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वार्षिक प्रतिवेदन

Annual Report 2015-16

ICAR-CIFE

Mumbai - India

वार्षिक प्रतिवेदन
Annual Report 2015-16

ICAR-Central Institute of Fisheries Education

(University Under Sec.3 of UGC Act 1956)

Indian Council of Agricultural Research

Off Yari Road, Andheri (W), Mumbai - 400061

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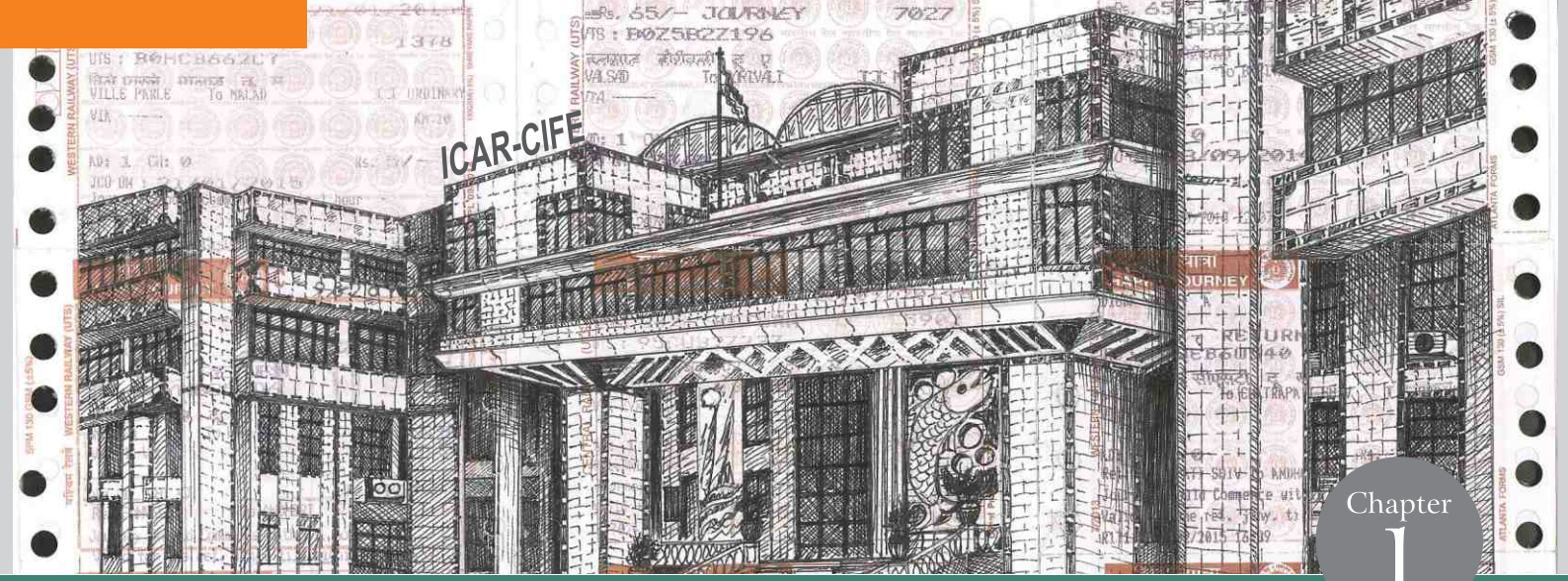


Chapter 1

Preface

Dr Gopal Krishna
Director (Acting)

I am pleased to present the consolidated outcome of focused vision and sincere endeavour by all members of ICAR-CIFE in the form of this Annual Report. As the only national fisheries university dedicated to development of human resource for the fisheries sector, CIFE bears the dual responsibility of maintaining exemplary standards of teaching & research and producing efficient, low cost, user friendly technologies for fish farmers and other stakeholders. As in the previous years, about 80% ARS seats were bagged by our students, highlighting our academic excellence. This year, in addition to our regular academic activities, we made special efforts to include all the fisheries institutes under ICAR in the process of improving fisheries education in the country and suitable guidelines were prepared for CIFE students to carry out research at any of the sister institutes. CIFE also strengthened its linkages with SAUs by signing MoUs and initiated sharing of expertise through video conferencing.

CIFE's commitment to quality research continued this year and I am extremely glad to note the appreciable number of high impact publications from this institute. In addition, a number of brochures, bulletins, pamphlets and other popular publications have also been produced to spread awareness among various stakeholders through exhibitions/ *Kisan melas*. I feel proud to enlist some of our promising technologies that include a WSSV DNA vaccine for shrimps, LAMP based detection for megalocytivirus, utilization of protein isolate from non edible seeds, upscaling, demonstration & diversification of technologies for finfish and shellfish in inland saline soil, breeding of high value ornamental fish, oscar & discus, nanoparticle based bio barcode for detection of betanodavirus and nutraceutical fortified fish products.

Special attention was given to our centres by improving the infrastructure and organizing various events and training programs. Concrete steps were taken for acquiring/ leasing land holdings of the centres to enable further development in future. Another unique initiative in the field of fisheries education has been taken at the grass-root level by designing a tailor-made skill development course for school drop-outs at CIFE centres located at Kakinada, A.P. and Rohtak, Haryana. This initiative is in line with the government's focus on promoting entrepreneurship through 'Skill India' program.

In line with ICAR's commitment to make all administrative and financial processes transparent, the application of online ERP system was expanded to include the use of human resource management system. Several programs were carried out to sensitize students, staff and society towards other important government agendas including 'Swachchh Bharat', Mera Gaon Mera Gaurav, renewable energy, waste recycling, judicious use of natural resources, etc. and we are proud that from this year we are processing organic waste from hostels and guests houses on our campus itself.

I take this opportunity to compliment CIFE *Parivar* for contributing whole-heartedly towards our march into 'Blue Revolution'. My special compliments to the documentation team for their untiring efforts in bringing out this report on time.

(Gopal Krishna)

Chapter

2 Executive Summary

During the current year, the Central Institute of Fisheries Education continued to contribute significantly with focus on education, research and extension. During the year, 60 Ph.D. Students and 78 M.F.Sc. students were enrolled in various disciplines. A total of 72 masters and 16 doctoral students were awarded in various disciplines. This year, 40 posts of Agricultural Research Service were bagged by our students. This year also our students attended international conferences and received awards. One student was awarded the Young Scientist Award during the 2nd International Conference on Science and Technology-2015 organized in Colombo, Sri Lanka; One student presented paper in International conference in Australia and one student secured overseas fellowship for Ph.D. in Chonnam National University, Korea. Students also got recognition by winning the best presentation awards given during national conferences.

Significant research achievements in the form of new information and upscaling of technologies & tools for sustainable fisheries and aquaculture production are the outcome of 33 institutional and 29 externally funded projects including one consultancy project. The institute focused its attention on various aspects like diversification of species for inland saline aquaculture, breeding and larval rearing of oscar (*Astronotus ocellatus*) by optimizing the hardness of water, biofloc based aquaculture, nano particle based bio-barcode for detection of Betanodavirus, LAMP based detection of pathogens, DNA vaccine against *Edwardsiella tarda* & WSSV, design of column based water filtration system for hatchery wastes, taxonomic evaluation and phylogenic study of flat fishes, development of aquatic nutraceuticals based fish products, medicated feed, utilization of protein isolates prepared from non-edible seeds, micro-array study to identify the marker gene related to different nutrients, stock comparision of *Clarias batrachus*, Value chain analysis of farmed shrimp and evaluation of flesh quality of pangasius.

The institute organized various extension education/transfer of technology related programmes and activities. A total of 90 short term training programmes were organized at the headquarter and four research centers out of which 81 programmes were conducted under skill development. About 1997 persons were imparted skill in various aspects of aquaculture. Eleven exhibitions and 12 Farmers' Meet were arranged to create awareness in fisheries. Eight programmes under the NEH Tribal sub plan activities were conducted in which 194 tribal participants were trained. Ten faculty members delivered radio talks which were aired on All India Radio. The institute actively participated in *Kisan Melas* at various places across the country showcasing the achievements and services being provided to the fishermen community. The institute organized 5 writeshops, 2 CAFT, 2 DBT-HRD training programmes, 9 meetings and 10 workshops/seminars during the period.

Two scientists visited abroad, one for International conference in Sri Lanka and other for Postdoc studies in Australia. The faculty attended 43 workshops/symposia/meetings and 18 summer schools/winter schools/training programmes. Fifteen guest lectures were delivered by faculty of other Universities out of which 3 were delivered by faculty from University of Las Palmas de Gran Canaria, Spain. Forty two guest lectures were delivered by the faculty of CIFE at various universities.

A total of 102 research papers were published in referred journals with high impact factor. Apart from this, a number of review papers, popular articles, books/book chapters and bulletins were also published during the year. The meetings of IRC, RAC, BoM, Academic Council and Extension Council were held as per schedule. Foreign dignitaries from Spain, Eritrea, China, Ethiopia and Bangladesh visited the institute.

कार्यकारी सारांश

इस वर्ष के दौरान केन्द्रीय मात्स्यिकी शिक्षा संस्थान ने शैक्षणिक, अनुसंधान एवं विस्तार के क्षेत्र में उत्कृष्ट योगदान दिया है । इस वर्ष पी. एच. डी. के 60 छात्र व एम. एफ. एस. सी. के 78 छात्रों का विभिन्न विषयों में नामांकन किया गया । कुल 72 छात्रों ने स्नाकोत्तर एवं 16 छात्रों को डाक्टरेट की डिग्री प्रदान की गई । इस वर्ष संस्थान के 40 छात्रों ने कृषि अनुसंधान सेवा की परीक्षा पास की । इसके साथ ही कई छात्रों ने अंतरराष्ट्रीय सम्मेलन में भाग लिया तथा उन्हें अवार्ड से सम्मानित किया गया । कोलोंबो, श्रीलंका में आयोजित द्वितीय अंतरराष्ट्रीय विज्ञान एवं प्रौद्योगिकी - 2015 के दौरान संस्थान के एक छात्र को युवा वैज्ञानिक अवार्ड से सम्मानित किया गया । एक छात्र ने आस्ट्रेलिया में आयोजित अंतरराष्ट्रीय सम्मेलन में अपना पेपर प्रस्तुत किया तथा एक छात्र को कोनम नेशनल यूनिवर्सिटी, कोरिया ने पी. एच. डी. हेतु फैलोशिप प्रदान की । राष्ट्रीय सम्मेलनों के दौरान संस्थान के छात्रों ने कई उत्कृष्ट पेपर प्रस्तुतिकरण किए जिस हेतु वे सम्मानित भी किए गए ।

उल्लेखनीय अनुसंधान उपलब्धियों में कई नई जानकारियां जैसे जीवन निर्वहन मात्स्यिकी एवं जलकृषि उत्पादन हेतु प्रौद्योगिकी का विकास एवं उपकरण पर अनुसंधान कार्य किया गया । वर्तमान में 33 स्थानीय एवं 29 बाह्य निधि परियोजनाओं के साथ एक सलाहकार परियोजना भी चल रही है । संस्थान का उद्देश्य विभिन्न पहलुओं जैसे अंतरस्थलीय लवणीय जलकृषि हेतु प्रजातियों का विविधीकरण, जल की कठोरता को अनुकूलन द्वारा ओस्कर के लार्वा पालन एवं प्रजनन, बायोफ्लोक आधारित जलकृषि बेटोनोडा वायरस के पता लगाने हेतु सूक्ष्म कणों पर आधारित जैव बारकोड, LAMP आधारित पैथोजन्य की पहचान, एडवर्डसियला ट्राडा एवं WSSV के लिए डी. एन. ए. वैक्सीन, हैचरी उत्सर्जन हेतु कोलम आधारित जल शुद्धिकरण प्रणालियों का डिजाइन, फ्लैट मछलियों के विषाणुगत मूल्यांकन एवं फलोजोनिक अध्ययन, जलीय - न्यूट्रास्यूटिक्ल्स आधारित मत्स्य उत्पाद का विकास, चिकित्सीय आहार, अखाद्य बीजों से तैयार किए गए प्रोटीन आयसोलेट की उपयोगिता, विभिन्न पोषकों से संबंधित मार्क जीन की पहचान पर मैक्रो-ऐरे अध्ययन, क्लैरयस वैक्ट्रिकस की भंडारन तुलना, फार्म में पाले जाने वाले श्रिंप का मूल्य श्रृंखला विश्लेषण एवं पैगाशियस के मांस की गुणवता का मूल्यांकन के अध्ययन एवं अनुसंधान पर केंद्रित है ।

संस्थान ने कई विस्तार, शिक्षा/प्रौद्योगिकी हस्तांतरण से संबंधित कार्यक्रम एवं क्रियाविधि का आयोजन किया। संस्थान मुख्यालय में 90 अल्पकालीन कार्यक्रम आयोजित किए गए तथा 4 उपकेन्द्रों में भी अल्पकालीन प्रशिक्षण आयोजित किए गए । इनमें 21 कार्यक्रम कौशल विकास के अंतर्गत संचालित किए गए । लगभग 1997 लोग जलकृषि के विभिन्न पहलुओं में प्रशिक्षण कार्यक्रमों का हिस्सा बने । मात्स्यिकी जागरूकता हेतु कुल 11 प्रदर्शनियां एवं 12 किसान बैठकों का आयोजन किया गया । पूर्वोत्तर पहाड़ी क्षेत्रों के आदिवासियों के कार्यक्रम के अंतर्गत कई गतिविधियां आयोजित की गई जिनमें 194 आदिवासी प्रतिभागियों को प्रशिक्षित किया गया । दस संकाय सदस्यों ने आकाशवाणी पर रेडियो टाक प्रसारित किया । देश के विभिन्न हिस्सों में आयोजित किसान मेला में संस्थान ने सक्रिय रूप से भाग लिया, जिसमें संस्थान की उपलब्धियां एवं मछुआरे समुदाय को प्रदान की जाने वाली सेवाओं के बारे में जानकारियां प्रसारित की गई । संस्थान ने कुल पांच लेखन 2 CAFT, 2 DBT, HRD प्रशिक्षण कार्यक्रम, 9 बैठकें एवं 10 कार्यशाला/सेमिनार आयोजित किए ।

दो वैज्ञानिक विदेश दौरे पर गए, जिनमें से एक ने श्रीलंका में आयोजित सम्मेलन में भाग लिया एवं अन्य आस्ट्रेलिया में पोस्ट डाक्टरेट डिग्री हेतु गए। यहां के संकायों ने 43 कार्यशाला परिसंवाद /बैठक एवं 18 समर स्कूल/विंटर स्कूल / प्रशिक्षण कार्यक्रमों में भाग लिया ।

विभिन्न विश्वविद्यालयों के 15 संकायों ने संस्थान में अतिथि व्याख्यान प्रस्तुत किए । जिनमें से तीन व्याख्यान लास पामाज द ग्रैन कैनोडिया स्पेन विश्वविद्यालय के संकायों ने प्रस्तुत किया ।

कुल 102 अनुसंधान पेपर प्रकाशित किए गए जो मुख्यत: उच्च प्रभाव वाले जर्नलस में प्रकाशित किए गए । इसके साथ ही कई पुर्नरीक्षण पेपर लोकप्रिय लेख, पुस्तक/पुस्तिका के अध्याय एवं बुलेटिन भी इस वर्ष के दौरान प्रकाशित किए गए । बैठकों में IRC, RAC, BOM, शैक्षणिक परिषद एवं विस्तार परिषद की बैठकें समय पर आयोजित की गई । अतिथि के रूप में विदेशों जैसे स्पेन, आस्ट्रेलिया, चीन, इथोपिया एवं बंगला देश के आगंतुकों ने संस्थान का दौरा किया ।

Chapter

3 Introduction

3.1. Introduction

ICAR-CIFE was establshed with the assistance of UNDP in 1961 to promote fisheries education in the country by training officials from state governments. It was initially under the administrative control of Ministry of Agriculture, Govt. of India and subsequently transferred to ICAR (Indian Council of Agricultural Research) in 1979. The mandate of the institute were widened to include higher fisheries education, research as well as extension education under its functional fold. Recognizing the pivotal role played by the Institute in Human Resources Development in fisheries, the Institute was accorded the status of Deemed-to-be- University in March, 1989. The institute has emerged as a centre of excellence in HRD not only with state-of-the-art facilities and laboratories but by producing competent manpower who have been securing top ARS positions besides joining national and international organizations. The institute has also been deeply engaged in orienting, grooming and preparing the professionals from the Afro-Asian countries in fisheries and aquaculture sector.

