hindi on *"Kisano Ki Aamdani Badaane Hetu Vaigynanik Tarikoo Se Machli Paalan"* (Scientific Fish Culture for Enhancing Farmers' Income)	22 September, 2017	ICAR-CIFE Kakinada Centre	ICAR-CIFE, Mumbai	80
A Brain Storming Session on *"Madhya Pradesh Rajya Mein Matshya Krishi Udyog, Utpad Evam Aya Bridhi Ke Upaya"*	1 December, 2017	ICAR-CIFE Powarkheda Centre	Madhya Pradesh State Fisheries Department, Govt. of Madhya Pradesh	50
One Day Farmers' Expert Interactive Workshop on "Prospects and Constraints of Aquaculture Practices"	19 February, 2018	ICAR-CIFE, Kolkata Centre	The Zoological Society, Kolkata	70
Awareness cum Workshop on "Soil and Water Quality Management for Aquaculture Systems"	19-20 March, 2018	Dibrugarh, Assam	State Fisheries Dept. of Assam and NGO Jeeva Suraksha	70

11.2. Important Meetings

Meetings	Date
Institute Research Council Meeting (Annual Meeting)	3-5 April, 2017
Rajbasha Implementation Committee Meeting	11 May, 2017
Review Meeting with Vigilance Officers	8 July, 2017
FAO-ICAR Meeting to Finalize Operational Mechanism for Indian Network for Fisheries and Animals Anti-Microbial Resistance (INFAAR)	14 July, 2017
Rajbasha Implementation Committee Meeting	29 September, 2017
Academic Council Meeting	14 October, 2017
Institute Research Council Meeting (Half yearly Meeting)	25 October, 2017
Extension Council Meeting	6 November, 2017
Rajbasha Implementation Committee Meeting	28 December, 2017
Research Advisory Committee Meeting	22-23 February, 2018

FAO-ICAR Meeting

Research Advisory Committee Meeting

Extension Council Meeting

Review Meeting with Vigilance Officers

11.3. CAFT Programmes Organised

Title	Period	No. of participants
Advances in Nano-Biotechnological Tools in Fisheries	4-13 December, 2017	11
Advances in Microbiological and Biochemical Techniques in the Assessment of Seafood Quality and Safety	9 -29 January, 2018	16
Molecular Techniques in Shrimp Health Management	24 Feb-5 March, 2018	08
Utilization of Proteins Extracted from Leaves and Non-edible Seeds for Preparing Fish Feed	6-16 March, 2018	10

A Brainstorming Session on 'Strategies of Promoting Fisheries Production, Entrepreneurship and Value Added Fish Products in Madhya Pradesh State'

A Brainstorming Session on 'Strategies of Promoting Fisheries Production, Entrepreneurship and Value Added Fish Products in Madhya Pradesh State' was held at CIFE, Powarkheda Centre on 1 Dec 2017. It was attended by Mr. Vinod Kumar, Principal Secretary, Fisheries (Madhya Pradesh); Mr. O. P. Saxena, Director, Fisheries Department (M.P.); Mr. M. S. Dhakad, Managing Director, Fish Co-operative Federation (M.P.); Dr. Gopal Krishna, Director, ICAR-CIFE along with state officials, farmers, entrepreneurs experts and staff of ICAR-CIFE.

Director, ICAR-CIFE, welcomed the guests and thanked Mr. Vinod Kumar and Mr. Saxena for expediting the transfer of land on which CIFE Powarkheda Centre is situated in the name of ICAR-CIFE. He expressed confidence that this will give impetus to development of better infrastructure at the Centre that will benefit the state and fulfill their training and research needs. Mr. Saxena was pleased that the brainstorming session was to be immediately followed by a 5 day training programme on "Fish Processing" for 20 state officials. He said that this is one important aspect which has to be emphasized in present times for enhancing farmers' profit and protecting from glut in production. Mr. Dhakad, suggested that the food industry should be roped in for this kind of enterprise and the guidelines approved for agricultural food products may be followed. The Principal Secretary, Fisheries (M.P.), encouraged the officials and farmers to participate whole heartedly in transformation of fisheries sector and looked forward to technology and training assistance from CIFE, Mumbai and its centre at Powarkheda. He emphasized the importance of high performing species and strains with better food conversion ratios.

In the ensuing brainstorming session farmers raised issues related to the use of locally available ingredients for fish feed like water hyacinth and maize cob, diseases in fish being grown in cages and possible treatments. Dr. Balange, Senior Scientist, FRHPH Division, CIFE, suggested that processing equipment can be provided by M.P. State to entrepreneurs as central facility that can be used on payment basis. Dr. Aparna Chaudhari, Head, FGB Division, CIFE and Nodal Officer, Powarkheda Centre suggested application of high value ornamental fish culture and giant freshwater prawn/carp polyculture technologies available with CIFE. During the visit to the Centre, Dr. Sunil Nayak, OIC, Powarkheda, appraised the officials about the activities of the Centre.

Workshop in Hindi on *"Kisano Ki Aamdani Badaane Hetu Vaigynanik tarikoo Se Machlipaalan"* (Scientific Fish Culture For Enhancing Farmers' Income)

On the occasion of Hindi *Pakhwada* celebrations (14-29 September, 2017), a Workshop in Hindi on *"Kisano Ki Aamdani Badaane Hetu Vaigynanik tarikoo Se Machlipaalan"* (Scientific Fish Culture For Enhancing Farmers' Income))was organized at ICAR-Central Institute of Fisheries Education, Kakinada Centre on 22 September, 2017. This was organised under the leadership of Dr. Gopal Krishna, Director, ICAR-CIFE. Dr. Parimal Sardar, Principal Scientist, ICAR-CIFE, and Dr. Muralidhar P. Ande, Officer-in-charge, ICAR-CIFE, Kakinada Centre, coordinated the programme. Workshop was

conducted in Hindi and Telugu languages. About 80 fish farmers and shrimp farmers, from different parts of the East Godavari District, A. P., trainees and research scholars participated in the programme. Four scientific lectures, farmers' interaction and a technical session were conducted during the workshop. Dr. Parimal Sardar interacted with the farmers on feed and feeding strategies for sustainable feed-based aquaculture. Dr. Muralidhar P. Ande, delivered a talk on 'Challenges and Opportunities in Pangasius Farming'. In the forenoon session, Dr. P. Ram Mohan Rao, Former Deputy Director, State Institute of Fishery Technology, Andhra Pradesh Kakinada delivered a lecture on 'Sustainable Carp Culture Technology for Enhancing Farmers' Income'. A progressive shrimp farmer, Dr. K. Madhusudhan Reddy, , A.P. delivered a talk on 'Challenges and Opportunities in *Litopenaeus vannamei* Farming'. On this occasion, Shri Ravi Shankar Patnaik, Chairman, Hindi implementation committee, Dr. J. Krishna Prasad, Dr. P. Srinivasa Rao, Shri K. Murali Mohan and and Shri V. Narsimhacharyulu also participated in the programme. At this event, certificates were distributed to the successful students of One-Year Skill Development Certificate Course on "Fish Farming and Hatchery Operation" (2016-17 batch).

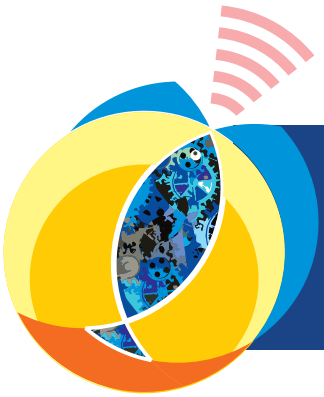
Hindi Workshop for Scientists, Officers & Staff Members

Quarterly Hindi Workshop for Staff Members was organised on 29 April 2017 at ICAR-CIFE Mumbai. Dr. N.P. Sahu, Dean (Academics) inaugurated the workshop. Mr. Rajendra Rawat from Film Division was the guest faculty of the first session. He elaborated on the Official Language Policy of the Union and Constitutional Provisions. On the second session, Dr. Motilal Gupta from Department of Official Language highlighted the problems with Official Language Implementation and their solutions. He also explained the practical use of Hindi in Information Technology. The workshop was attended by 21 participants. The workshop was co-ordinated by Mr. D. K. Dharam, Assistant Director (Official language).