Mandate

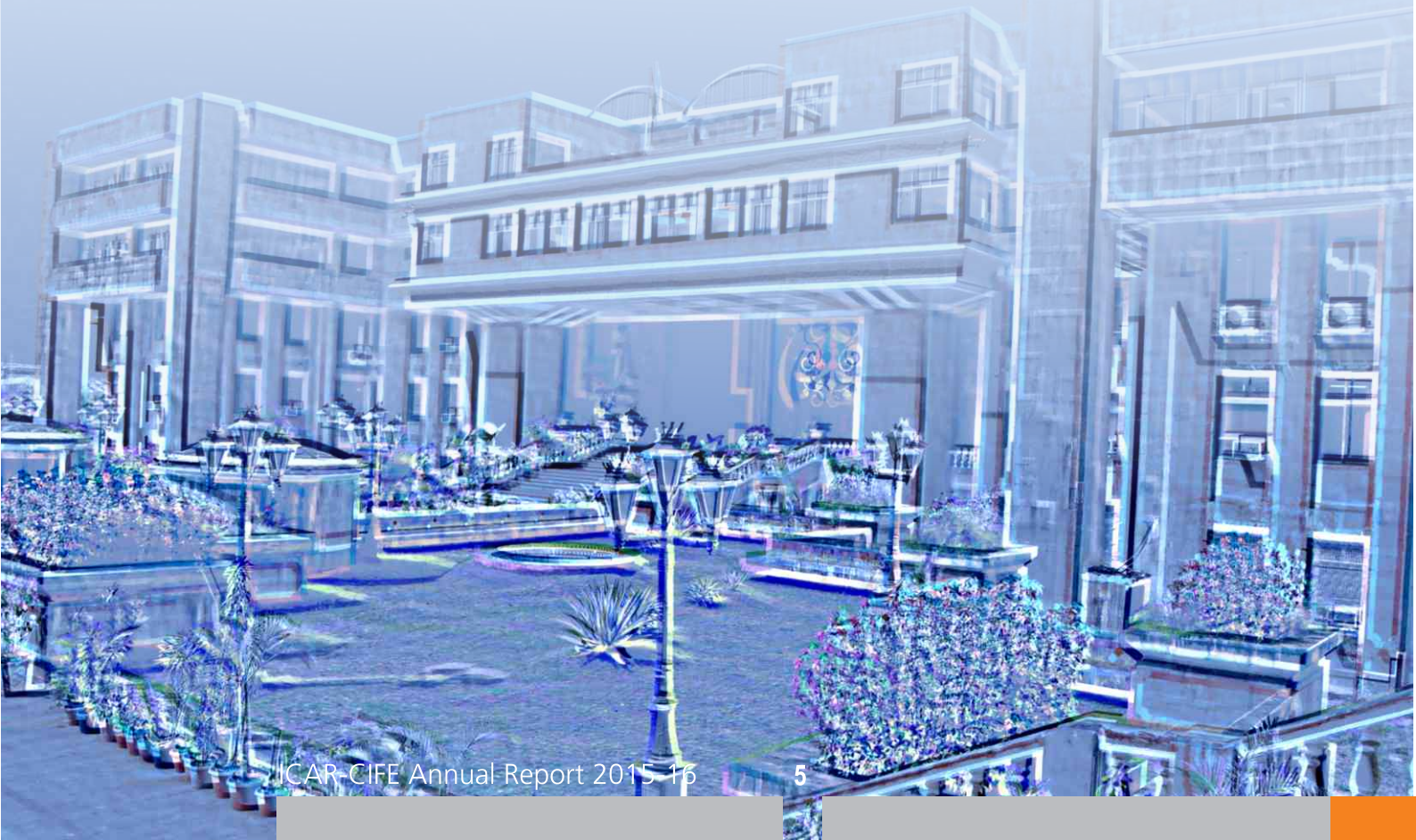
- To conduct post-graduate academic programs in core and emerging disciplines of fisheries science.
- To conduct basic and strategic research in frontier areas of fisheries.
- To conduct training programmes in demand-driven and upstream areas for different stakeholders of fisheries sector.
- To provide technical assistance, inputs for policy development and consultancy services.

Vision

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

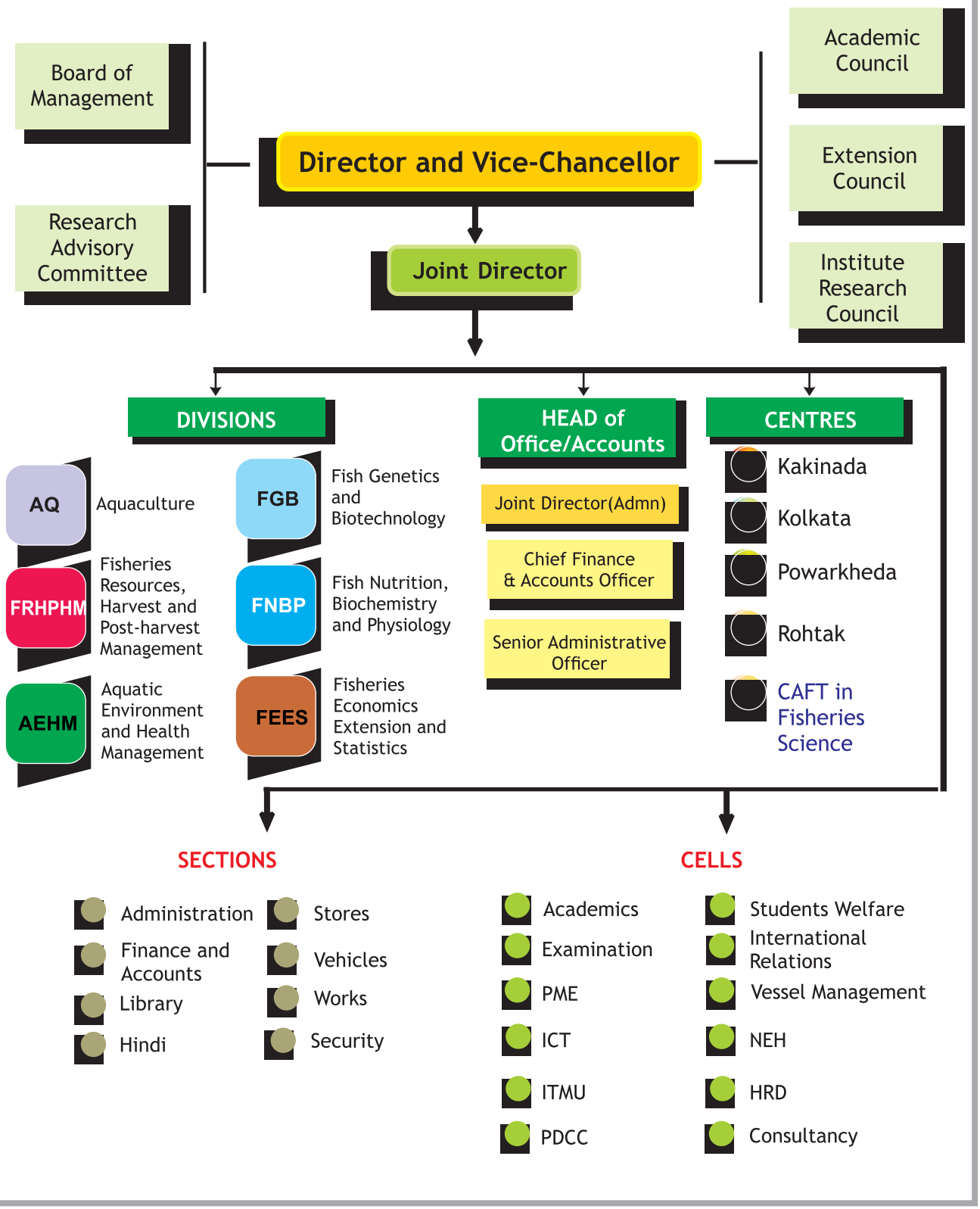
Mission

To achieve academic and research excellence



Organogram

ICAR-CIFE, Mumbai



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Chairman
Dr. W.S.Lakra
(upto 31.08.15)

Dr. Gopal Krishna
(from 01.09.15)

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Dr. N.P. Sahu
Dr. S.N. Ojha
Dr. A. Gopalkrishnan
Shri Pradeep Vithal Tapke
Shri Rafiq M. Naik
Shri Devendra Kumar

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Shri G.R. Deshbandhu
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(upto 31.08.15)

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(from 01.09.15)

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Dr. Kundan Kumar
Prof. Ashok Kumar Saxena
Prof. T.J. Pandian
Dr. P. Jayasankar
Dr. K.K. Vijayan
Dr. Ravi Shankar
President, PGSSU
Representative of ACM of PGSSU

Member Secretary
Shri G. R. Deshbandhu
(upto16.06.15)
Shri Ashish Roy
(from 17.06.15)

Extension Council

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Dr. W. S. Lakra
(upto 31.08.15)

Dr. Gopal Krishna
(from 01.09.15)

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Dr. Sheela Immanuel
Dr. B.K. Mahapatra
Dr. Arpita Sharma
Dr. Somdutt

Member Secretary
Dr. S. N. Ojha

3.3. Staff Position (2015-16)

Category Wise

CIFE Staff	Sanctioned	In position	Vacant
RMP	2	1	01
Scientific	104	88	16
Technical	106	82	24
Administrative	64	46	18
Skilled Supporting	70	61	09
Non Ministrial	01	01	00
Total	347	279	68

3.4. Budget (2015-16)

(Rs. In Lakh)

S. No.	Head	Sanctioned	Received	Expenditure Incurred
1.	Plan	908.00	908.00	884.04
2.	Non-plan	4243.00	4243.00	4199.84
	Total	**5151.00**	**5151.00**	**5083.88**

S.No.	Head	Balance C/f	Received	Expenditure Incurred
3.	CAFT	8.09	16.50	9.34
4.	SDU	189.31	172.47	61.22
5.	Externally Funded Projects	397.59	184.88	329.41
	Total	**594.99**	**373.85**	**399.97**

Revenue generation (Rs. In Lakh)

Target : Rs. 198.82 Achieved: Rs. 93.86

Chapter

4 Academic Achievements

4.1. Enrollments

A total of 78 students enrolled for the masters programmes including one foreign student from Africa. Out of the 60 students who enrolled for the doctoral programmes one student was from Srilanka and one from Nigeria.

M.F.Sc. (Batch 2015-2017)

Sr.No.	Name of the Programme	No. of candidates enrolled
1.	Aquaculture (AQC)	12
2.	Aquatic Animal Health (AAH)	08
3.	Aquatic Environmental Management (AEM)	06
4.	Fish Biotechnology (FBT)	06
5.	Fish Genetics and Breeding (FGB)	06
6.	Fish Physiology and Biochemistry (FPB)	06
7.	Fish Nutrition and Feed Technology (FNFT)	06
8.	Fisheries Extension (FEX)	06
9.	Fisheries Economics (FEC)	06
10.	Fisheries Resource Management (FRM)	09
11.	Post-Harvest Technology (PHT)	07
	Total	78

Ph.D. (Batch 2015-2018)

Sr.No.	Name of the Programme	No. of candidates enrolled
1.	Aquaculture (AQ)	14
2.	Aquatic Animal Health (AAH)	04
3.	Aquatic Environmental Management (AEM)	04
4.	Fish Biotechnology (FBT)	03
5.	Fish Genetics and Breeding (FGB)	03
6.	Fish Physiology and Biochemistry (FPB)	04
7.	Fish Nutrition and Feed Technology (FNFT)	04
8.	Fisheries Extension (FEX)	04
9.	Fisheries Economics (FEC)	05
10.	Fisheries Resource Management (FRM)	09
11.	Post-Harvest Technology (PHT)	06
	Total	60

4.2. Results

Discipline-wise number of passed-out students are as follows:

Name of the Programme	No. of successful candidates
Ph.D.	
Aquaculture (AQC)	03
Fish Biotechnology (FBT)	03
Fish Nutrition and Feed Technology (FNFT)	01
Fish Pathology and Microbiology (FPM)	01
Fisheries Resource Management (FRM)	04
Fisheries Extension(FEX)	02
Aquatic Animal Health (AAH)	01
Fish Nutrition and Biochemistry	01
Total	**16**
M.F.Sc. (2013-15)	
Aquaculture (AQC)	13
Aquatic Animal Health (AAH)	06
Aquatic Environmental Management (AEM)	06
Fish Biotechnology (FBT)	06
Fish Genetics and Breeding (FGB)	05
Fish Physiology and Biochemistry (FPB)	06
Fisheries Economics (FEC)	05
Fisheries Extension (FEX)	05
Fish Nutrition and Feed Technology (FNFT)	06
Fisheries Resource Management (FRM)	08
Post-Harvest Technology (PHT)	06
Total	**72**

4.3. List of dissertations submitted by M.F.Sc. students during the year 2015-2016

S. No.	Name of the Student	Title	Major Guide
Aquaculture			
1.	Mr. Sontakke Ravindra Harish	Effect of different diets on growth and survival of *Notopterus chitala* fry	C.S. Chaturvedi
2.	Ms. Dorothy, M.S.	Evaluation of growth and survival of *Litopenaeus vannamei* (Boone, 1931) under biofloc based culture system in inland saline water	Babitha Rani A.M.
3.	Mr. Manish Kumar	Comparative performance of *Pangasianodon hypophthalmus* (Sauvage, 1878) culture in cages and ponds	Kiran Dube Rawat
4.	Ms. Harsha Haridas	Evaluation of growth and immune response of gift strain of tilapia in biofloc based system	A.K. Verma
5.	Mr. Somu Sunder	Evaluation of growth and physiological changes in *Pangasionodon hypophthalmus* under different salinities	Suresh Babu P.P.
6.	Mr. Javed Amiri	Comparative studies on the aquatic productivity through organic manures and inorganic fertilizers	Chandra Prakash
7.	Mr. Arun V.V.	Effect of abiotic factors on hatching rate and cyst production of Indian and exotic stocks of *Artemia franciscana*	Neelam Saharan
8.	Mr. Jitendra Thakur	Study on production potential and economic viability of carp seed using sugar industry bio-wastewater	Chandra Prakash
9.	Ms. Poonam Rani	Performance evaluation of red tilapia in inland saline water at various salinity levels with special reference to ionic manipulation	V. Hari Krishna
10.	Mr. Vinod Kumar Paswan	Effects of salinity and Ca++/Mg++ ratio on physiological and production parameters of *Litopenaeus vannamei* (Boone, 1931) reared in inland saline water	V. Hari Krishna
11.	Mr. Mohammad Irshad Khan	Studies on induced breeding and seed production of indigenous carp in captive conditions	V.K. Tiwari
12.	Ms. Jyotismita Thakuria	Responses of water hardness on gonadal development and gene expression of gill Na+/K+-ATPase of Oscar, *Astronotus ocellatus* (Cuvier, 1829)	Paramita Banerjee Sawant
13.	Mr. Ashish Upadhyay	Ionic manipulation of inland ground saline water for growth and survival of tilapia	A.K. Reddy

Aquatic Animal Health			
14.	Ms. Sampal Pal	Identification and characterization of selected genes involved in toll-like receptor (TLR)-pathway in *Etroplus suratensis*	K.V. Rajendran
15.	Ms. Naznin Ahmed	Development of lamp assay for detection of megalocytivirus in ornamental finfish	Gaurav Rathore
16.	Ms. Nigairangbam Sushila	Comparative study of in vitro response of selected drugs to *Betanodavirus*	Gayatri Tripathi
17.	Mr. Sajal Kole	Assessment of nanodelivery of DNA construct against *Edwardsiella tarda* in *Labeo rohita*	Megha Bedekar
18.	Mr. Tasok Leya	Immunomodulatory and antibacterial effect of curcumin derived from turmeric (Curcuma long Linn.) against fish pathogenic bacteria in *Cirrhinus mrigala*	R.P. Raman
19.	Miss. Poojashree K.J.	Expression studies on toll-like receptor 5 in *Pangasianodon hypophthalmus* exposed to *Edwardsiella tarda*	K. Pani Prasad
20.	Mr. Biswajit Sukla Das	Pathogenicity evaluation of *Aeromonas* spp. isolated from freshwater ornamental fishes	Kundan Kumar
Aquatic Environmental Management			
21.	Ms. Kumari Kavita	Quantification of plastic debris in coastal environment off Mumbai, Maharashtra	P. K. Pandey
22.	Mr. Om Pravesh Kumar Ravi	Phytoremediation of calcium from inland salinewater through an integrated treatment system	V. S. Bharati
23.	Ms. Anjali P. Thilakan	Effect of biofloc on water quality and growth performance of *Etroplus suratensis* (Bloch, 1790)	P. K. Pandey
24.	Ms. Samchetshabam Gita	Utilization of agro-waste for the removal of selected textile dyes	S. P. Shukla
25.	Ms. Ananya Ashok	Assessment of Dioxin-like compounds from sediments of selected sites in Mumbai, India	P. K. Pandey
26.	Ms. Sangeetha M. Nair	Column mode remediation and evaluation of toxicity of selected metal nanoparticles towards freshwater phytoplankton	S. P. Shukla
Fish Biotechnology			
27.	Mr. Nilav Aich	SNP mining in selected genes of giant freshwater prawn *Macrobrachium rosenbergii* (De Man, 1879)	Aparna Chaudhari

28.	Mr. Nishant Kumar Dubey	Expression profiling of selected reproduction related genes of *Clarias batrachus* at different life stages	Gireesh Babu P.
29.	Mr. Gulshan Kumar	Homology modeling and docking studies on reproductive hormones and receptors of *Clarias batrachus* (Linnaeus, 1758)	Aparna Chaudhari
30.	Mr. Sudhanshu Raman	Molecular phylogeny of selected mahseer species using complete mitochondrial genome	A. Pavan Kumar
31.	Ms. Priyanka Kumari	Genetic characterization of *Mystus seenghala* stocks using mitochondrial DNA markers	Gopal Krishna
32.	Mr. Ganesha	Designing the locus specific primers for the novel microsatellites identified in *Clarias batrachus*	Gopal Krishna
Fish Genetics and Breeding			
33.	Mr. Manu Kumar G.	In-Silicoidentification of putative essential genes and therapeutic candidates in *Aeromonas hydrophila* infecting fish	S. Jahageerdar
34.	Mr. Pravesh Kumar	Development and nano-delivery of chitosan conjugated steroidogenic acute regulatory protein (StAR) gene construct in *Clarias batrachus*	Rupam Sharma
35.	Ms. Sahana S.	The effect of different cryoprotectants on morphology and fertility of Mahseer spermatozoa	Gopal Krishna
36.	Ms. Mrinmoyee Datta	Standardization of size and dose of silver nano particle for DNA delivery in *Labeo rohita* (Hamilton, 1822)	Rupam Sharma
37.	Mr. Anupam Tripura	A genetic study on inheritance of important economic traits in selected ornamental fishes	S. Jahageerdar
Fish Physiology and Biochemistry			
38.	Ms. Nuzaiba, P. M.	Responses of different dietary protein sources on gene expression of *carnitine palmitoyl* transferase I	P. P. Srivastava
39.	Mr. Showkat Ahmad Dar	Pharmacokinetic study of benzimidazole derivatives in *Labeo rohita* (Hamilton, 1822)	Subodh Gupta
40.	Ms. Anagha T.	Studies on dietary nano-zinc oxide on muscle development and gene expression of calpain and cathepsin in *Pangasianodon hypophthalmus* (Sauvage, 1878)	Subodh Gupta

41.	Ms. Doreena Ann Suchiang	Gene expression study of TNF-α and IGF-1 in *Labeo rohita* (Hamilton, 1822) fed with graded level of carbohydrate	Sujata Sahoo
42.	Ms. Smital Dilip Kamble	Responses of dietary zinc and pH of ambient water on gene expression of carbonic anhydrase in *Pangasianodon hypophthalmus* (Sauvage, 1878)	Sujata Sahoo
43	Mr. Sachin Kumar	Studies on the effects of dietary zinc on gene expression of superoxide dismutase-I and catalase in *Pangasianodon hypophthalmus* (Sauvage, 1878) in response to thermal stress	P. P. Srivastava
Fisheries Economics			
44.	Mr. Vinay A.	Economic analysis of tuna fisheries in Lakshadweep	Ramasubramanian V.
45.	Ms. A. Anuja	Can sustainable fishing techniques maximize economic benefits? The case of Kombuthurai fishing village, Thoothukudi, Tamil Nadu	Vinod Kumar Yadav
46.	Mr. Stanzin Gawa	Value chain analysis of Trout in Kashmir	Nalini Ranjan Kumar
47.	Mr. Vinay M. Hatte	An economic analysis of supply chain management of inland fish marketing in Nanded district of Maharashtra	Swadesh Prakash
48.	Ms. Jamuna Debbarma	Assessment of the role of Tripura tribal area Authonomous District Council in fisheries sector of Tripura	Rama Sharma
Fisheries Extension			
49.	Mr. Hino Fernando	Sociology of fishing knowledge of Thoothoor shark fishers	P.S. Ananthan
50.	Ms. Sruthy P. Krishnan	An assessment of leadership in the fisheries cooperatives in Kerala	S.N. Ojha
51.	Mr. Sumit Mondal	Analysis of women cooperative societies in ornamental fisheries, West Bengal	Arpita Sharma
52.	Mr. Balkam R. Sangma	Gender roles in matrilineal society of Meghalaya : A study in fishery sector	Arpita Sharma
53.	Ms. Shalumol Salas	Women empowerment through entrepreneurial activities of fishery based Self Help Groups in Kerala	S.N. Ojha

Fish Nutrition and Feed Technology			
54.	Ms. Amrutha Gopan	Evaluation of fillet appearance and immune responses in *Pangasianodon hypophthalmus* (Sauvage, 1878) fed with carotenoids	Muralidhar P. Ande
55.	Mr. Mir Ishfaq Nazir	Evaluation of growth and immune responses of Fucoidan-based nutraceuticals in *Labeo rohita* (Hamilton, 1822)	N.P. Sahu
56	Mr. Syamlal Lalappan	Studies on gene expression of Myogenin and Myf5 in *Labeo rohita* (Hamilton, 1822) fed with graded levels of carbohydrate	K.K. Jain
57.	Mr. Gopal Dongre	Studies on dietary intervention for flesh quality of *Pangasianodon hypophthalmus* (Sauvage, 1878)	Muralidhar P. Ande
58.	Mr. Gagan Devaiah	Studies on growth and immune responses in *Pangasianodon hypophthalmus* (Sauvage, 1878)	K. K. Jain
59.	Mr. Ambuj Kumar Singh	Evaluation of Fucoidan from different seaweeds on immune responses of *Labeo rohita* (Hamilton, 1822)	N. P. Sahu
Fisheries Resource Management			
60.	Mr. T. Nirmal	A taxonomic study of Hermit Crab along selected districts of Maharashtra coast	A.K. Jaiswar
61.	Mr. Veerendra Singh	Effect of grazers on seaweed distribution and biomass along Raigarh district (Maharashtra)	Geetanjali Deshmukhe
62.	Mr. Prem Singh Prajapat	A study on biology of white sardine (*Escualosa thoracata*) along Goa coast of India	S.K. Chakraborty
63.	Ms. Manoharmayum S Devi	An appraisal of single-day and multi-day gill net fishery in Satpati, Thane district, Maharashtra	Latha Shenoy
64.	Mr. Phurin Songtheng	Study of trophic relationship in the aquatic community of Dimbhe reservoir, Maharashtra	Asha T. Landge
65.	Mr. Gladston Y.	Design and operational performance of pomfret gill nets in Satpati, Thane district, Maharashtra	Latha Shenoy
66.	Mr. Roshan Kumar Ram	Marine algal biodiversity of intertidal region of Raigad district, Maharashtra	Geetanjali Deshmukhe
67.	Ms. Mary Josephine P.	A study on ecological and productivity status of Masunda lake	Asha T. Landge

Post-Harvest Technology			
68.	Ms. Hauzoukim	Development of enrobed fish products : Improvement in functionality of coated materials by added nutraceuticals	Martin Xavier
69.	Ms. Martina Laishram	Prevalence of *Arcobacter* spp. in seafood and their environment	B.B. Nayak
70.	Mr. Sourav Ghosh	Response of luminescent bacteria to antimicrobial property of cephalopod ink	B.B. Nayak
71.	Ms. Surekha Saraff	Development of Fishpaneer™ from *Pangasianodon hypophthalmus* mince	A.K. Balange
72	Ms. Utkarsha A. Keer	Quality changes in *Acetes* spp. during low temperature preservation and thermal processing	A.K. Balange
73.	Ms. Sreepriya Prakasan	Molecular characterization of shiga toxin-producing Escherichia coli from sea food	Sanath Kumar H.

4.4. List of Ph.D. students awarded the degree during 1.4.2015 to 31.03.2016

Sr. No.	Name of the student	Topic of the thesis	Major Advisor	Date of Viva-voce
2009-2012				
1.	Ms. Rekha Das FBT-361	Silencing of GIH gene in *Penaeus monodon* using a DNA construct expressing in RNA and its effect on maturation	Gopal Krishna	02.09.2015
2.	Mrs. Anulekshmi Chellappan FRM-309	Fishery, bionomics and stock assessment of coastal tuna along Maharashtra coast	S.K. Chakraborty	04.09.2015
3	Ms. Kavita Kumari FBT-408	Characterization of CYP1A gene in C*atla catla* and evaluation of it expression a biomarker for xenobiotic pollution	Gopal Krishna	08.12.2015
4	Mr. Siddaiah G. M. FNB-370	Nutritional strategy for enhancing growth and immunity of *Pangasianodon hypophthalmus* (Sauvage, 1878) exposed to different salinity	S. Munil Kumar	01.03.2016
5	Ms. Sukham M. Devi FRM-340	Taxonomy and biology of selected clupeids	A. K. Jaiswar	08.03.2016
6	Ms. Vidya R. FPM-367	Studies on Toll-like Receptor TLR) in mud crab, *Scylla serrata* (Forskal, 1775)	K. V. Rajendran	
2010-2013				
7	Mr. Yamnam B. Singh FRM-386	Ichthyofaunal diversity of Thoubal River, Manipur and biology of some endemic fishes	S.K. Chakraborty	06.07.2015
8	Ms. Banti Debanath FEX-419	Gender perspectives in fisheries development in Tripura – determinates, adoption behaviour and sustainable livelihoods	M. Krishnan	22.09.2015
9	Mr. Lainthuamluaia FRM-383	Pattern of aquatic biodiversity and trophic status of Savitri (Ranbajire) Reservoir in Raigad District, Maharashtra	Asha T. Landge	07.03.2016
2011-2014				
10	Ms. Shivta Kureel FEX-PA1-03	Systems approach to grass root level innovations in fisheries sector	Arpita Sharma	13.07.2015
11	Mr. Raghvendra Singh AQC-PA1-06	Study on induced breeding and seed production of indigenous carp, *Chagunius changunio* (Hamilton-Buchanan, 1822)	V. K. Tiwari	23.11.2015
12	Ms. Amruta P. Shete AQC-PA1-04	Studies on bio-integration of fish culture and hydroponic	A. K. Verma	28.01.2016

13	Mr. Sikendra Kumar AQC-PA1-07	Growth, survival and immunomodulation of *Cirrhinus mrigala* (Hamilton, 1822) fingerlings through dietary supplements	Chandra Prakash	25.02.2016
2012-2015				
14	Mrs. Lopamudra Sahoo AAH-PA2-05	Study on immune response and expression of immune genes in *Labeo bata* to some selected immunostimulants	K. Pani Prasad	29.06.2015
15	Mr. Esayas Welday Tekle FNFT-PA2-03	Immuno-modulatory and growth responses of tilapia fingerling to moringa extracts	N. P. Sahu	20.02.2016
2014-2012				
16	Mr. T. Obulesu FBT-364	Studies on the synergistic of dietary squalene and N-3 polyunsaturated fatty acids (PUFA) supplementation in modulating aging process	R. Anandan	18.12.2015

4.5. Student achievements

Smt. Nirmala C. Kulkarni, Best M.F.Sc girl student research award

Ms. Neha Wajahat Qureshi was awarded the Smt. Nirmala C. Kulkarni Best M.F.Sc girl student research award for the year 2013-14 on 31st August, 2015.