Zonal National Inland Fisheries and Aquaculture Policy (NIFAP) Workshops

Ministry of Agriculture & Farmers Welfare, Govt. of India constituted a Committee under the Chairmanship of Dr. Dilip Kumar, Former Director, ICAR-CIFE, for drafting the National Inland Fisheries and Aquaculture Policy (NIFAP). More than a decade of CIFE's evidence-based fisheries policy research and advocacy has brought the much neglected policy aspects into the mainstream. Recognising the CIFE's expertise in this area, DADF and the Chairman identified CIFE as a technical collaborator for developing the Policy document. The Committee, in its meetings held in New Delhi and Mumbai, decided to take stakeholder opinion by organising regional consultations. ICAR-CIFE and the drafting Committee prepared the draft document and detailed format for conducting the stakeholders' consultations and recording the inputs across the country followed by a final national level workshop in Mumbai.

ICAR-CIFE, Mumbai steered our Zonal Stakeholder Consultations at Vijayawada on 30 May 2017, Guwahati on 16 June 2017, Bilaspur on 3 July 2017 and Patna on 22 July 2017. More than 300 participants representing farmers, fishers, DoF staff, scientists, NGOs and civil society actively participated in each of the consultations and flagged many policy related concerns and demands. The important among them were protecting wetlands from pollution, resolving multiple water use conflicts, ensuring minimum water level in reservoirs and flow in rivers, improving governance in fisheries cooperatives, treating aquaculture on equal footing with agriculture for water use and tariffs, promoting cage culture and ornamental fisheries, encouraging organic aquaculture and species diversification, seed and feed certification, strengthening storage and transportation infrastructure to overcome geographical disadvantages in NEH regions, improving productivity in beels through scientific management, increasing credit flow to fishers and farmers, strict regulation for conserving habitats and breeding grounds, inter sectoral coordination, conservation of native fish species, periodic assessment of aquatic resources and strengthening data base on culture and capture fisheries, promoting eco-tourism potential and guidelines to regulate aquaculture in inland saline states.



Chapter 12

Distinguished Visitors

Shri Radha Mohan Singh
Hon'ble Union Minister of Agriculture and Farmers Welfare
New Delhi

Shri S. S. Ahluwalia
Union Minister of State, Ministry of Drinking
Water and Sanitation, New Delhi

Shri Mahadev Jagannath Jankar
Hon'ble Minister for Animal Husbandry,
Dairy Development and Fisheries Development
Government of Maharashtra

Dr Bharati Lavekar
Member of Legislative Assembly
Versova, Mumbai, Maharashtra

Distinguished Visitors to CIFE, Mumbai/Centres

Minister, Govt. of India

Shri Radha Mohan Singh
Hon'ble Union Minister of Agriculture and Farmers Welfare, New Delhi
Motipur Centre-10 September, 2017;
Rohtak Centre-25 March, 2018

Shri S. S. Ahluwalia
Union Minister of State, Ministry of Drinking Water and Sanitation, New Delhi
Kolkata Centre-11 September, 2017

Shri Arjun Ram Meghwal
Union Minister of State, Water Resources, River Development & Ganga Rejuvenation, Parliamentary Affairs, New Delhi
Kolkata Centre-3 October, 2017

Minister of State Government

Shri Mahadev Jagannath Jankar
Hon'ble Minister for Animal Husbandry, Dairy Development and Fisheries Development Government of Maharashtra
Mumbai HQ-6 June, 2017

Shri Pashupati Kumar Paras
Hon'ble Minister for Animal and Fish Resources Government of Bihar
Motipur Centre-10 September, 2017

Shri Suresh Sharma
Hon'ble Minister for Urban and Housing Development
Government of Bihar
Motipur Centre-10 September, 2017

Member of Parliament/MLA

Shri Rama Kishore Singh
Member of Parliament, Vaishali, Bihar
Motipur Centre-10 September, 2017

Shri Gajanan Kirtikar
Member of Parliament, North-West, Goregaon, Mumbai
Mumbai HQ

Dr Bharati Lavekar
Member of Legislative Assembly Versova, Mumbai, Maharashtra
Mumbai HQ-6 June, 2017 & 28 February, 2018

ICAR, New Delhi

Dr Trilochan Mohapatra
Secretary (DARE) & Director General (ICAR), New Delhi
Kolkata Centre-4 July, 2017

Shri Chhabilendra Roul, IAS
Special Secretary (DARE) & Secretary (ICAR), New Delhi
Kolkata Centre-10 November, 2017

Dr J. K. Jena
Deputy Director General (Fisheries), ICAR, New Delhi
Kolkata Centre-15 June, 2017; Mumbai-14 July, 2017; Motipur Centre-10 September, 2017; Mumbai HQ-22-23 February, 2018; Rohtak Centre-25 March, 2018

Dr J. S. Sandhu
Deputy Director General (Crop Science), ICAR, New Delhi
Kolkata Centre-8 July, 2017

Secretary

Dr N. Vijaya Lakshmi, IAS
Secretary, Animal Husbandry, Dairying and Fisheries
Government of Bihar
Motipur Centre-10 September, 2017

Dr Vinod Kumar, IAS
Secretary, Animal Husbandry, Dairying and Fisheries
Government of Madhya Pradesh
Powarkheda Centre-1 December, 2017

Ms I. Rani Kumudini, IAS
Chief Executive, NFDB, Hyderabad
Kolkata Centre-10 January, 2018

Vice-Chancellor

Prof A. K. Mishra
Vice-Chancellor
Maharashtra Animal and Fisheries Sciences University, Nagpur
Mumbai HQ-6 June, 2017

Dr K. M. Bujarbaruah
Vice-Chancellor
Assam Agriculture University, Jorhat, Assam
Mumbai HQ-14 October, 2017

Dr S. Felix
Vice-Chancellor
Tamil Nadu Dr J. Jayalalithaa Fisheries University (TNJFU), Tamil Nadu
Mumbai HQ-4 September, 2017

Prof Purnendu Biswas
Vice-Chancellor
West Bengal University of Animal & Fishery Science, West Bengal
Kolkata Centre-10 July, 2017

Dr C. Vasudevappa
Vice-Chancellor, NIFTEM, Sonepat, Haryana

Prof K. Pradhan
Former Vice-Chancellor, OUAT, Bhubaneswar, Odisha
Kolkata Centre-14 June, 2017

Dr A. K. Srivastava
Chairman, Agricultural Scientist Recruitment Board, Delhi
Kolkata Centre-10 January, 2018

International Delegate

Prof Myung-Joo Oh
Department of Aqualife Medicine, Chonnam National University, South Korea
Mumbai HQ-24-29 July, 2017

Dr Wisik Kim
Department of Aqualife Medicine, Chonnam National University, South Korea
Mumbai HQ-24-29 July, 2017

Mr Choon Sup Kim
Department of Aqualife Medicine, Chonnam National University, South Korea
Mumbai HQ-24-29 July, 2017

Dr Rajesh Bhatia
AMR expert, FAO, New Delhi
Mumbai HQ-14 July, 2017

Dr Sara Hyedari
MD, US Agency for International Development, New Delhi
Mumbai HQ-14 July, 2017

Director and Joint Director of ICAR Institute

Dr R. K. Singh
Director, ICAR-IVRI, Bareilly, Uttar Pradesh
Mumbai HQ-14 July, 2017

Dr Ravishankar C. N.
Director, ICAR-CIFT, Kochi, Kerala
Mumbai HQ-23 February, 2018

Dr K. K. Vijayan
Director, ICAR-CIBA, Chennai
Mumbai HQ-14 October, 2017

Dr Kuldeep Kumar Lal
Director, ICAR-NBFGR, Lucknow, Uttar Pradesh
Mumbai HQ-9 August, 2017; Kolkata Centre-29 October, 2017

Dr B. K. Das
Director, ICAR-CIFRI, Barrackpore, West Bengal
Kolkata Centre-10 November, 2017; Mumbai HQ-28 February, 2018

Dr Eknath B. Chakurkar
Director, ICAR-CCARI, Goa
Kakinada Centre-18 January, 2018