Best paper presentation award

Mr. John Fawole Femi, Ph.D. student won the best oral presentation award (3rd place) at XIV Biennial Animal Nutrition Conference (ANSICON , 2016) held at NDRI, Karnal for his paper titled: Immunomodulation and antioxidant activity and interferon Gama expression in *L. rohita* to dietary propolis extract.

Ms. Lopamudra Sahu won the best paper award for the paper titled: Application of glucan as an immunostimulant extracted from *Euglena gracilis* to improve immunity in *Labeo bata* during the National Seminar on Fisheries and aquaculture: Livelihood security, sustainability and conservation at College of Fisheries, Lembuchera on 21-22 January, 2016

Poster award

Mr. B. N. Sanap received the second prize for poster presentation during the technical session of uncoventional feed resources, ANSICON-2016 held at ICAR-NDRI, Karnal on 6-8 February, 2016 for the paper titled: Utilization of electron beam irradiated Jatropha kernel meal in the diet of *Labeo rohita* (Hamilton, 1822) fingerlings (Sanap, B. N., Sardar, P., Phulia, V., Sahu, N. P. Dasgupta, S., Pailan, G. H. and Datta, S.)

Dr. Hiralal Chaudhary Gold Medal

Ms. Jyothirmayee Das, won the Dr. Hiralal Chaudhary Gold Medal for securing first position in M.F.Sc. (Fisheries Economics, 2012-14)

Dr. M.A. Upare Gold Medal

Ms. Jyothirmayee Das won the Dr. M.A. Upare Gold Medal for securing the highest OGPA in M.F.Sc (Fisheries Economics, 2012-14)

Dr. N.R. Menon award for best M.F.Sc. Thesis

Mr.Tarachand Kumawat (FRM) won the Dr. N.R. Menon award for best M.F.Sc. thesis titled: Compliance of bag net fishery of Maharashtra coast, India with Article 7 of the FAO Code of Conduct for Responsible Fisheries.

Jalihal Award for Best Master's Thesis 2014

Mr. Raja Aadil Bhat, (AAH) won the Jalihal Award for Best Master's Thesis 2014 titled: Molecular cloning, characterisation and expression analysis of melanoma differentiation associated gene 5 (MDA5) of green chromide, *Etroplus suratensis*

Young Scientist Award

Ms. Anusha Wickramasinghe, (AEM) was honoured with the Young Scientist Award at the 2nd International Conference on Science and Technology-2015", organized by Vishwashanthi Multipurpose Society in Colombo, Sri Lanka

International awards

Following papers were presented at the International Conference by M.F.Sc. students

Sajal Kole, Megha K. Bedekar, Rajendran K.V., Gayatri Tripathi, M. Makesh (2015). Potential efficacy of nanodelivery of DNA vaccine using chitosan nanoparticles against *Edwardsiella tarda*. International Conference on Aquaculture and Fisheries July 20th -22nd , 2015 Brisbane, Australia (First on-line presentation)

Deepika Anand, K. Sreedharan, P.P. Suresh Babu, Anutosh Paria, M. Makesh and K. V. Rajendran (2015). Expression profiles of two downstream signalling molecules of Toll-pathway in Tiger shrimp (*Penaeus monodon*), Cactus and Dorsal genes in response to infection with white spot syndrome virus and *Vibrio harveyi*. International Conference on Aquaculture and Fisheries, July 20th -22nd , 2015 Brisbane, Australia.

Dr. C.V.Kulkarni gold medal endowment award

Dr. K. Nagalakshmi received the Dr. C.V. Kulkarni Gold medal endowment award for the best Ph.D. research of the year 2015 on 31 August, 2015.

PFGF Best MFSc thesis award

Mr. Sanjit Kumar Asem (PHT) won the PFGF Best MFSc thesis award for his thesis titled: Isolation of *Escherichia coli* harboring blaNDM-5 from fresh fish in India

Overseas Fellowship

Mr. Sajal Kole, (AAH) won the Overseas Fellowship for Ph.D. in Department of Aqualife Medicine, Chonnam National University, Korea

4.6 Guest faculty (Abroad)

Name of the faculty	Designation and place	Title of lecture	Date
Prof. Dr. S.J. Kaushik	European Research Area Chair, University of Las Palmas de Gran Canaria, Spain	Efficient utilization of resource effeciency in aquaculture	03 Jun, 2015
Prof. (Dr.) Marisol Izquierdo	Director of the Aquaculture and Marine Genetics Department in University of Las Palmas de Gran Canaria, former Director of Canarian Institute of Marine Sciences, Director of Scientific Policy of ULPGC	Fish broodstock nutrition	03 Jun, 2015
Prof. (Dr.) Ricardo Haroun	Director of Eco Aqua University of Las Palmas de Gran Canaria.	Sea grass and mariculture, biodiversity and conservation	03 Jun, 2015
Prof. (Dr.) Rosario Berriel	Vice-President of foreign affairs for internatinalization and Co-operation from Las Palmas de Gran Canaria	International co-operation in their university system	03 Jun, 2015

4.7 Guest faculty (National)

Name of the faculty	Designation and place	Title of lecture	Date
Ms. Purnima Joshi	Librarian, KC Law College Mumbai	Copyright, copyright violation & plagiarism	25 Apr, 2015
Dr. P. Keshavnath	Retired Professor	Non-conventional ingredient in fish nutrition	25-26 Jun, 2015
Prof. Anil Uppadyaya	Dept of Fisheries Economics and Statistics, College of Fisheries, CAU, Agartala	Fisheries marketing and price analysis	1-3 July, 2015
Prof. Balachandra Naik Prof. Vilas Kulkarni	Dept. of Agribusiness Management, University of Agricultural Sciences, Dharwad	Fisheries marketing and price analysis	01-03 Jul, 2015
Dr. Madhavi Indap	Professor, Ruparel College, Mumbai	Angiogenesis : Creating new possibilities for life	05 Aug, 2015
Dr. Gopakumar	Ex- DDG (Fisheries), ICAR, New Delhi	Fisheries education in India	17 Nov, 2015
Dr. A. D. Diwan	Ex ADG (Marine fisheries) ICAR	Shell fish physiology	11-13 Jan, 2016
Dr. G. Venkateswarlu	ADG, Education (ICAR)	IPR and Related Issues in Biotechnology	15 Jan, 2016
Dr. Sathees C. Raghavan	Associate Professor Department of Biochemistry, Indian Institute of Science, Bangalore	DNA repair and cancer	10 Feb, 2016
Dr. Shenan Harpaz	Volcani Centre, Israel	Aquaculture in Israel	20 Feb, 2016
Dr. E. Vivekanandan	Emeritus Scientist	Climate change: its mitigation and adaptation	16 Mar, 2016

4.7. Invited lectures delivered by faculty to other universities

Name of the faculty	Title of lecture	Name of university /programme etc.	Date
Shrinivas Jahageerdar	Statistical application in biomedical research	Haffkine Institute, Parel	9 Apr, 2015
Sunil Kumar Nayak,, R. K. Upadhyay, L.P. Bamaliya Hasan Javed	Culture and breeding of indian major carps	State Agriculture Department, Hoshangabad (M.P.).	25 May-15 Jun, 2015
Kiran Dube Rawat	Rearing of fish seeds in cage	Chhattisgarh Fisheries Officers	20 Jun, 2015
Karthireddy Syamala	Basic principles of fish nutrition and function of individual nutrients	P.R. Govt. College, Kakinada	31 Jul, 2015
Karthireddy Syamala	Basic principles of fish nutrition and function of individual nutrients	P.R. Govt. College, Kakinada	31 Jul, 2015
T.I. Chanu	Ecology of culture ponds significance and importance of phytoplankton, zooplankton and Benthos	P.R. Govt. College, Kakinada	04 Aug,2015
Muralidhar P. Ande	Different types of additives used in aquafeed with their specific function	P.R. Govt. College, Kakinada	06 Aug, 2015
Karthireddy Syamala	Nutrient cycles and Nutrient dynamics	P.R. Govt. College, Kakinada	17 Aug, 2015
Muralidhar P. Ande	Nutritional requirement of different commercially important finfish	P.R. Govt. College, Kakinada	22 Aug, 2015
P. Srinivasa Rao	Criteria for site selection of aquaculture ponds	P.R. Govt. College, Kakinada	27 Aug, 2015
K. Pani Prasad	Key note address: As conference chair, international conference on fisheries and aquaculture - ICFA 2015	Colombo, Sri Lanka	25-27 Aug, 2015
Muralidhar P. Ande	Nutritional requirement of different commercially important shell fish	P.R. Govt. College, Kakinada	01 Sep, 2015
K. Pani Prasad	Monoclonal and polyclonal antibody production	DBT Trainees CMFRI, Kochi	07 Sep, 2015
T. I. Chanu	Water and soil quality management	P.R. Govt. College, Kakinada	08 Sep,2015
Gaurav Rathore	Fish diseases and therapeutics	Model Training Course on Improved Disease Management Practices in Fresh Water Aquaculture CIFA, Bhubaneshwar	28 Sep, 2015

Megha Kadam Bedekar	Lead Paper: Role of biotechnology in vaccine designing	Recent advances in veterinary and animal science and role of women veterinarian, organized by MAFSU, at Pune	8-10 Oct, 2015
K. Pani Prasad	Key note address: Advances in aquatic animal health management	2nd Indo Global Summit and Expo on Veterinary 2015 at Hyderabad	27 Oct, 2015
N.P. Sahu	Feed additives including phyto extracts, immuno stimulants and hormones	DBT training programme for Fisheries professionals on molecular biology and biotechnology CMFRI, Kochi	4 Nov, 2015
Shrinivas Jahageerdar	Analysis of QTL Data and SAS Genetics-an overview	ICAR-NAARM, Hyderabad	06 Nov, 2015
N. P. Sahu	Nutraceuticals for fish and shellfish Health management Molecular approaches in diagnosis and control of emerging and transboundary diseases of freshwater fish and shellfish,	ICAR-CIFA, Bhubaneswar	17-26 Nov, 2015
K.V. Rajendran	Transboundary diseases of importance to brackishwater aquaculture and their diagnoses	ICAR, CIFA, Bhubaneswar	24 Nov, 2015
Shrinivas Jahageerdar	Managing effective population size in carp hatcheries	NFDB sponsored workshop on Development of Brood bank for Amur Common carp	02 Dec, 2015
K.V. Rajendran	Disease diagnostic techniques in aquaculture	ICAR, CMFRI, Cochin	16 Jan, 2016
K.V. Rajendran	Advances in disease diagnostic procedures in aquaculture	College of Fisheries, Lembucherra, Tripura	21 Jan, 2016
N. P. Sahu	Futuristic research need in fish nutrition research for sustainable aquaculture production	College of Fisheries Lembucherra, Tripura	22 Jan, 2016
M. Krishnan	Fisheries and aquaculture: livelihood security, sustainability and conservation	College of Fisheries Lembucherra, Tripura	22 Jan, 2016
Kiran Dube Rawat	Status of reservoir fisheries in India and their productivity enhancement		02 Feb, 2016
K. Murali Mohan	Brackish water ecology, section of cultivable species and construction maintenance of brackish water farms	P.R. Govt. College, Kakinada	12 Feb, 2016

P. Srinivasa Rao	Carp and shrimp hatchery management techniques	P.R. Govt. College, Kakinada	16 Feb, 2016
Geetanjali Deshmukhe	Ecosystem Services of Coastal Wetlands – Case Study of Gulf of Kutch – Keynote Address	Mumbai University	16 Feb,2016
K.V. Rajendran	Video conference Lecture on Aquatic animal health surveillance	Kamdhenu University, Gandhinagar, Gujarat	17 Feb, 2016
Arun Sharma	Method of pathological examination of fish and infection diseases in fish	P.R. Govt. College, Kakinada	18 Feb, 2016
K. Murali Mohan	Use of probiotic and antibiotics in aquaculture operation and banned antibiotics	P.R. Govt. College, Kakinada	19 Feb, 2016
Arun Sharma	Eco-friendly and sustainable aquaculture and quarantine management	P.R. Govt. College, Kakinada	20 Feb, 2016
N. P. Sahu	Sustainable aquaculture: Challenges and opportunities Multi-disciplinary international conference on science, sustainability and society in the current scenario: challenges & opportunities	Vikas College, Mumbai	20 Feb, 2016
Arun Sudhagar Pankaj Kumar	Fish diseases and their prevention methods and transportation of fish seed & stocking	State Fisheries Department, Haryana at Panipat, Haryana	02 Mar, 2016
V Harikrishna Arun Sudhagar Pankaj Kumar	Post-harvest management techniques in fisheries and scope of ornamental fishes in Haryana NCR region	State Fisheries Department, Haryana at Panipat, Haryana	09 Mar, 2016
V Harikrishna ArunSudhagar Pankaj Kumar Ashok Kumar	Ornamental fisheries-scope & utility and fish diseases	State Fisheries Department, Haryana at Rohtak, Haryana	27 Mar, 2016

4.8. PGDIF&AM and PDP

Post Graduate Diploma in Inland Fisheries & Aquaculture Management (PGDIF&AM) and Professional Development Programme (PDP)

SL. NO.	Name of the Programme	Sponsoring organisation	Duration of training	No. of participants
1.	One year PG Diploma in Inland Fisheries & Aquaculture Management (PGDIF&AM)	Directorate of Fisheries, M.P. Haryana, Meghalaya, J & K. and Punjab	1 year May 2015 to Apr, 2016	18
2.	Professional Development Programme (PDP): Module IV: *Fisheries Development Management*	Directorate of Fisheries, Nagaland, M.P., Chhattisgarh	Feb-May, 2015 and 2016	5
3.	Professional Development Programme (PDP): Module II: *Aquaculture*	Directorate of Fisheries Meghalaya and Private candidates from Nagaland, M.P & Chhattisgarh	Jun-Sep, 2015	13
4.	Professional Development Programme (PDP): Module I:Capture & Enhanced Fisheries	Private candidates from M.P., Nagaland, and Chhattisgarh	Oct-Jan, 2015-16	2
	Total			**38**

Lecture on copyright laws and publication ethics.

4.9. Report of the Activities of PDCCC

The Personality Development and Career Counselling Centre (PDCCC) organizes programs to boost confidence and personal development of students, prepare them to face interviews and help them develop communication skills. PDCCC aims to link the job requirement of fisheries industries with the human resources available in the institute. In 2015-16, PDCCC organized several programs with active participation from students. An orientation program for newly joined master's students was conducted on 01 Aug., 2015 to familiarize them with the institute. In order to sensitize students and scientists on issues of copy right and plagiarism, a guest lecture was organized at CIFE on 24 May, 2015. An English speaking course was organized for the students by a professional English training institute. The program was attended by 30 master's students. A 7-week personality development program was organized by PDCCC to provide skills training in personality, confidence and emotional intelligence using neuro-linguistic programs. The program was attended by 25 students. As part of "*Rashtriya Ekta Divas*", the birth anniversary of Sri Sardar Vallabhbhai Patel on 31 Oct., 2015, PDCCC organized quiz competition, documentary show on Sardar Patel and lecture on "Patriotic Transformation" by a representative from Chinmaya Mission. PDCCC is actively involved in connecting students with job opportunities in fisheries sector by regularly posting job offers received from the industries.

English language classes

Personality development training

Chapter

5 Research Achievements

Aquaculture

The Team

Aquaculture

1. Seed production and culture of *Labeo calbasu* (Hamilton, 1822) in weed infested ponds (2012-15)

N. K. Chadha, Somdutt, Chandra Prakash and Paramita Banerjee Sawant

Experiment on breeding and seed rearing of *Labeo calbasu*

Eight females and 11 males with an average wt. of 1 kg were bred to produce 10.49 lakh spawn. About 50,000 fry of 25mm size were supplied to Department of Fisheries, Govt. of Haryana and after rearing for two months about 35,000 fingerlings were released in the river Yamuna at Dadupur, Yamuna Nagar (Haryana) for rejuvenation and conservation. Fingerlings (20,000) were released in the River Narmada at Hoshangabad (M.P.)for rejuvenation and conservation. About 82,000 fry were sold to the private farmers, generating total revenue of Rs.16,400 @ Rs. 200/1000 fry and 25,000 fingerlings are being raised for future stock at the farm.

Experiment to enumerate the effective dose of alum for weed control

Effect of alum on the weeds; *Chara* sp. and *Hydrilla* sp. was measured in terms of reduction in chlorophyll a and b for weeds and pH, nitrate & phosphate concentrations for water, where the weeds were grown and treatments were applied. Alum at 500 ppm was effective for controlling weed, wherein, effect of alum was noticed within 24-72 hours after its application (after 45 days of growth) as evidenced by discoloration whereas complete decomposition was observed by 60th day. Use of alum beyond 500 ppm resulted in lowering of pH less than 4, making water more acidic and unsuitable for fish culture. Nitrate and phosphate concentrations reduced considerably within 6 hours using alum.

2.Up-scaling, demonstration and diversification of technologies for finfish and shellfish in inland saline soils (2012-16)

A.K. Reddy, V. Harikrishna, Arun Sudhagar and P.S. Ananthan

The technology for the commercial farming of *Litopenaeus vannamei* in saline affected soils has been demonstrated in different parts of Haryana in collaboration with Department of Fisheries, Government of Haryana.

Potassium level (50% of sea water) and Ca++: Mg++ ratio was maintained at 1:2.5. On-farm training on feed management, ionic fortification and water quality management were given to the farmers from time to time. The technology was successfully demonstrated with an average productivity of 7.5 tons/ ha.

Grow out trials on *L . Vannamei* using various salinity ranges were demonstrated. The trials demonstrated an average productivity of 8 tons/ ha in cemented ponds and 7 tons/ ha in earthen ponds.

Grow out trials on *Pangasianodon hypophthalmus* were conducted using low inland ground saline water of 2-4 ppt. The fish grew to an average weight of 560 g and achieved an average production of 16.8 tons/ha. Similarly grow out trials on GIFT Tilapia were conducted in low saline inland ground water of 2-4 ppt. and achieved a production of 1500 Kg / 0.15 ha (10.0 tons/ha).

Experimental trials on *Cobia (Rachycentron canadum*) using inland ground salinewater at various salinity ranges were conducted to elucidate the suitability of inland saline groundwater for the rearing of cobia with fortification of potassium. There was complete mortality in low inland ground salinewater at all the salinities. The study clearly indicated that potassium fortification is essential for the culture of cobia in inland ground salinewater. The growth performance was almost similar at 10 and 15 ppt in comparison to 5 ppt even though no significant differences were observed in the survival rate at all the tested salinities. The potassium fortification to a tune of 50% equivalence to the equivalent salinity of seawater is essential for obtaining optimum growth and survival. The fishes were fed with commercial floating feed having a crude protein content of more than 40% and achieved average weight of 476.7 g in 60 days.

Experimental trials were conducted on Pompano *(Trachinotus blochii*) using inland ground saline water fortified with potassium at various salinity ranges. There was complete mortality at 10 and 15 ppt salinity and 75 % survival at 5 ppt. The study clearly indicated that potassium fortification is essential for the culture of pompano in inland ground salinewater. The growth performance was higher at 15 ppt salinity. The potassium fortification to a tune of 50% equivalence to the equivalent salinity of sea water is essential for obtaining optimum growth and survival of Pompano.

Experimental trials on Amur carp using inland ground salinewater at various salinity ranges indicated that it can survive up to 17 ppt but feed intake reduced from 13 ppt onwards. Growth rate reduced with the increased salinity. Potassium amendment did not affect the performance of amur carp at all the tested salinities. The growth was almost same as that in freshwater up to 5 ppt.

3. Breeding, larval rearing and colour enhancement of selected high value tropical ornamental fishes (2012-16)

Paramita Banerjee Sawant, N. K. Chadha, Chandra Prakash, P. P. Srivastava, S. Dasgupta and S. G. S. Zaidi

Studies on responses of water hardness on maturation of Oscar (*Astronotus ocellatus*) revealed that it adapts and matures at water hardness of 90 ppm. Gonadal development is not discernable at extreme soft and hard water. This conclusion is worthwhile and useful for the ornamental fish breeders, who would get a clue on the optimum level of hardness to be maintained for maturation, breeding and seed production of this high value cichlid, wherever water of ambient hardness is unavailable under captive conditions. This study therefore, contradicts the opinion of aquarium hobbyists that soft water is adequate for optimum maturation and breeding of Oscar.

Upregulation of gill-Na^+/K^+ ATPase gene was recorded in response to higher water hardness.

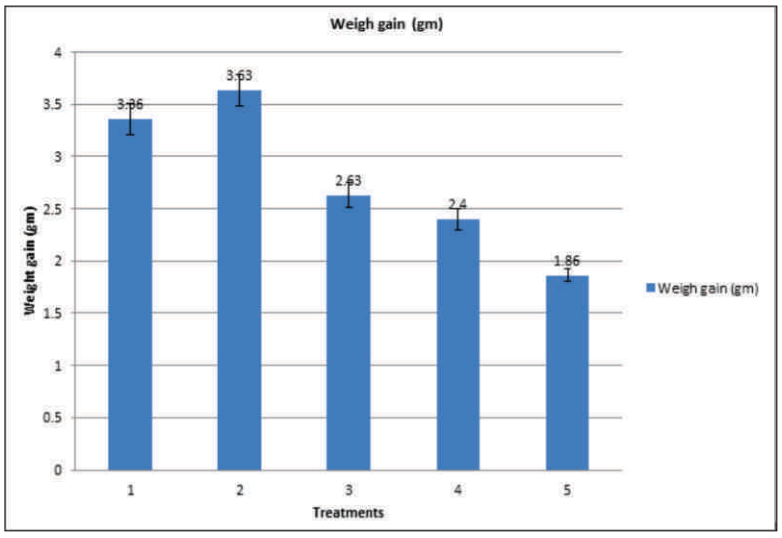
Inadequate feeding induces aggressiveness and tendency towards cannibalism in oscar. Various compositions of feed were tried out for better growth and maturation and the best combination was selected for further study to standardize the protein and lipid ratio for optimum maturation of oscar. Studies on comparative evaluation of larval diets in Discus (*Symphysodon discus*) revealed better performance of Spirulina based diet in comparison wih fish meal, artemia, enriched artemia, formulated pellets and commercial diets.

4. Evaluation of biofloc based system for rearing of *Labeo rohita* and *Litopenaeus vannamei* (2013-16)

Babitha Rani, A. K. Reddy, K. Paniprasad , A. K. Verma and V. Harikrishna

Biofloc technology is used as a sustainable culture method where the nitrogenous compounds produced within the system will be assimilated by heterotrophic bacterial communities which produce the biofloc. The biofloc is produced by addition of external carbon source to maintain the Carbon : Nitrogen ratio (C:N ratio) above 10:1. In the project, an experiment was conducted in tapioca flour based *in-situ* biofloc system to optimize the protein concentration in the diet of *Labeo rohita* fingerlings. The treatments used varying protein levels (T1 (35%), T2 (30%), T3 (25%), T4 (20%) and T5 (15%) in the diet of fishes maintained in biofloc system with a C:N ratio of 15:1. There was similar body weight in 30% and 35% protein diet-fed groups and were higher than the rest of the groups. The *in-situ* biofloc system was maintained under zero water exchange and which recorded optimum water quality parameters.

In another experiment, the microbial floc was produced *ex-situ* by using various carbon sources and among them tapioca flour was found to be the best for producing the biofloc in good quantity and quality. Microbial floc production was carried out in 3 indoor FRP tanks (500 L; capacity) in 3 batches at 5-day interval. Biofloc was harvested using nylon filter bag with 10 µm pore size, centrifuged at 2000 rpm, and dried under shade followed by drying in a hot air oven at 45 °C. The dried flocs were ground into fine powder (less than 200 µm). Four experimental diets were formulated viz., T1, T2, T3, T4 with graded level of dried microbial floc at 2 (T2), 4 (T4), 8 (T8) and 12% (T12) respectively and a control diet (C) without biofloc. In 60 days feeding trial using *Labeo rohita* fingerlings, significantly higher weight gain was observed in all the treatment groups compared to control, of which 8% biofloc supplemented group recorded the highest weight gain.



Weight gain of *Labeo rohita* fingelings fed with various percentage of protein (T1, T2, T3, T4, T5:-35%, 30%, 25%, 20% and 15%) in in-situ biofloc system

Aquatic Environment and Health Management

The Team

Aquatic Environment and Health Management

5. Development of nanoparticle based bio barcode (s) for detection of Betanodavirus (2015-18)

Pani Prasad K., Jeena, K. and Mujahid Khan Pathan

Gold fish and guppies were screened for betanodavirus infection by PCR. Screened by PCR SSN1 cell lysate infected with NNV and PEG precipitated betanodavirus.

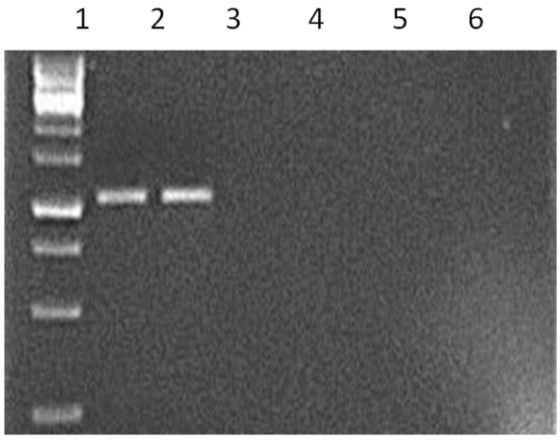
Designed primers for Betanodavirus coat protein Primer sequence:

Forward : 5'
GGAATTCATGGTACGCAAAGGTGAGAAG 3'

Reverse : 5'
CCAAGCTTTTAGTTTTCCGAGTCAACCCT 3'

Amplified the coat protein of Betanodavirus from the PEG precipitated virus stock.

Gel image showing the Betanodaviral coat protein amplicon from PEG precipitated virus. Lane 1: 1 Kb gene ladder, Lane 2: Betanoda viral coat protein from PEG precipitated virus sample 1; Lane 3: Betanoda-viral coat protein from PEG precipitated virus sample 2; Lane 4: *Poecilia reticulata* intestinal epithelium; Lane 5: negative control; Lane 6: *P. reticulata* eyes.



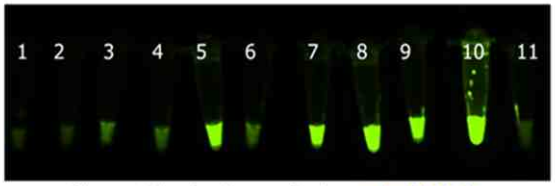
6. Loop mediated isothermal amplification (LAMP) based detection of selected pathogens of fish (2014-17)

Gaurav Rathore and Kundan Kumar

Evaluation of LAMP assay for detection of Megalocytivirus (MCV): Sensitivity/detection limit of LAMP assay for detection of Megalocytivirus (MCV) was found to be as low as 1 copy of the Linearized plasmid (pBM3A-MCP) containing major capsid gene of MCV. No amplification was detected with RSIV, Betanodavirus, *Edwardsiella tarda*, *Aeromonas hydrophila* and *Pseudomonas aeruginosa*. This result indicates that LAMP method is highly specific to MCV Sabah strain. Out of 33 fish samples that were tested for detection of MCV, 17 samples were positive for MCV by LAMP, whereas in Nested PCR, only 15 samples were found positive for MCV.

Visual Detection of Megalocytivirus infection by LAMP

Observe tubes for change of colour in daylight.
Yellow colour-Positive (Tubes-5,7,8,9,10); Pink colour-Negative



Observe tubes for change of colour under UV light.
Dark fluorescent green-Positive (Tubes-5,7,8,9,10); Light green-Negative

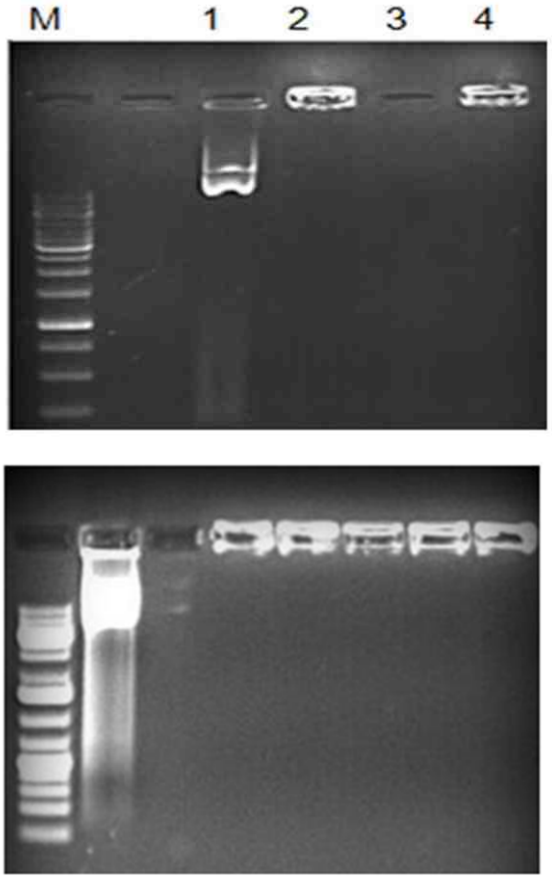
Isolation and characterization of *Flavobacterium columnare* from fish: A total of 14 diseased fish samples (Indian major carps) were processed that showed signs of fin rot and scale erosion. One isolate was confirmed as *F. columnare*. This Isolate will be used for development of LAMP assay.