Dr P. C. Sharma
Director, ICAR-CSSRI, Karnal, Haryana
Kolkata Centre-24 June, 2017

Dr J. K. Sundaray
Director (Acting), ICAR-CIFA, Bhubaneswar, Odisha
Mumbai HQ-13 December, 2017

Dr Abhijit Mitra
Director, ICAR-NRC, Mithun, Nagaland
Kolkata Centre-12 July, 2017; Mumbai HQ-7 December, 2017

Prof R. K. Saha
Director (Extension Education), CAU, Imphal
Kolkata Centre-23 December, 2017

Shri Ashish Roy
Joint Director (Administration) & Registrar ICAR-NAARM, Hyderabad, Telangana
Mumbai HQ-9 August, 2017

Special Invitee

Padma Vibhushan Dr Anil Kakodkar
Former Chairmen, Atomic energy Commission of India
Mumbai HQ-April 4, 2017

Dr M. V. Gupta
World Food Prize Laureate (2005)
Mumbai HQ-14 October, 2017

Dr Ambekar Eknath
Former DG, NACA, Bangkok
Mumbai HQ-11 August, 2017

Dr E. G. Silas
Former Director, ICAR-CMFRI, Cochin, Kerala
Mumbai HQ-22-23 February, 2018

Dr S. D. Tripathi
Former Director, ICAR-CIFE, Mumbai
Mumbai HQ -6 June, 2017

Dr Dilip Kumar
Former Director, ICAR-CIFE, Mumbai
Mumbai HQ-10 September, 2017 & 9 November, 2017

Dr T. K. Srinivasa Gopal
Former Director ICAR-CIFT, Cochin, Kerala
Mumbai HQ-22-23 February, 2018

Dr N. Sarangi
Former Director, ICAR-CIFA, Bhuvneshwar, Odisha
Mumbai HQ-22-23 February, 2018

Dr P. N. Pandey
Professor (Retd.), Ranchi University, Jharkhand
Mumbai HQ-22-23 February, 2018

Dr S. Dam Roy
Former Director, ICAR-CARI, Port Blair
Kolkata Centre-10 September, 2017

Dr Indrani Karunasagar
Director (R&D), Nitte University, Bangalore, Karnataka
Mumbai HQ-22-23 February, 2018

Dr A. K. Singh
Former Director, ICAR-DCFR, Bhimtal, Uttarakhand
Mumbai HQ-14 October, 2017

Dr S. C. Mukherjee
Former Joint Director, ICAR-CIFE, Mumbai
Mumbai HQ-9 November, 2017

Dr R. S. Biradar
Former Joint Director, ICAR-CIFE, Mumbai
Mumbai HQ-9 November, 2017

Dr A. K. Pal
Former Joint Director, ICAR-CIFE, Mumbai
Kolkata Centre-16 December, 2017

Chairman/MD/Director/Deputy Director of State Fisheries

Shri P. K. Mishra
Commissioner of Fisheries
Government of West Bengal
Kolkata Centre-5 January, 2018

Dr V. V. Sadamate
Agriculture Extension Specialist & Former Advisor Agriculture, Planning Commission
Government of India
Mumbai HQ- 9 November, 2017

Shri Gurucharan Singh
Director of Fisheries, Himachal Pradesh
Mumbai HQ-10 July, 2017

Shri Nishant Ahmed
Director of Fisheries, Bihar
Kolkata Centre-10 January, 2018

Dr Subrata Mukherjee
Director of Fisheries, West Bengal
Kolkata Centre-5 January, 2018

Mr O. P. Saxena
Director of Fisheries, Madhya Pradesh
Powarkheda Centre-5 December, 2017

Shri R. S. Sangwan
Director of Fisheries, Haryana
Rohtak Centre-23 February, 2018

Dr B. K. Chand
Director of Fisheries, Odisha
Kolkata Centre-10 January, 2018

Dr S. K. Saxena
Director, Export Inspection Council of India

Dr K. M. Paknikar
Director of Agharkar Research Institute, Pune, Maharashtra
Mumbai HQ-4 December, 2017

Shri Piyus Sharma
Director, Hoshangabad Co-operative Central Bank, Hoshangabad, Madhya Pradesh
Powarkheda Centre-5 December, 2017

Shri Umesh Kumar Mohanty
Deputy Director of Fisheries, Odisha
Kolkata Centre-10 January, 2018

Shri T. Yonggam
Deputy Director of Fisheries, Arunachal Pradesh
Kolkata Centre-10 January, 2018

Dr S. Jacob
Joint Director, Export Inspection Council, India
Mumbai HQ-28 February, 2018

Dr P. Ram Mohan Rao
Former Deputy Director
State Institute of Fishery Technology, Government of Andhra Pradesh, Kakinada, Andhra Pradesh
Kakinada Centre-22 September, 2017

Dr Suhas G Markandeya
Member Secretary
Rajiv Gandhi Science and Technology Commission, Mumbai
Mumbai HQ-4 April, 2017

Dr A. V. Sapre
Advisor, Rajiv Gandhi Science and Technology Commission, Mumbai
Mumbai HQ-4 April, 2017

Dr V. V. Mahajani
Advisor, Rajiv Gandhi Science and Technology Commission, Mumbai
Mumbai-HQ - 4 April, 2017

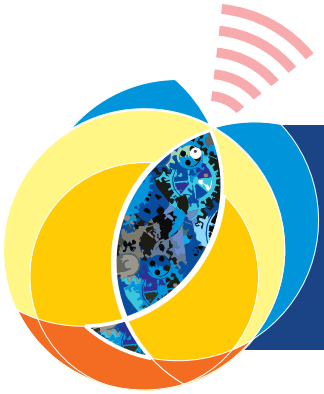
Dr T. Prasad Dora
Chairman, FISHCOPFED
Kolkata Centre-28 December, 2017

Shri Mahender Singh Dhakad
Managing Director, Fish Federation Government of Madhya Pradesh
Powarkheda Centre-1 July, 2017

Shri T. R. Gauda
MD, Security Paper Mill
Ministry of Finance, Hoshangabad, Madhya Pradesh
Powarkheda Centre-26 July, 2017

Dr Motilal Gupta
Department of Official Language, Madhya Pradesh
Powarkheda Centre-29 April, 2017

Brahmacharini Nidhi Chaitanya
Acharya, Chinmaya Mission, Mumbai
Mumbai HQ-22 June, 2017



Chapter 13

Others

SWACHH BHARAT ABHIYAAN

The *Swachch Bharat Pakhwada* was celebrated at ICAR-CIFE from 16-30 May 2017 and 15 September-2 October 2017. A clean-up drive was organised at the boys hostel, old campus; wet laboratory, old campus; Ph.D. boys hostel, new campus and girls hostel on 20 May, 2017 and 17 September, 2017. All the students and Wardens/Deputy Wardens and other ICAR-CIFE staff members actively participated in the cleanliness mission. The students also displayed posters depicting motivational messages on importance of cleanliness and hygiene Dr. (Mrs.) Sujata Saxena, Head and Principal Scientist from ICAR-CIRCOT actively participated in the program. Dr. Gopal Krishna, Director/Vice Chancellor ICAR-CIFE, visited the hostel and appreciated the efforts put in by the students in keeping the hostel and its premises clean.

During the *Swachchta Abhiyan* "Best from Waste", a competition for the students of Versova Welfare Association High School, Versova, Mumbai and the students of ICAR-CIFE, Mumbai was arranged on 26 May, 2017. A 'Clean up drive' for Versova Beach and Versova Landing Centre was also conducted under the Swachchta Week on 27 May and 29 May, 2017 respectively by an active team consisting of students and staff. CIFE *pariwar* led a march from CIFE campus to Versova Beach and Landing Centre displaying placards to generate public awareness on the importance of *Swachchta* in our lives. During the closing ceremony, Dr. Gopal Krishna, Director, ICAR-CIFE, appreciated the enormous efforts taken by the staff and students to keep their premises as well as surroundings clean throughout the year. The programme came to a close with the distribution of prizes to winners of the competition and distribution of cloth bags to the staff. The *Swachch Bharat Abhiyan* was co-ordinated by Dr. Aparna Chaudhari, Principal Scientist, Head, FGB division, Dr. N. S. Nagpure, Principal Scientist and Chief Warden, Dr. Gayatri Tripathi, Principal Scientist and Warden Girl's Hostel, Dr. Rupam Sharma, Principal Scientist and Warden Boy's Hostel, Dr. A. K. Balange Senior Scientist and Deputy Warden, Boy's Hostel and Dr. L. Manjusha, Scientist and Deputy Warden, Girl's Hostel.

ICAR-CIFE Kolkata Centre successfully observed "Swachch Bharat Pakhwada" during 16-30 May, 2017. All scientists, staff, students and trainees participated in the programme wholeheartedly. The programme commenced by taking oath on *Swachch Bharat* under the guidance of Dr. G. H. Pailan, Officer In-Charge, ICAR-CIFE Kolkata Centre. A competition on Poster Presentation on the theme of '*Swachch Bharat*' was organised at the centre. Staff, students and trainees participated in the programme and the posters were displayed in the office for the visitors during the entire *Swachch Bharat Pakhwada*.






56th Annual Day

ICAR – Central Institute of Fisheries Education (Deemed University), Mumbai organized its 56th Annual Day function on 06 June 2017. Shri Mahadev Jagannath Jankar, Hon'ble Minister for Animal Husbandry, Dairy Development and Fisheries Development, Govt. of Maharashtra was the Chief Guest. Dr. Bharati Lavekar, MLA, Versova, Mumbai and Prof. A. K. Mishra, Vice-Chancellor, Maharashtra Animal and Fisheries Sciences University, Nagpur were the Guests of Honour. The dignitaries who graced the occasion included former Directors, HODs, Administrative Officers and staff of the institute. Directors / In-charges of Regional Centres of various institutes like NIO, CIRCOT, CMFRI, and CIFT were also present for the celebration of the same.

The programme marked the distribution of institutional awards and prizes/medals to winners of various sports events conducted during the year 2016-17. Dr. Gopal Krishna, Director/Vice Chancellor of CIFE presented the report of the institute and congratulated the awardees. The Chief Guest along with the Guests of Honour conferred institutional awards in various categories including Best Scientist, Best Technical, Best Divison etc. As a part of Annual Day celebrations, a lecture series was also organized where eminent scientists shared their views on the 'Ideas of Blue Revolution and Innovations and Higher Education'; Mr. Vignaesh D., (PHT 2016/19) the best M.F.Sc. thesis awardee also presented his research work. The session was chaired by Dr. S. D. Tripathi, former Director of CIFE.

The Chief Guest and the Guests of Honour appreciated the endeavours undertake by the institute in human resource development at different levels in the fisheries sector. Shri Mahadev Jagannath Jankar, Hon'ble Minister for ADFD, Govt. of Maharashtra while addressing the gathering assured all help and support to the institute for fisheries development. Prof. A. K. Mishra, Vice-Chancellor, MAFSU, Nagpur emphasized the importance and need for high-end research by the institute to develop technologies for improved production and profitably of aquaculture.

The Annual Day function was followed by a cultural event in the evening wherein students, staff and family members participated with great enthusiasm.

Hindi Pakhwada

Hindi Pakhwada was celebrated from 14-29 September 2017. All the officers, staff and students attended the programme with great enthusiasm. Various competitions like essay writing, poetry, extempore speech, songs etc. were organized. During the Hindi Pakhwada 'Mahila Diwas was also celebrated which was chaired by Dr. (Mrs.) Sujata Saxena, Head and Principal Scientist from ICAR-CIRCOT. Dr. Sujata in her speech expressed her views and concerns on safety of women at work and public places. She emphasized on bringing new regulations and norms for better safety of working women. Dr. Gayatri Tripathi, chairperson, Women's Harrasment Committee delivered a lecture on 'Sexual Harassment of Women at Workplaces' and elucidated various statutes protecting the dignity of working women today. The programme was attended by women employees of CIFE as well as families of CIFE PARIWAR In the valedictory programme, prizes were distributed to the winners of the various competitions.

Science Club Activities

The following lectures were delivered under the science club activity

Name of the faculty	Designation	Title of lecture	Date
Prof. S. Felix	Vice Chancellor, TNFU, Tamil Nadu	Responsible techno-innovations and integration in fisheries and aquaculture	4 September, 2017
Dr. Gayatri Tripathi	Principal Scientist	*Bhrun koshikayo ka bhavish prarup*	28 September, 2017
Dr. S. N. Ojha	HoD (Act.), FEES	*Prasar Darshan*	28 September, 2017
Dr. P. P. Srivastava	Principal Scientist	*Matsya aahar ka mahatva*	28 September, 2017
Dr. S. P. Shukla	Principal Scientist	*Antartica jaliya paristhithi tantro mein pradushan*	28 September, 2017
Dr. Chandra Prakash	Principal Scientist	*Aquaculture mein pani evam mitti ki jaanch ka mahtva*	28 September, 2017
Mr. Rahul Kumar	Finance & Accounts Officer	*Vastu evam sevakar: Ek Charcha*	28 September, 2017
Dr. Rupam Sharma	Principal Scientist	*Aushadhi ke vitran mein Sukshm Pradhyoki*	28 September, 2017
Dr. A. K. Balange	Senior Scientist	*Surimi aur surimi prarup utpad: Mang, aapurti aur bhartiye bazaar mein shamta*	28 September, 2017
Dr. Abhijit Mitra	Director of ICAR-NRC on Mithun Dimapur, Nagaland	*Mithun ka maas aur dhoodh ki stithi aur shamta, tatha uttar pruvaye Bharat mein jivika ka sadhan*	7 December, 2017
Dr. Megha Bedekar	Senior Scientist	Evaluation of two DNA vaccine constructs in *Labeo rohita* against *Edwardsiella tarda*	16 February, 2018

International Yoga Day Celebrations

International Yoga Day was observed with great enthusiasm on 21 June, 2017 at ICAR-CIFE,

Mumbai and its Centres. All the officials, staff members and students participated in the programme.

Sadbhavana Diwas

ICAR-CIFE, Mumbai and its Centres observed "Sadbhavana Diwas" on 18 August, 2017 to

promote national integration and communal harmony among the people of various religions, languages and regions. The programme started by taking oath on "Sadbhavana Diwas". All scientists and staff members participated in the programme wholeheartedly.

Vigilance Awareness Week

ICAR-CIFE, Mumbai and its Centres observed the 'Vigilance Awareness Week' from 30 October-5 November, 2017. The main focus of the Vigilance Awareness Week for this year was "My Vision-

Corruption Free India". All the officials took the Oath of Integrity. The faculty and students expressed their views on the issue.

Rashtriya Ekta Diwas

ICAR-CIFE, Mumbai and its centres organised the "Rashtriya Ekta Diwas" (National Unity Day) on 31 October, 2017. All the officials attended the programme and took the pledge on account of observance of 142nd birth anniversary of Shri Sardar Vallabhbhai Patel.

Agricultural Education Day

Agricultural Education Day was celebrated on 3 December, 2017

Personality Development and Career Counseling Center (PDCCC)

Personality Development and Career Counseling Center (PDCCC) organized a "Personality Development" and "English Language Training" programme for students of CIFE. The "Personality Development" programme was attended by 30 students. The programme included lectures on confidence building, motivation, self assessment, facing interview, conflict management, stress management and team work. The "English Language Training" programme consisted of 40 hours of training on vocabulary, introduction, conversation skills, negotiating, objection handling, issue handling, telephonic etiquette, e-mail etiquette, interview skills, resume writing etc. Both the programmes were supported by ICAR SDAE.

World Environment Day

World Environment Day was celebrated in the Institute on 5 June 2017. To mark the occasion, planting of fruit and vegetable saplings was held in the Girls Hostel Garden. Director, HoDs , faculty and students actively participated in planting the saplings.

Library and other Learning Resources

The library of ICAR-Central Institute of Fisheries Education, Mumbai is the national facility for Fisheries and Allied Sciences. Library has a rich collections about 37459 books, 8759 Foreign Journals, 4228 Indian Journals, 251 Ph.D. theses, 2000 reports and other serial publications.