7. 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 and Dhamotharan K.

Tech. Associate: Nalini Poojary

Edwardsiella tarda is an important pathogen of freshwater aquaculture system which causes edwardsiellosis in many species of fishes. To counteract the disease, a novel bicistronic plasmid DNA vaccine was successfully developed in the lab. In this project, it is targeted to develop suitable delivery system for the vaccines. In this regard, revival of bacterial culture and recombinant clones containing vaccine construct was carried out. GAPDH and IFN inserts were confirmed with PCR. Recombinant plasmids were purified for nanoconjugation. Chitosan-conjugated vaccine nanoparticles were prepared and characterised for size, zeta potential and stability.



Optimization of size and stability of Nanoconjegated DNA vaccine construct

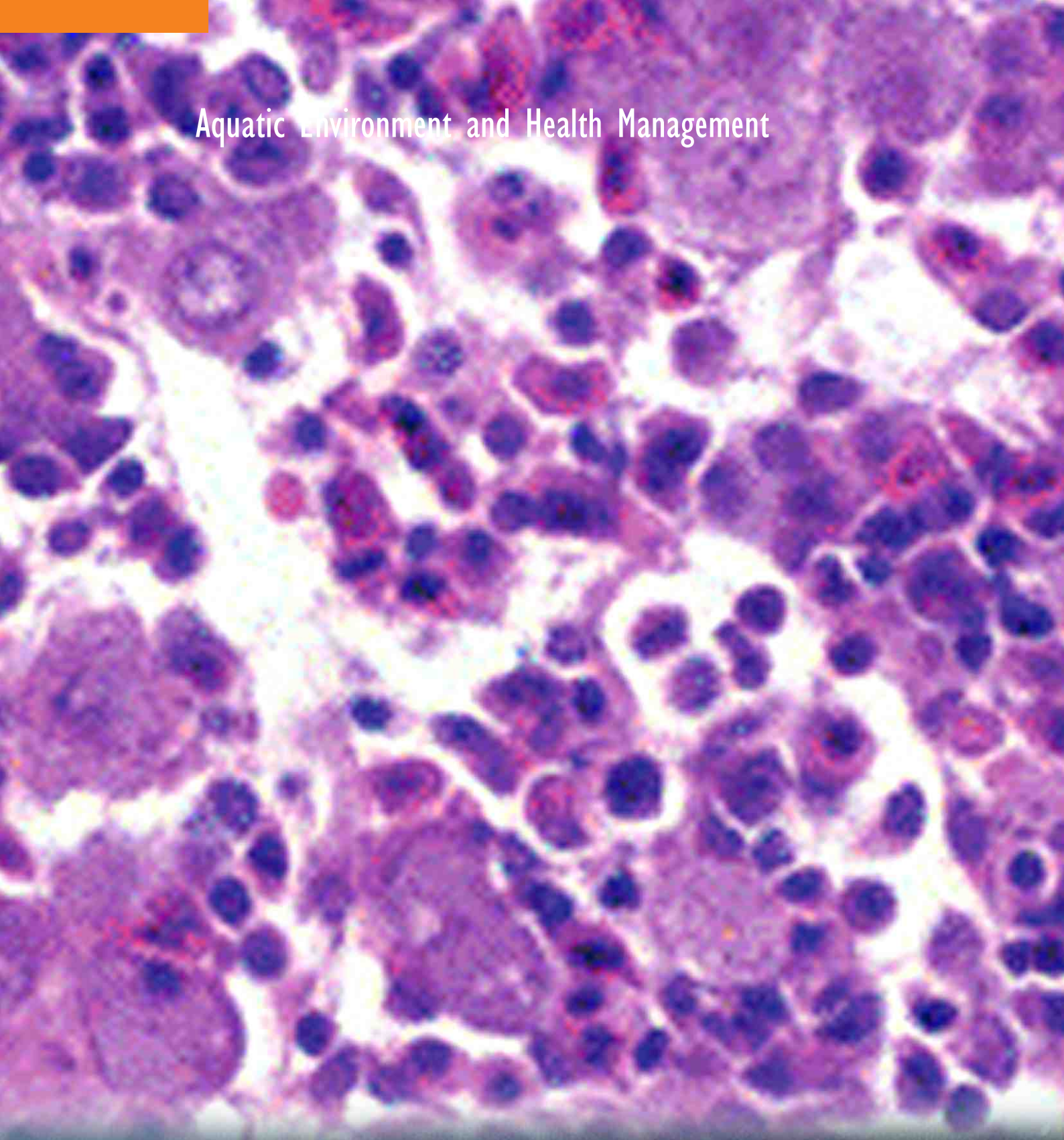
8. Designing and testing of column based water filtration units for removal of inorganic and organic waste from hatchery wastewater (2012-15)

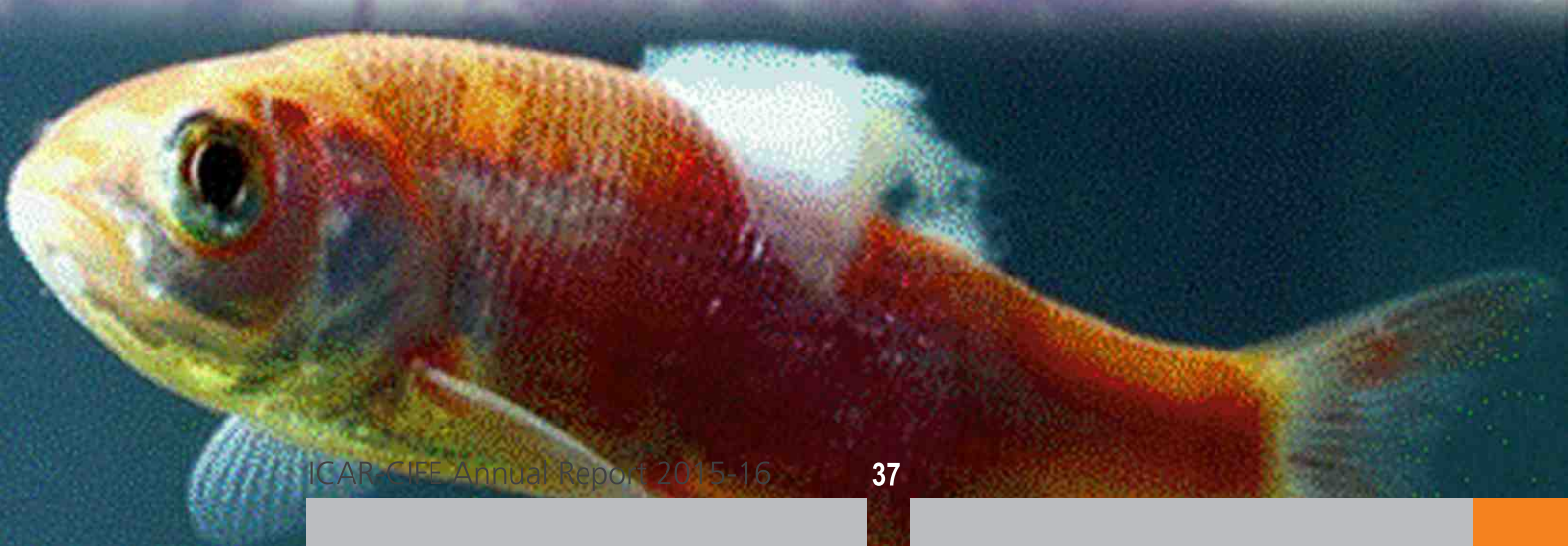
S.P. Shukla, P. K. Pandey, A. Vennila and V. S. Bharti

A prototype was designed for water filtration unit based on electro-adsorption principle. The unit consists of an electrically charged column with physically entrapped adsorbents. Initial trials of the unit at 5 ppm ammonia concentration showed 40-60% removal of ammonia from water. The unit removed about 40% arsenic (III) from water at 5ppm initial concentration. The flow rate of the unit was 20L/min (1200L/h) and the material used for the fabrication is of low cost and can be reused without compromising on the efficiency. The process of patenting the technology is underway.

Wall Mounted Filtration Unit

Aquatic Environment and Health Management





Fisheries Resources, Harvest and Post-Harvest Management

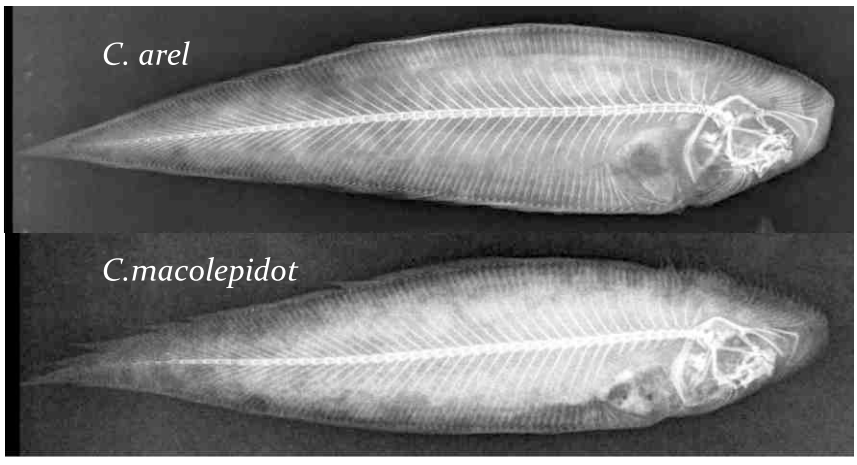
The Team

Fisheries Resources, Harvest and Post-Harvest Management

9. Taxonomic evaluation and phylogenetic study of flatfishes (order Pleuronectiformes) occurring in Indian waters (2013-16)

A.K. Jaiswar, A. Pavan Kumar and Shashi Bhushan

Altogether 436 specimens belonging to 38 species of flatfishes under six families (*Psettodidae, Paralichthyidae, Bothidae, Samaridae, Soleidae, Cynoglossidae*) were collected from different parts of India. Samples of 38 species of flatfishes were collected from Veraval (Gujarat); Versova, New Ferry wharf, Sassoon Docks, Ratnagiri (Maharashtra), Digha (West Bengal), Mandapam, Tuticourin, Rameshwaram (Tamil Nadu) and Cochin (Kerala). Morphological characters-morphometric and meristic characters of these fishes were studied. Osseochromometry study based on Otoliths and scales and radiography of representative samples was done. Tissue samples were collected for barcoding. Barcoding of 10 species have been done and work on the remaining is under progress. Phylogeny based on the morphological characters were traced for the family Cynoglossidae. An identification key was prepared for the family Cynoglossidae.



10. Productivity and fisheries resource mapping of selected estuarine and coastal waters of Maharashtra (2015-18)

Latha Shenoy, Geetanjali Deshmukhe, Asha T. Landge, V.S. Bharti, and Neha Qureshi **Tech. Associates:** Satish Kamat and Ram Singh

Preliminary survey was conducted along the coast of Maharashtra for selection of sites and transects. Two estuaries; Karanja in Raigad district & Bhayander in Thane district were selected for the study. Sampling and analysis of environmental, fishing and biological parameters were carried out. About 37 phytoplankton, 27 zooplankton and 26 fish species were recorded from Karanja. Trawlers and Purse seiners, though registered at Karanja, landed the catch at their base of operation, i.e. Sassoon Docks in the Greater Mumbai district. Smaller sized boats operated gill nets and dol nets in the estuary. A structured questionnaire was prepared to collect the primary data on variety wise quantity of fish landings, price of fish and CPUE. Secondary data on variety wise landings for the last two decades in Karanja and Bhayander creeks was collected and compiled.

11. Development of fish products fortified with aquatic nutraceuticals (2014-17)

K.A. Martin Xavier, A.K. Balange and K. Nagalakshmi

Different levels of sodium alginate were incorporated in batter formulations, which were used for coating fish stick. Experiments were conducted and the products were par-fried in oil. Analytical results indicated alginate incorporation improves the coating

functions like pick up, adhesion degree, frying loss and cooking yield. It was observed that 1% alginate incorporation reduced the oil uptake of the product up to 42.5%.

Alginate containing seaweed was used for the production of cereal based functional extruded snacks. The optimum level of independent variables i.e. moisture; seaweed concentration and barrel temperature for maximum expansion ratio were 16.45%, 4.33% and 123.08 ˚C respectively whereas for maximum porosity, the values were 16.06%, 4.51% and 124.04 ˚C respectively. Sensory evaluation studies have shown that up to 5% level sargasum powder can be included without altering the quality.

12. Development of acetes based value added fish products (2013-16)

Balange A. K., Sanath Kumar H, B.B. Nayak and Martin Xavier

Effect of freezing on the quality and shelf life of acetes was investigated and it revealed that acetes can remain in edible condition up to 4 months of frozen storage. However there may be loss of some sensitive nutrients. Products developed from acetes include acetes sausages, acetes wafers and acetes chutney.

13. Diversity of *Salmonella enterica* in seafood and molecular bases of its survival and persistence (2015-18)

Sanath Kumar H, B.B.Nayak and L.Manjusha

Salmonella enterica were isolated from samples of fish and shellfish collected from landing centers and fish markets using multiple enrichment broth and selective agars. PCR confirmation of isolates was done by invA gene-specific primers. The percentage prevalence of Salmonella was 23.07% in fin fish and 20% in shellfish. Eighteen isolates of Salmonella obtained from samples of shrimp were further tested for clonality using arbitrarily primed PCR (AP-PCR). The hypothesis here is that the isolates obtained from the same sample are clonally identical and may have originated from a common source of contamination. Clonal analysis has so far revealed diverse nature of Salmonella strains isolated from the same sample.

14. Enteric viral risk assessment in seafoods (2013-16)

B. B.Nayak, Sanath Kumar and K. V. Rajendran

Seafood samples including clams, mussels, oysters and finfish collected from different landing centres, local markets and supermarkets in Mumbai were analysed for the presence of enteric viruses like norovirus, poliovirus, enterovirus and hepatitis A virus. About 21.6% of the samples were positive for norovirus, 27% for poliovirus and 24.3% for enterovirus. Hepatitis A virus was detected in none of the samples. The samples positive for norovirus were also checked for the presence of fecal coliforms to study the correlation between these fecal pathogens if any. The results showed a high correlation indicated by r = 0.892, which points towards the co-existence of fecal coliforms and enteric virus in the environment. Prevalence of these enteric pathogens in seafood intended for human consumption indicates a significantly higher load of fecal contamination, which can consequently result in gastro enteritis and other infectious outbreaks.