Online Journals (e-Journals)

Consortium for e-Resources in Agriculture (CeRA) facility is available for online journals through Wi-Fi in the campus and more than 3561 journals are accessible full text. A dedicated digital section is available to retrieve the literature or accessing the e-books in the library. On-line Public Access Catalogue (OPAC), KOHA, a self-guiding software is available for the users for searching the books in the library. Beside this library also extends the document delivery services to send the research paper on request basis.

PGSSU Activities

CIFEST 2K17

Among the activities of PGSSU, the most exciting event named as CIFEST was observed from 10-12, November, 2017 in the University Campus. The Mega event was inaugurated by Dr. N. P. Sahu, Dean (Academics) in the presence of Dr. Swadesh Prakash, Dean (Student Welfare) and other scientists and students. The event was co-ordinated by Mr. Sivaguranathan, Organizing Secretary and Mr. Tapas Paul, Convener with the help of all other PGSSU members. The Mega event included several cultural events such as singing, dancing, monoact, mime and skit and literary events like quiz, debate, extempore, painting and rangoli competition.

Students from CIFE were divided into four teams namely Rising Dolphins, Hunting Whales, King Octopus and Wave Riders. All students participated in the event enthusiastically in this color and fun filled festival and displayed their talents. The overall winner trophy was won by Rising Dolphins and runners-up by Hunting Whales. A fashion show competition was organized during the festival. Mr. Azan Yanthan was awarded Mr. CIFE and the Miss. CIFE was won by Ms. Abhilipsa Biswal. All the students of CIFE enjoyed the three-day event.

Fresher's Day

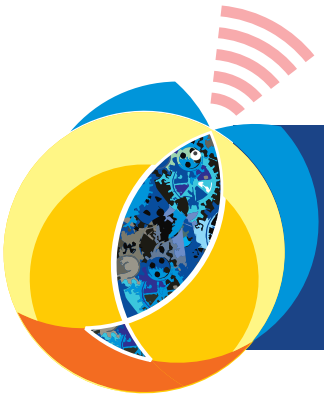
Fresher's day was organized with an idea of instilling confidence in newly joined Masters students and to recognize their talents. On the colorful stage filled with floral decorations, Director Dr. Gopal Krishna addressed the students. Mr. Tapas Paul (Academic Council representative- PGSSU) coordinated the function with the guidance from other PGSSU members. Newly joined students from various departments showcased their talents and enthralled the audience with their dance, songs and dramas. Dr. Gayatri Tripathi, Warden, Girls' hostel, judged the performance and distributed the prizes along with Dr. Naresh S. Nagpure. The most awaited prize of the Best Department title was won by the Division of Aquaculture. Mr. Fresher was won by Mr. Phibi Philip and Ms. Fresher was won by Ms. Vel Selvi.

New Year Celebration 2017

The new year 2018 was welcomed with excitement, joy and positivity. The program was hosted by the newly elected CIFE Post Graduate Students Union (PGSSU). Dr. Gopal Krishna, Director, ICAR-CIFE, inaugurated the programme, which started with a short film reminiscing the year 2018. Exciting games and entertainment activities were organized by the cultural committee for the faculty and the students. CIFE-PGSSU celebrated the new year differently by collecting old clothes and donating it to the economically weaker sections. Food packets were also distributed to the underprivileged. Involvement of the students, teachers and all others made this event a great success.

Other Celebrations

Maharashtra Din, Kamgaar Diwas (Labours' Day), Dr. Ambedkar Jayanthi, Chatrapati Shivaji Maharaj Jayanti, Holi, Ganesh Chaturthi, Saraswati Puja, Onam, Bihu, Eid, Chaat Puja Dandiya and Lohri which were celebrated with great enthusiasm by the CIFE Parivaar.



Chapter 14

Personalia

Staff as on 31 March 2018

CIFE Headquarters, Mumbai

RMP

Director
Dr Gopal Krishna

Joint Director

Scientific Staff

Head of Division
Dr N. P. Sahu
Dr N. K. Chadha
Dr K. V. Rajendran
Dr (Mrs) Aparna Chaudhari
Dr B. B. Nayak
Dr S. N. Ojha (Acting)

Principal Scientist
Dr K. K. Jain
Dr (Mrs) Neelam Saharan
Dr (Mrs) Kiran Dube Rawat
Dr (Mrs) Latha Shenoy
Dr Naresh S. Nagpure
Dr Geetanjali Deshmukhe
Dr P. K. Pandey (on deputation)
Dr S. Jahageerdar
Dr V. K. Tiwari
Dr (Mrs) Arpita Sharma
Dr K. Pani Prasad
Dr P. P. Srivastava
Dr R. P. Raman
Dr Parimal Sardar
Dr Ashok Kumar Jaiswar
Dr Chandra Prakash
Dr Rupam Sharma
Dr (Mrs) Gayatri Tripathi
Dr Satya Prakash Shukla
Dr Swadesh Prakash
Dr Subodh Gupta
Dr Mukunda Goswami

Senior Scientist
Dr (Mrs) Zeba Jaffer Abidi
Dr (Mrs) Asha T. Landge
Dr Ajit Kumar Verma
Dr Ashutosh D. Deo
Dr P. S. Ananthan
Dr Sanath Kumar H.
Dr (Mrs) Megha Kadam Bedekar
Dr (Mrs) Rama Sharma
Dr A. K. Balange
Dr (Mrs) Paramita B. Sawant

Scientist
Dr (Mrs) Vidyashree Bharati
Dr (Mrs) Babita Rani A.M.
Dr A. Pavan Kumar
Dr Gireesh Babu Pathakota
Dr Kundan Kumar
Mr Vinod Kumar Yadav
Mrs Manjusha L.
Dr Martin Xavier K.A.
Dr Sikendra Kumar
Mrs Jeena K.
Dr Saurav Kumar
Mrs Tincy Varghese
Dr Mujahidkhan Ajamalkhan Pathan
Dr Shashi Bhushan
Mrs Shamna N.
Mr Dhamotharan K. (on study leave)
Mr Karankumar Ramteke
Mrs Rathi Bhuvaneswari G.
Mrs Layana P
Mr Manish Jayant
Ms Niha Wajahat Qureshi
Ms Husne Banu
Mr Angom Lenin Singh
Mrs Upasana Sahoo
Mrs Madhuri Pathak
Dr Shivaji Dadabhau Argade

Technical Staff

Chief Technical Officer (T-9)
Mr R. D. Tandel
Dr S. K. Pandey
Mr Alkesh Dwivedi
Dr M. K. Chouksey
Mr S. S. Kamat
Mr D.R. Khogare
Mr S. K. Sharma

Asstt. Chief Technical Officer (T-7/8)
Dr Chandrakant M.H.
Mr Dasari Bhoomaiah
Mr Ram Singh
Mr P. K. Das
Dr (Mrs) Nalini Poojary
Mr Subhash Chand
Ms Revati B. Dhongde
Mrs Rekha Nair

Sr. Technical Officer (T-6)
Mr C. B. Kareer
Mrs Rajani H. Khandagale
Mr Sanjeevan Kumar

Technical Officer (T-5)
Mr B. G. Mandhare
Mr J. M. Koli
Mr S. Maity
Mr B. J. Rathod
Mr N. K. Aglave
Mr S. R. Bandkar
Mrs Bharati Ghagare
Mr Avinash Sable
Mr Suryakant L. Koli
Mr B. T. Phande
Mr Anil Kumar Kulsange

Sr. Technical Assistant (T-4)
Mr Sagar Suresh Sawant
Mr Rajarshee Moitra
Mr Yogesh Jadhao
Mr K. Dhana Raju
Dr Pawan Kumar
Mr Mohd. Baqar
Mr A. P. Dhawde
Mr Sikandar S. Hussain
Mr K. V. Rajendran
Mr V. G. Dhindore
Mr Arun Puri Gosavi
Mr R. D. Deshmukh

Technical Assistant (T-3)
Mrs Reshma K. Raje
Mr Dhanpat Singh Rawat
Mr V. K. Bhave

Sr. Technician (T-2)
Mr Pranaya Kumar Biswal

Technician (T-1)
Mr Mohd Sadiq M. Mulla
Mr Abhijeet Vijay Jadhav
Mr T. G. Gaikwad
Mr G. B. Kamble

Non-Ministerial Staff
Mr S. Kamaraju

Adminstrative Staff

Chief Finance & Accounts Officer
Mr Prashant Sharma

Sr. Administrative Officer
Mr Mahesh B. Khubdikar

Dy. Director (Official Language)
Dr R. P. Uniyal

Assistant Director (Official Language)
Mr Devendra Kumar Dharam

Finance & Accounts Officer
Mr Rahul Kumar

Assistant Administrative Officer
Mrs Sushma Singh
Mrs Poonam N. Behl
Mrs F. G. Fernandes
Ms C. S. Khundol
Mr D. S. Ingale

Private Secretary
Mr P. R. Ninawe

Personal Assistant
Mrs Pragati R. Gadre

Assistant
Mr R. R. Kadam
Mrs Swati S. Koli
Mr V. S. Kuveskar
Mr Suraj Gupta
Mr D. V. Raorane
Mrs A. U. Joshi
Mr A. G. Kolambkar
Mrs S. V. Pawar
Mrs Sanyuja S. Parab

Upper Division Clerk
Mr B. P. Chauhan
Mr N. L. Ghane
Mr P. G. Angne
Mr M. B. Waghela
Mrs C. C. Raut
Mrs Anu Grover
Mr S. H. Bhosale

Lower Division Clerk
Mr Shirish P. Malvankar
Mr R. N. Kamble
Mr Prasenjit P. Sonawane
Mr Ram A. Shinde
Mr Ninad V. Kandalgaonkar

Skilled Support Staff

Mr B. N. Sukur
Mr G. G. Zendekar
Mr Surajbali R. Jaiswar
Mr B. S. Tamankar
Mr Ashok R. More
Mr D. B. Gaikwad
Mr Sitaram B. Padyal
Mr J. K. Makwana
Mr Bandu R. Chavan
Mr Ankush R. Dore
Mr M.P. Kotian
Mr Ashok R. Shingade
Mr Jagdish N. Dhanu
Mr Vasant N. Ondkar
Mr Arvind M. Lavande
Mr Vinod Kumar Yadav
Mrs R. H. Chavan
Mr Ankush N. Joyashi
Mr Ganesh N. Zendekar
Mr Anil D. Sonawane
Mr Fakirmayan U. Mullaji
Mr Sambhaji S. Shelke
Mrs Reshma Naik
Mrs Revati Venkateshvaran
Ms Ujjawala V. Tiwari
Mrs Sabita Devi

CIFE Centre Kakinada

Officer Incharge/Scientist
Dr Muralidhar P. Ande

Scientist
Dr (Mrs) Karthireddy Syamala
Dr Arun Sharma
Dr Thongam Ibemcha Chanu

Technical Staff

Chief Technical Officer (T-9)
Dr J. K. Prasad
Dr P. Srinivas Rao
Mr K. Murli Mohan

Asstt. Chief Technical Officer (T-7/8)
Mr V. N. Acharyulu
Mr R. R. S. Patnaik

Sr. Technical Assistant (T-4)
Mr M. Satyanarayana

Sr. Technician (T-2)
Mr A. Gurraiah

Technician
Mr V. Shivaji
Mr Sheikh Valisha
Mr G. V. V. Satyanarayana

Administrative Staff

Assistant
Mr B. Laxman Rao

Upper Division Clerk
Mrs M. Rama Mani

Skilled Support Staff

Mr Sheikh Nana Saheb
Mr K. Niranjan
Mr K. Prasad
Mr O. Veera Raju
Mr T. Satyanarayana
Mr P. V. K. Reddy
Mr P. D. Reddy
Mr S. S. Reddy
Mr Y. Buchilingam
Mr M. Govindu

CIFE Centre Kolkata

Officer Incharge/Principal Scientist
Dr G. H. Pailan

Scientific Staff

Principal Scientist
Dr B. K. Mahapatra
Dr Subhendu Datta
Dr S. Munilkumar
Dr S. Dasgupta

Scientist
Dr (Mrs) Sujata Sahoo
Mr Dilip Kumar Singh

Technical Staff

Chief Technical Officer (T-9)
Dr Asok Biswas

Technical Officer (T-5)
Mr P. K. Patra
Mr S. K. Das

Sr. Technical Assistant (T-4)
Mrs G. Aruna Devi
Mr Prakash Kumar Behera
Mr T. K. Ghosh

Administrative Staff

Private Secretary
Mrs Kaberi Biswas

Assistant
Mr C. N. Sahani
Mr P. K. De

Upper Division Clerk
Mr Kishore Bose

Lower Division Clerk
Mr Ram Milan Singh

Skilled Support Staff

Skilled Support Staff
Mr R. N. Prasad
Mr Ramesh Chowdhary
Mrs Suman Pandey

CIFE Centre Powarkheda

Officer Incharge/ Scientist
Dr Sunil Kumar Nayak

Scientific Staff
Scientist
Mr Dhalongsaih Reang

Technical Staff

Chief Technical Officer (T-9)
Dr R. K.Upadhyay

Asstt. Chief Technical Officer
Mr L. P. Bamalia

Sr. Technical Officer (T-6)
Mr Hasan Javed

Technical Officer (T-5)
Mr Gurubachan Singh

Sr. Technical Assistant (T-4)
Mr Anup Singh

Sr. Technician (T-2)
Mr Raghuvir Prasad

Technician (T-1)
Mr S. Prajapati

Asstt. Administrative Officer
Mrs Asha Dhurve

Skilled Support Staff

Skilled Support Staff
Mr Lallu Prasad
Mr Vishnu Lal
Mr Mangli Prasad
Mr Shambhu Dayal
Mr Hari Singh
Mr Manoharlal
Mr Ram Swaroop

CIFE Centre Rohtak

Officer Incharge/ Scientist
Mr Hari Krishna

Scientific Staff

Scientist
Mr Arun Sudhagar S. (On study leave)
Mr Pankaj Kumar
Dr Sreedharan K.
Mr Satya Prakash

Technical Staff

Asstt. Chief Technical Officer (T-7/8)
Mr Ashok Kumar

Sr. Technical Assistant (T-4)
Mr Satyendra Kumar Singh
Mr Lokesh Kumar

Technical Assistant(T-3)
Mr Krishan Kumar

Technician (T-1)
Mr Lavesh Kumar

Skilled Support Staff
Mr Gyani Ram
Mr Gyan Chand

CIFE Centre Motipur

Officer Incharge/ Scientist
Dr Mohd. Aklakur

Appointments

Sl. No.	Name of the Officials	Date
1	Mr Prashant Sharma, CF&AO	29.08.2017

Superannuation/Resignations etc.

Superannuation

1	Mrs S. M. Bagwe, TO (T-5)	30.04.2017
2	Mrs N. Y. Raorane, AAO	31.05.2017
3	Mr M. A. Rao, SSS, Kakinada Centre	31.05.2017
4	Dr W. S. Lakra, OSD	30.06.2017
5	Mr R. G. Kudale, TO (T-5)	30.06.2017
6	Mr Suresh Chandra, CF&AO	31.07.2017
7	Mr Madhukar Wasnik, SSS	30.09.2017
8	Mrs S. P. Nalawade, TO (T-5)	31.10.2017
9	Mr Baburam R. Jaiswar, TO (T-5)	31.12.2017
10	Mr S. K. Das, TO (T-5), Kolkata Centre	31.12.2017
11	Dr K. Murali Mohan, ACTO, Kakinada Centre	28.02.2018
12	Dr Chandra Prakash, PS	31.03.2018

Voluntary Retirement

13	Mrs Sandhya K. Wadhavkar, AAO	05.10.2017
14	Mrs Sarala Arutla, Private Secretary	01.11.2017

Resigned

15	Mr Abhay Mudgal, AO	08.09.2017

Terminated

16	Mr Rohit S. Koduri, SSS	13.04.2017

Transfers to CIFE

Sl. No.	Name of the Employee	Transfer From	Date of Joining
1	Dr Shivaji Dadabhau Argade, Scientist	ICAR-CIWA, Bhubaneswar	22.09.2017