Value Added Products Developed by ICAR-CIFE

Fish Nutrition, Biochemistry and Physiology

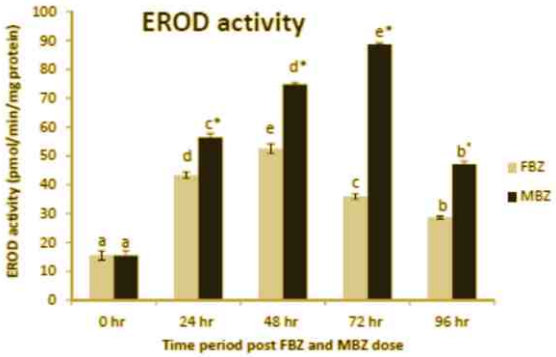
The Team

Fish Nutrition, Biochemistry and Physiology

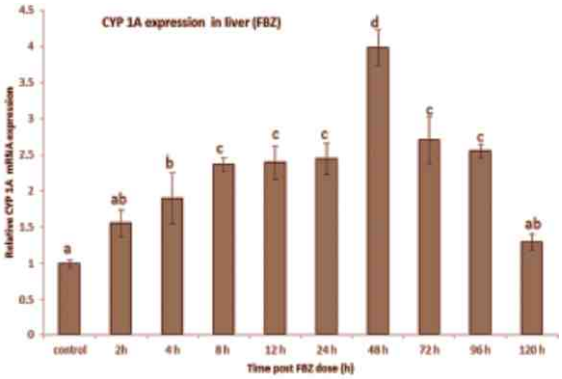
15. Pharmacodynamics and physio-metabolic responses for selected anti-parasitic compounds in *Labeo rohita* (2014-16)

Subodh Gupta, P. P. Srivastava, Gaurav Rathore, Muralidhar P. Ande and Ashutosh Deo

Fenbendazole (FBZ) and Mebendazole (MBZ) are Benzimidazole derivatives and potent broad spectrum anthelmintic agent, widely used against intestinal helminthic infection in humans and animals. Cytochrome P450s (CYPs) play a significant role in drug metabolism and biotransformation that are dispersed in the liver of aquatic animals. However, insufficient information is available in fish regarding the role of CYP genes involved in drug metabolism. The induction and expression of CYP1A against the Benzimidazole derivatives was studied. Fenbendazole and Mebendazole were given at 20mg/kg body weight to fish. The enzyme activity of cytochrome P450 was assayed by ethoxyresorufin-O-deethylase (EROD) from hepatic microsomal fraction. EROD activity was found at 0,24,48,72 and 96 h post drug administration. EROD analysis showed the induction of CYP1A activity from 1.9 to 3.8 when *Labeo rohita* administered with FBZ and the activity was 3.8 to 6.0 times higher than the control in the case of MBZ drug administration. Secondly, the expression studies of CYP1A were carried out at 0, 2,4,8,12,24, 48, 72, 96, and 120h after treatment. Real-time PCR analyzed CYP1A mRNA expression. The mRNA expression was found significant in all time point ($p<0.05$) with highest level at 48 h in FBZ fed group, while it was 72 h in case of MBZ fed group of fishes. The overall expression level was higher in MBZ fed group compared to FBZ fed group. Thus, pharmacodynamics and detoxification studies indicate that detoxification metabolism of Fenbendazole in *Labeo rohita* is efficient as compared to Menbendazole. The information provides a way to understand utility of gene expression analysis and drug metabolization in fish.



Cytochrome P450 activities profile (nmol/min/mg microsomal protein) obtained from liver extract of *Labeo rohita* fed with Febendazole and Mebendazole medicated feed @ 20mg/kg. at different time interval



Cytochrome P450 1A mRNA level concentration expression pattern in liver extract of *Labeo rohita* fed with Febendazole and Mebendazole medicated feed @ 20mg/kg. at different time interval.

16. Expression profiling of growth and immune related genes in fish fed with carbohydrate rich diet (2014-17)

Sujata Sahoo, N. P. Sahu, K. K. Jain, Megha Kadam Bedekar and Sikendra Kumar

Metabolic enzymes (amylase, hexokinase, glucose-6-phosphate dehydrogenase activity) and antioxidants enzymes (SOD, catalase activity) were studied from the intestine and liver tissues at different time from zebra fish fed with graded level of digestible carbohydrates on T1(20 %.DC),T2 (30 % DC) and T3(40%DC). Amylase activity of T2 and T3 group was similar for 15th and 30th day but higher than T1 group, whereas on 60th day T1 activity was more than the T2 and T3 group. Hexokinase activity was highest in T3 (40% DC) on15thand30th day where as in T2 (30% DC), activity was highest on 60thday. Glucose-6-phosphate dehydrogenase activity showed similar trend as hexokinase. Catalase activity was more in T3 in all time intervals whereas SOD activity was highest on 15th and 60th day but on 30th day T2 activity was highest. Microarray experiment was conducted using experimental groups (T1 and T3) after 15 days of feeding trial. Out of 44000 detected genes, 12397 gene expression altered more than two fold in which around 147 growth and immunity related genes have been found. From the detected 147 genes, 15 tentative target genes have been selected as per relevance for real time PCR validation.

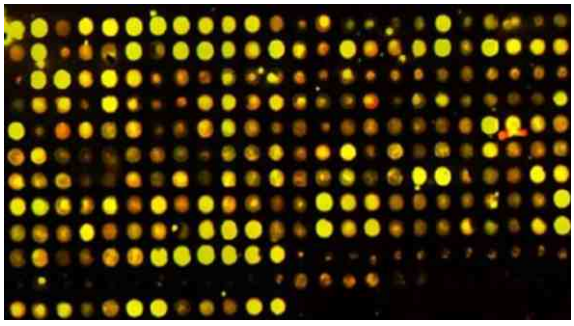


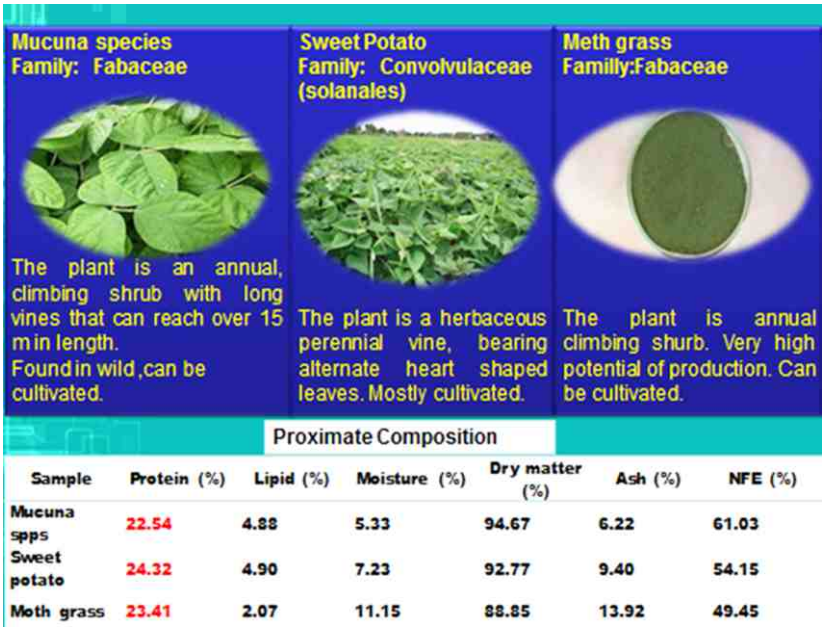
Photo of microarray study

17. Evaluation of leaf meal as a replacer of deoiled ricebran (DORB) in the diet of *Labeo rohita* (2015-18)

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

Evaluation of three plant leaves; *Mucuna* species (Valvet beans), *Ipomoea batata* (Sweet potato) and Meth from eastern parts of India was carried out for the preparation of leaf meal. The analysis of proximate composition revealed the crude protein of 22.54%, 24.32% and 23.41% in mucuna, sweet potato and meth leaf meal respectively. Initial standardization for solid state fermentation (SSF) of sweet potato leaf meal with fungus *Aspergillus oryzae* and *Rhizopus oryzae* did not increase the nutrient level significantly.

The antinutritional factors (ANFs) present in sweet potato leaf meal were cyanide, phytate, total oxalate, trypsin inhibitors, tannins and alpha amylase. In-vitro digestibility of the protein in the tested ingredients was found to be low, which may be due to presence of anti-nutritional factors.



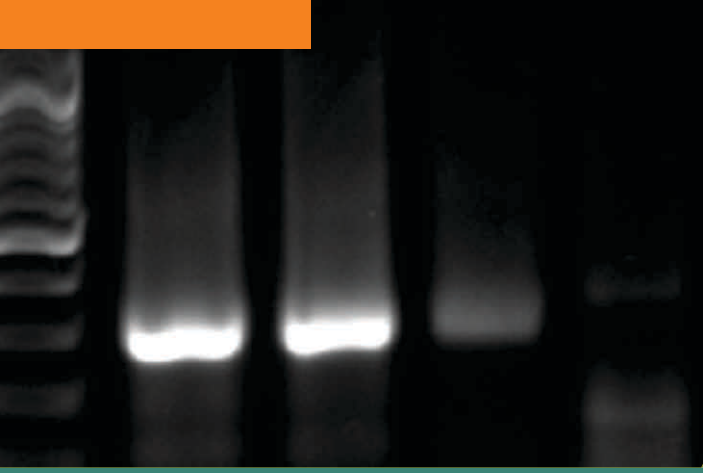
Proximate Composition

Sample	Protein (%)	Lipid (%)	Moisture (%)	Dry matter (%)	Ash (%)	NFE (%)
Mucuna spps	22.54	4.88	5.33	94.67	6.22	61.03
Sweet potato	24.32	4.90	7.23	92.77	9.40	54.15
Meth grass	23.41	2.07	11.15	88.85	13.92	49.45

Evaluated leaf meal for replacement of deoiled ricebran (DORB)

Fish Nutrition, Biochemistry and Physiology

Fish Genetics and Biotechnology



Fish Genetics and Biotechnology

18. Stock comparison of *Clarias batrachus* (Linnaeus, 1758) for selective breeding (2012-17)

S. Jahageerdar, Gopal Krishna, Sunil Kumar Nayak, Arun Sharma, Thongam Ibemcha Chanu, Rupam Sharma, C.S. Chaturvedi, Asha Landge and Som Dutt

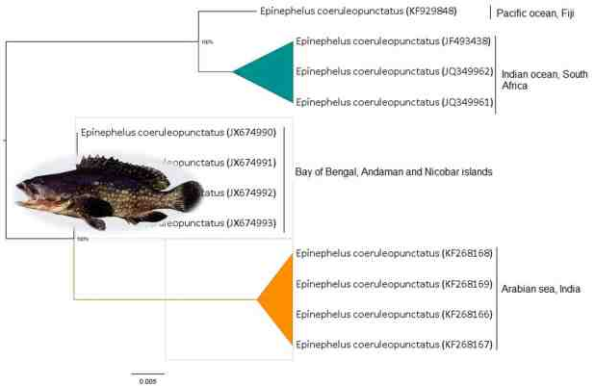
Five stocks of *Clarias batrachus* from different geographical locations were collected and assembled at Balabhadrapuram farm where

special breeding facility has been created. Full-sib families were produced, PIT tagged and reared under commercial conditions and are ready for selection. Heritability of the first year body weight suggests that the trait can be improved by genetic selection.

19. DNA barcoding of selected fishes from Indian coast (2013-16)

W. S. Lakra, Pavan Kumar, A. K. Jaiswar, K. Nagalakshmi, S. K. Chakraborty, Gopal Krishna, P. Gireesh Babu and Aparna Chaudhari

Samples of teleosts were collected from different parts of India. DNA barcodes were developed for a total of 200 species including Perciformes, Siluriformes, Pleuronectiformes



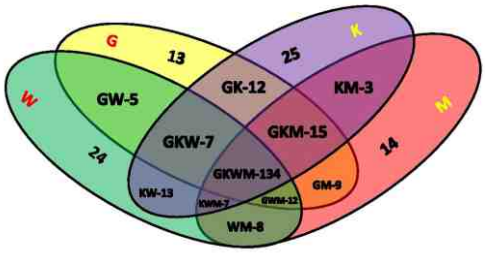
Occurrence of allopatric lineages in *Epinephelus coeruleopunctatus*

and Tetraodontiformes. A total of 150 seafood products (fresh, frozen, ready–to–eat, ready-to-cook and canned products) were authenticated using DNA barcodes and the study revealed that 20% of products were mislabeled. Several cryptic lineages were observed in fish groups that have Indo-Pacific lineages.

20. SNP mining within reported coding sequences of freshwater prawn *Macrobrachium rosenbergii* using next generation sequencing (2013-16)

Aparna Chaudhari, C. G. Joshi, Gireesh Babu P and P. G. Koringa

SNPs were mined in 34 transcript sequences of selected disease, housekeeping, reproduction and regulation related genes reported in NCBI. Amplicon sequencing approach was used on



Venn diagram showing SNP sharing among stocks (W-West Bengal, G-Gujarat, K-Kerala, M-Maharashtra

Roche GS-FLX and Ion Torrent platforms. Thirty specimens each were collected from 4 wild stocks of *M. rosenbergii*, from Rivers Hoogly, W.B; Narmada, Gujarati, Kalu, Maharashtra and Lake Vembanad, Kerala. A total of 320 SNPs were detected from 33 genes (24411 bp) across all the stocks with 215, 219, 223 and 213in W.B., Gujarat; Kerala and Maharashtra, respectively. Totally 134 SNPs were common to all stocks while 24, 13, 25 and 14 SNPs were unique to W.B., Gujarat, Kerala and Maharashtra stocks, respectively. Pair-wise Nei's genetic distances (0.304 to 0.469) showed phylogeny consistent with geographical distribution. Four pathogen defense genes were found to be highly polymorphic, of which lectin 3 had the highest SNP rate (6 SNPs/100 bp). This approach for mining SNPs and using them for population differentiation is reported for the first time.

21. Commercial production, toxicity and field tests of WSSV DNA vaccine (2015-17)

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

A WSSV DNA vaccine developed at FGB division of the institute for use in shrimps has to be tested in the field for which approval of Review Committee on Genetic Manipulation is mandatory. Toxicity studies have to be performed on commercial batches of the vaccine for which MoUs have been signed with NIRRH, Parel and VXL Drugs & Pharmaceuticals Ltd., Delhi. In addition, tests are being carried out on possible environmental transmission of WSSV DNA vaccine administered by dip treatment. A scalable procedure for plasmid preparation devoid of RNA and endotoxins is being developed.

22. CIFE- Academic Management System (2015-17)

S. Jahageerdar, N.P. Sahu, P.P Srivastava and Sudeep Marwaha

The online site http://amscife@icar.gov.in was created.Online registration of courses by the students was initiated. Course approval, lecture notes distribution through the system is operational.