Transfers from CIFE

Sl. No.	Name of the Employee	Transfer To	Date of Relieving
1	Dr Arup Ratan Sen, Principal Scientist	ICAR-NRCIF, Motihari, Bihar	08.05.2017
2	Dr Nalini Ranjan Kumar, Principal Scientist	ICAR-NIAP, New Delhi	19.06.2017
3	Dr Nagalakshmi K, Scientist	ICAR-CIFT, Kochi	24.06.2017
4	Dr Ramasubramanian, Principal Scientist	ICAR-IASRI, New Delhi	30.06.2017
5	Mr B.L. Kokkula, Asstt.Admn.Officer	ICAR-NRCP, Pune	29.12.2017

Promotions

Sl. No.	Name of the Employee	From	To	*w.e.f.*
1	Dr. Subrata Dasgupta	Senior Scientist	Principal Scientist	10.06.2015
2	Dr. A. K. Balange	Senior Scientist (GP 8000)	Senior Scientist (GP 9000)	26.04.2015
3	Ms. Manjusha L.	Scientist (GP 6000)	Scientist (GP 7000)	11.05.2015
4	Dr. K. A. Martin Xavier	Scientist (GP 6000)	Scientist (GP 7000)	01.01.2017
4	Mr Deepak Khogare	Asstt. Chief Tech. Officer	Chief Tech. Officer	01.01.2017
5	Dr. P. Srinivasa Rao	Asstt. Chief Tech. Officer	Chief Tech. Officer	01.01.2017
6	Mr Santosh K. Sharma	Asstt. Chief Tech. Officer	Chief Tech. Officer	01.01.2017
7	Mr K. Murali Mohan	Asstt. Chief Tech. Officer	Chief Tech. Officer	01.07.2017
8	Mr Ashok Kumar	Sr. Tech. Officer	Asstt. Chief Tech. Officer	01.09.2017
9	Ms Revti Dhongade	Sr. Tech. Officer	Asstt. Chief Tech. Officer	28.06.2017
10	Mrs Rekha S. Nair	Sr. Tech. Officer	Asstt. Chief Tech. Officer	28.06.2017
11	Mr Sanjeevan Kumar	Tech. Officer	Sr. Tech. Officer	26.05.2017
12	Mr Anil Kumar Kulsange	Sr. Tech. Asstt.	Tech. Officer	10.08.2017
13	Mr Arun A. Puri Gosavi	Tech. Asstt.	Sr. Tech. Asstt.	15.07.2017
14	Mr R. D. Deshmukh	Tech. Asstt.	Sr. Tech. Asstt.	31.07.2017
15	Mr B.L. Kokkula	Asstt. Admn. Officer	Admn. Officer	29.12.2017
16	Mr Pravin Ninawe	Personal Secretary	Private Secretary	16.05.2017
17	Ms. Chandrarekha S. K.	Assistant	Asstt. Admn. Officer	19.11.2017
18	Mr Dilip S. Ingale	Assistant	Asstt. Admn. Officer	01.03.2018
19	Mrs F. G. Fernandes	Assistant	Asstt. Admn. Officer	01.06.2017
20	Mrs. Sanyuja S. Parab	Upper Division Clerk	Assistant	03.07.2017
21	Mr Kishore Bose	Lower Division Clerk	Upper Division Clerk	10.01.2018
22	Mr Shaik Vallisha	Skilled Support Staff	Technician	16.05.2017
23	Mr Gautam B. Kamble	Skilled Support Staff	Technician	16.05.2017
24	Mr Satyandra Prajapath	Skilled Support Staff	Technician	16.05.2017
25	Mr G. V. V. Satyanarayana	Skilled Support Staff	Technician	16.05.2017
26	Mr Lavesh Kumar	Skilled Support Staff	Technician	16.05.2017
27	Mr Ninad V. Kandalgaonkar	Skilled Support Staff	Lower Division Clerk	16.05.2017

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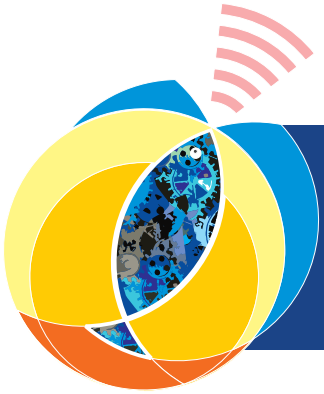


Chapter 15

हिन्दी प्रगति प्रतिवेदन

हिन्दी प्रगति प्रतिवेदन

परिषद द्वारा राजभाषा निरीक्षण

संस्थान में दिनांक 16 नवम्बर 2017 को परिषद के राजभाषा अधिकारियों द्वारा संस्थान की राजभाषा संबंधी निरीक्षण किया गया । परिषद से निम्नलिखित अधिकारी निरीक्षण हेतु संस्थान दौरे पर आए

-

1. श्री ओम प्रकाश जोशी - सहायक मुख्य तकनीकी अधिकारी
2. श्री महेश गुप्ता - सहायक मुख्य तकनीकी अधिकारी
3. श्री मोहिन्दर कुमार - प्रधान निजी सचिव - महानिदेशक
4. श्री हरि ओम - निजी सचिव - निदेशक (राजभाषा)

डा. गोपाल कृष्णा, निदेशक एवं कुलपति ने सभी निरीक्षण अधिकारियों का राजभाषा कार्यान्वयन समिति के सभी सदस्यों से परिचय कराते हुए संस्थान के संक्षिप्त क्रियाकलापों से निरीक्षण दल को अवगत कराया ।

श्री प्रताप कुमार दास, सहा. मु. तक. अधिकारी ने संस्थान की हिन्दी प्रगति का एक प्रतिवेदन प्रस्तुत किया जिसमें संस्थान में हो रही हिन्दी की गतिविधियों एवं भावी कार्यक्रमों से निरीक्षण अधिकारियों को अवगत कराया गया। तत्पश्चात श्री प्रताप कुमार दास, सहा. मुख्य तकनीकी अधिकारी ने संस्थान की हिन्दी प्रगति एवं भावी कार्यक्रमों से निरीक्षण अधिकारियों को अवगत कराया ।

निरीक्षण एवं विचार-विमर्श के दौरान निरीक्षण अधिकारी श्री महेश गुप्ता, स.मु.तक.अधि. ने निरीक्षण प्रपत्र के मदानुसार चर्चा करते हुए हिन्दी को वर्तमान में प्रशासनिक अनिवार्यता बताया तथा कार्यान्वयन की गति को सुचारू रूप से बढ़ाने एवं राजभाषा विभाग द्वारा जारी लक्ष्यों की पूर्ति करने हेतु जैसे कई बिन्दुओं पर चर्चा की गई । उन्होंने यह भी स्पष्ट किया कि इस निरीक्षण का उद्देश्य संसदीय राजभाषा समिति के आगमन से पूर्व हमें राजभाषा द्वारा दिए गए लक्ष्यों की प्राप्ति के सभी अभिलेखों को समुचित ढंग से तैयार रखना है । अंत में श्री देवेन्द्र कुमार धरम, सहा. निदेशक (राजभाषा) के धन्यवाद प्रस्ताव के साथ बैठक समाप्त की गई ।

राजभाषा कार्यान्वयन समिति की बैठक का आयोजन

संस्थान की राजभाषा कार्यान्वयन समिति की निम्नलिखित बैठकों का आयोजन किया गया -

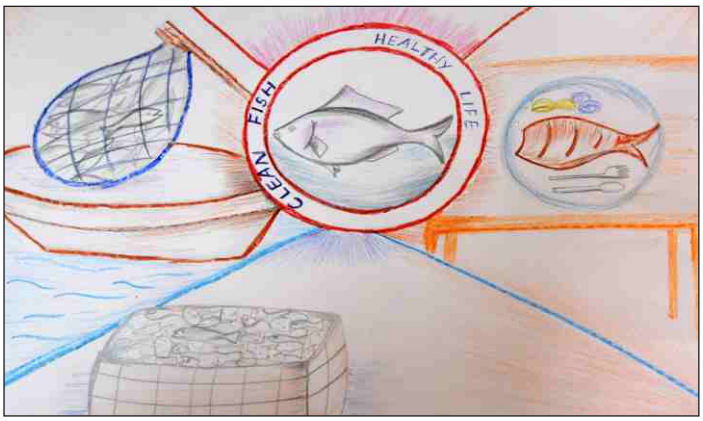
86 वीं राजभाषा कार्यान्वयन समिति बैठक - दिनांक 11 मई 2017

87 वीं राजभाषा कार्यान्वयन समिति बैठक - दिनांक 29 सितम्बर 2017

88 वीं राजभाषा कार्यान्वयन समिति बैठक - दिनांक 28 दिसम्बर 2017

हिन्दी कार्यशाला का आयोजन

- संस्थान में दिनांक 29 अप्रैल 2017 को संघ की राजभाषा नीति एवं संवैधानिक प्रावधान तथा हिन्दी में सूचना प्रौद्योगिकी विषय पर हिन्दी कार्यशाला का आयोजन किया गया । इस कार्यशाला में संस्थान के 20 वैज्ञानिकों, अधिकारियों एवं कर्मचारियों ने भाग लिया । इस कार्यशाला के मुख्य वक्ता श्री राजेन्द्र रावत एवं डा. एम. एल. गुप्ता, राजभाषा विभाग थे ।



संस्थान में दिनांक 4 जुलाई 2017 को "मात्स्यिकी शब्दकोश" पर एक कार्यशाला का आयोजन किया गया, जिसमें संस्थान के सभी विभागों के वैज्ञानिकों ने सक्रिय रूप से भाग लिया ।

दिनांक 17 नवम्बर 2017 को संस्थान के सभी विभागाध्यक्ष एवं प्रभारी अधिकारियों से उनके

विभाग/अनुभाग की हिन्दी प्रगति संबंधी विचार जानने हेतु एक विशेष हिन्दी गोष्ठी का आयोजन किया गया।

हिन्दी पखवाड़ा 2017 का आयोजन

भा.कृ.अनु.प. - केन्द्रीय मात्स्यिकी शिक्षा संस्थान, मुंबई में दिनांक 14 सितम्बर से 29 सितम्बर 2017 तक हिन्दी पखवाड़ा का आयोजन किया गया । पखवाड़ा का उद्घाटन संस्थान के निदेशक एवं कुलपति डा. गोपाल कृष्णा के कर कमलों द्वारा किया गया । उद्घाटन सत्र के मुख्य आतिथि मुंबई विश्वविद्यालय के हिन्दी विभागाध्यक्ष डा. करूणाशंकर उपाध्याय थे । हिन्दी पखवाड़ा के अंतर्गत कर्मचारियों एवं संस्थान के छात्रों हेतु गीत, कविता, भाषण व लेखन आदि कई प्रतियोगिताओं का आयोजन किया गया । म्युनिसिपल स्कूल के बच्चों एवं संस्थान के सभी कर्मचारी के बच्चों के लिए चित्रकला प्रतियोगिता एवं महिलाओं हेतु महिला दिवस का आयोजन भी किया गया । इसी के साथ संस्थान के विज्ञान क्लब के अंतर्गत विभिन्न विभागों के वैज्ञानिकों ने अपने विषय से संबंधित व्याख्यान एवं प्रस्तुतिकरण दिया । दिनांक 28 सितम्बर 2017 को एक वैज्ञानिक गोष्ठी के साथ जी. एस. टी. विषय पर व्याख्यान प्रस्तुत किया गया जिसे श्री राहुल कुमार, वित्त एवं लेखा अधिकारी ने प्रस्तुत किया । विज्ञान गोष्ठी में संस्थान के डा. एस. एन. ओझा - प्रधान वैज्ञानिक, डा. पी. पी. श्रीवास्तव - प्रधान वैज्ञानिक, डा. एस. पी. शुक्ला - प्रधान वैज्ञानिक, डा. चन्द्र प्रकाश - प्रधान वैज्ञानिक, डा. गायत्री त्रिपाठी - प्रधान वैज्ञानिक, डा. ए. के. बालंगे - वरिष्ठ वैज्ञानिक, डा. रुपम शर्मा- प्रधान वैज्ञानिक ने दिनांक 28 सितम्बर 2017 को अपने व्याख्यान प्रस्तुत किये । दिनांक 29 सितम्बर 2017 को समापन समारोह आयोजित किया गया, जिसके मुख्य अतिथि श्री विनोद कुमार तिवारी जी, माधुरी पत्रिका के पूर्व संपादक एवं निदेशक पत्रकारिता विभाग, झुंझुंनवाला विश्वविद्यालय थे । हिन्दी पखवाड़ा के अंतर्गत विजेता सभी प्रतिभागियों को प्रमाणपत्र एवं पुरस्कार वितरित किए गए।

उपकेन्द्रों में हिन्दी पखवाड़ा का आयोजन

संस्थान के उपकेन्द्र क्रमश: कोलकाता, रोहतक, पवारखेडा एवं काकिनाड़ा केन्द्र में हिन्दी पखवाड़ा 2017 का आयोजन किया गया । इसके अंतर्गत विभिन्न प्रतियोगिताओं आदि का आयोजन किया गया।

हिन्दी प्रकाशन

वर्ष 2017-18 के दौरान संस्थान से निम्नलिखित हिन्दी /द्विभाषी पुस्तक/पुस्तिकाएं प्रकाशित की गई।

उपकेन्द्रों का तकनीकी बुलेटिन - संकलन

मछली पालन क्यों औरे कैसे - पुस्तक का प्रकाशन
लेखक : वी. के. तिवारी, संपादक : पी. के. दास

हिन्दी जलवाणी पाठ्यक्रम

संस्थान के एम. एफ एस. सी. सत्र 2017-19 के प्रथम वर्ष के छात्र-छात्राओं हेतु हिन्दी जलवाणी विषय का अनिवार्य पाठ्यक्रम संचालित किया गया । इसमें अंतर्गत लगभग 78 छात्रों को हिन्दी जलवाणी की कक्षा का संचालन कार्य किया गया ।

वेबसाइट का द्विभाषीकरण

संस्थान के वेबसाइट का द्विभाषीकरण दिसम्बर 2016 में एवं जुलाई 2017 में अद्यतन किया गया ।

बैठक में प्रतिनिधित्व

भा.कृ.अनु.प. - भारतीय बागवानी अनुसंधान संस्थान, बैंगलुरू में भारतीय कृषि अनुसंधान परिषद के संस्थानों में 'प्रशासन/प्रबंधन की दक्षता एवं प्रभाव बढ़ाने तथा राजभाषा नीति का प्रभावी कार्यान्वयन' विषय पर दिनांक 11 अगस्त 2017 को आयोजित हिन्दी के राष्ट्रीय सम्मेलन में संस्थान के श्री देवेन्द्र कुमार धरम, सहायक निदेशक (राजभाषा) ने भाग लिया ।

महिला दिवस

डा. सुजाता सक्सेना, विभागाध्यक्ष एवं प्रधान वैज्ञानिक, भाकृअनुप - केंद्रीय कपास प्रौद्योगिकी अनुसंधान संस्थान , मुंबई महिला दिवस पर मुख्य अतिथि के रूप में आमंत्रित किया गया । उन्होंने अपने संबोधन में महिला कर्मचारियों की सुरक्षा से जुड़ी बातों पर ध्यान आकृष्ट किया । इस अवसर पर प्रधान वैज्ञानिक डा. गायत्री त्रिपाठी ने "कार्यस्थल पर महिलाओं का यौन उत्पीड़न एवं उनकी सुरक्षा" विषय पर एक भाषण प्रस्तुत किया जिसमें संस्थान कर्मियों के साथ-साथ संस्थान परिवार की महिलाओं ने भी भाग लिया । अंत में डा. गीतांजली देशमुखे ने धन्यवाद प्रस्ताव किया ।

ICAR CIFE International Guest House

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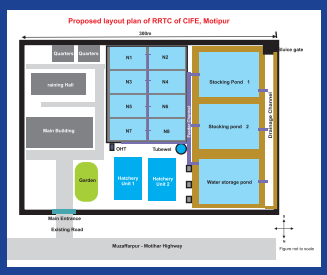

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CIFE's Research Vessel MFV Saraswati