23. Development of inbred lines of zebra fish and assessment of in breeding depression (2015-18)

Gopal Krishna, Mujahid Khan, S. Jahageerdar and Aparna Chaudhari

The goal of the project is to develop inbred strains of zebra fish with known levels of inbreeding. Five wild stocks of zebra fish have been collected. Pure breeding with single pair mating has been designed and currently forty six full sib families have been generated and traits are being recorded.

Zebrafish facility developed at CIFE, Mumbai

Fish Genetics and Biotechnology

Fisheries Economics, Extension and Statistics

The Team

Fisheries Economics, Extension and Statistics

24. A value chain analysis of farmed shrimp in India (Gujarat) (2013-2016)

Nalini Ranjan Kumar, M. Krishnan, Swadesh Prakash and Vinod Yadav

The factors affecting *P. vannamei* production in Navsari district of Gujarat were identified as seed and feed whereas labour, seed and experience of farmer in shrimp farming was found in case of *P. monodon*. Cost and value addition in the *P. vannamei* value chain was estimated to be Rs.253.3/kg and Rs.331.5/kg, respectively. Share of shrimp farmer in total value addition was 76.3 % followed by processor (20.7%), export agent (1.65%) and commission agent (1.31%). Cost and value addition in case of *P. monodon* was Rs.293.27 and Rs.460.1/kg, respectively. The share of shrimp farmer in value addition in this case was 84.7 % followed by processor (11.8%), export agent (1.8%) and commission agent (1.7%). There is ample scope to improve value addition in the value chain by: (1) Speeding up of leasing of land suitable for brackishwater aquaculture since a large chunk of such land is still un-utilized which has great potential (2) Educating the importance of biosecurity to farmers and enforcing it on the shrimp farms (3) Capacity building of shrimp farmers in pond management in general and disease management in particular as they are totally dependent on the advice of company technicians for the use of chemicals and medicines in their pond. (4) Improving the supply of quality SPF seed to farmers, as shrimp seeds being supplied to the farmers are generally of poor quality.

25. Capacity building of stakeholders to integrate fisheries and aquaculture in emergency response and preparedness (2015-17)

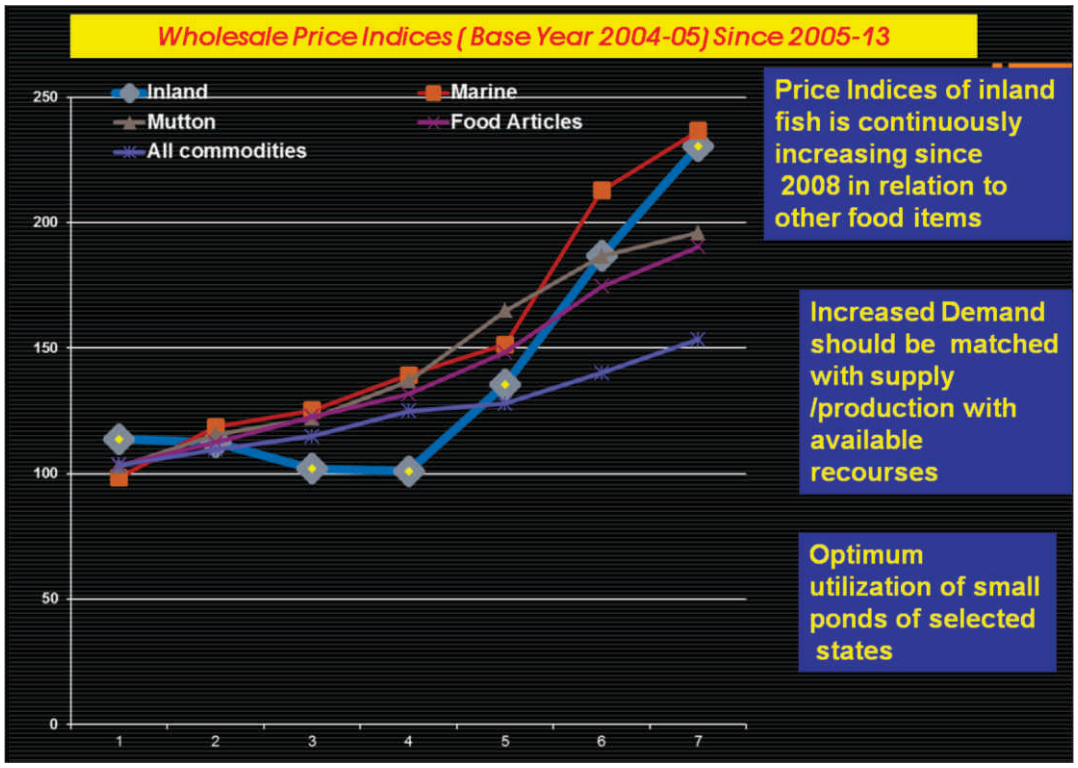
Arpita Sharma, B.K. Mahapatra and Murlidhar P. Ande

For capacity development of relevant stakeholders to integrate fisheries and aquaculture in emergency response and preparedness based on existing capacities and expected needs, the methodology of conducting workshops in different regions was adopted. Accordingly, three workshops were organized. First workshop on Fisheries and aquaculture response in emergencies was conducted on 18.12.15 at CIFE, Mumbai, second workshop was organized from 25 to 27 Feb, 2016 in Sunderbans region in West Bengal and third from 10-12 Macrh, 2016 at Jorhat, Assam. A set of documents which included the Fisheries and aquaculture emergency response guidance and the Guidelines for the fisheries and aquaculture sector on damage and need assessments in emergencies were distributed to the participants. The workshop was conducted as per the structure provided in these Guidance books, FAO (2015).

26. Economic evaluation and livelihood assessment of leased out ponds under Panchayati Raj system in northern India. (2013-16)

Swadesh Prakash, M. Krishnan, N. R. Kumar, Arpita Sharma and V. Ramasubramanian

Eighty farms were visited in Saharanpur, Karnal and Ramabainagar and Jalaun during 2015-16. The cost and return analysis reveals that the cost of fingerlings accounted for the largest proportion (18.2%) of the total cost of fish production, followed by cost of feed (13.2%). The lime and labour cost accounted for 8.2% and 6.9% of the total cost respectively. This clearly shows that large amount of money is spent by fish farmers for the purchase of fingerlings and feed. The fixed cost of production consists of cost of fixed assets such as pump, vehicles, aerators, pond etc., which accounted for 35.5% of total cost of production. Returns over per rupee investment, pond management, fixed and variable cost reveals profitable venture of fish culture in the selected district which are 1.53, 2.53,5.18 and 3.79 1.83 respectively. Functional analysis of input output relationship revealed elasticity of production greater than zero but less than one. Additional input use will result in generation of higher revenue from fish production (in value terms) The MVP analysis suggested the use of these inputs (fingerling, labour, feed and pond size) will increase revenue from fish production in the study area. The output from a fish farm will also be determined by the quantity and quality of fingerlings used along with policies that will ensure availability of these inputs to fish farmers at affordable prices.



Fisheries Economics, Extension and Statistics

The Kakinada Team

Kakinada Centre

27. Stock comparison and development of base population of *Clarias batrachus* for selective breeding (2012-17)

S. Jahageerdar, Somdutt, C.S. Chaturvedi, Rupam Sharma, Asha. T. Landge, Sunil Kumar Nayak, Arun Sharma, and T. I. Chanu,

Technical Associates: J. Krishna Prasad, P. Srinivasa Rao, and R.R.S. Patnaik

Collection and assembling of stocks of *Clarias batrachus* from various geographical locations

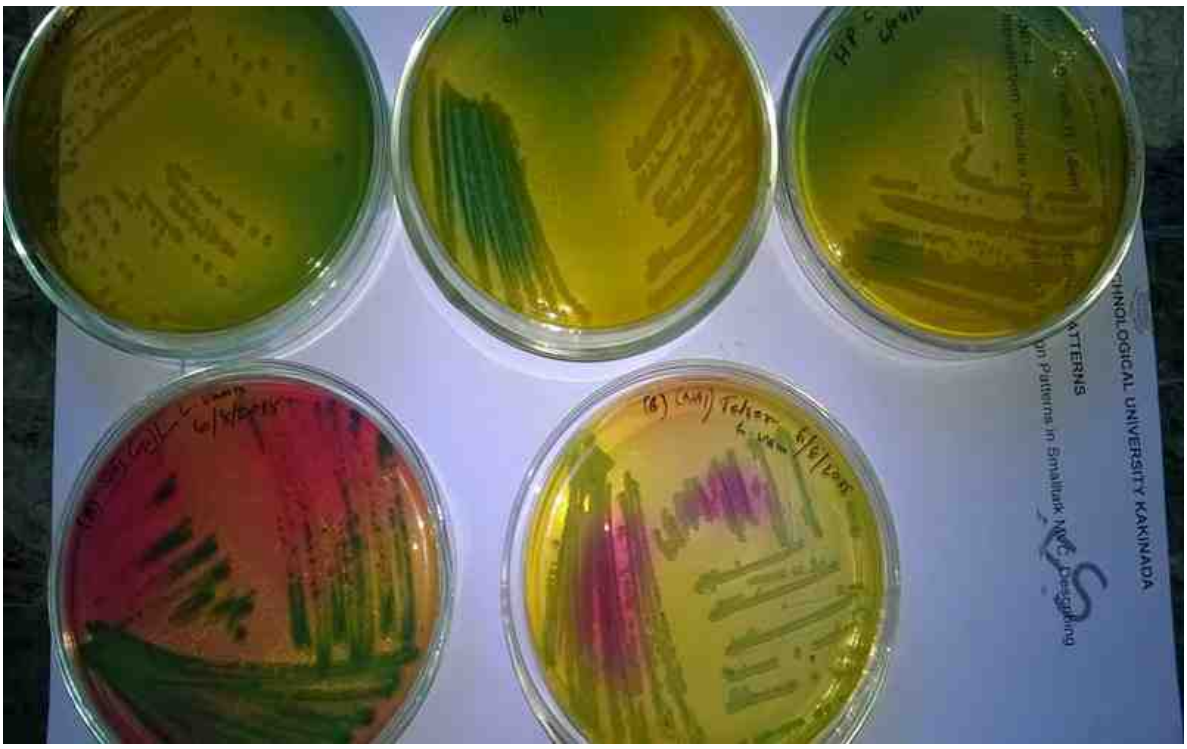
was done. One more stock of *Clarias batrachus* from Andhra Pradesh was collected. Tagged *Clarias batrachus* (30 nos/family) were stocked in earthen pond for growth studies under monoculture and polyculture with carp. Growth performance data; average body length, average body weight, body width and body depth were measured every month from monoculture and polyculture carp ponds. Growth studies data collected during one year culture period showed better growth performance of *Clarias batrachus* under monoculture compared to *Clarias batrachus* polyculture with carp. Eighty eight families of Andhra stock were attempted for breeding experiments during the reporting year. Success was obtained for 37 families and juveniles were maintained at different cement cisterns for further tagging programme.

28. 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 and Arun Sharma

Technical Associates: J. K. Prasad, P. Srinivasa Rao, Murali Mohan, V. N. Acharyulu and R.R.S. Patnaik

Biosecurity measures like bird fencing and crab fencing were taken up. Preliminary survey of commercial probiotics and bioremediators used in *L. vannamei* farming in East Godavari District, Andhra Pradesh was conducted to identify the most commonly used commercial probiotics and bio-remedators. Necessary Information was collected from shrimp farmers.



29. Isolation and characterization of pathogenic bacteria associated with *L. vannamei* farming (2015-18)

Arun Sharma, Muralidhar P. Ande, Karthireddy Syamala, Thongam Ibemcha Chanu and Damotharan K.,

Technical Associates: J. K. Prasad, P. Srinivasa Rao, Murali Mohan, V. N. Acharyulu, and R.R.S. Patnaik

Collection of *L. vannamei* from and around Amalapuram area of East Godavari District, Andhra Pradesh was done and bacteria were isolated. Pure culture was maintained and different biochemical tests were performed. Initial biochemical tests revealed presence of vibrio.

Kolkata Centre

The Team

Kolkata Centre

30. Captive maturation, breeding and culture of indigenous ornamental fish *Botia dario and Colisa lalia* (2014-17)

B. K. Mahapatra, G. H. Pailan, S. Datta, P. Sardar and S. Munilkumar

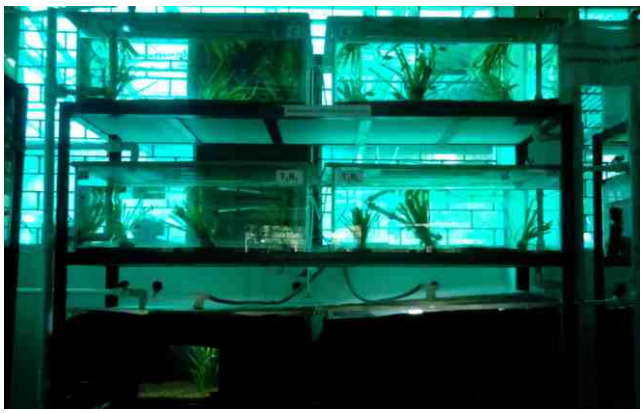
Botia dario and Colisa lalia were collected from their natural habitat from Ganga river basin of Tribeni (Hooghly), Churni river system (Ranaghat) and some from Shantipur with a size range of 3.1-8.3 cm and 1.7-4.2 cm respectively. After procuring, fishes were disinfected by giving bath treatment with 5 ppm $KMnO^4$ and were acclimated for 15 days in laboratory conditions before the experiment. Out of 1052 *C. lalia*, 170 were males and 102 were females. Among 1022 acclimatized *Botia dario,* 305 males and 117 females were segregated. *B. dario*, a bottom dweller fish and *C. lalia* (column feeder) both are omnivorous freshwater indigenous ornamental fish. Initial study showed that *C. lalia* preferred to eat zooplankton> mosquito larvae> dry feed> tubifex and in case of *B. dario*, the preference was tubifex>snail>chicken liver> dry feed>dead plankton.

Food selectivity study is being conducted with combination of artificial feed and supplementation of plankton, tubifex worms and plankton. To develop the broodstock, habitat has been planted with *Vallisneria* sp. along with river sand. Photoperiod was regulated. Effect of photoperiod and temperature on gonadal development of broodstock is also being investigated.

The water quality parameters of the natural habitat of the collected fishes have been analysed and found to be in the range of water temperature (°C) – 22-28, pH- 7.2-8.1, alkalinity (mg/L) 196-220 and hardness (mg/L) 210-230. In the captivity, it was found that water temperature 22-28°C and pH- 6.3 to 7.75 was good for survival of *B. dario.*

Starter stock of algae (*Chlorella* sp), rotifer (*Brachionus calyciflorus*), moina (*Moina micrura*) and tubifex (*Tubifex tubifex*) for indoor culture have been developed. Effect of feeding enriched tubifex and zooplankton on growth and coloration of *B. dario* has been initiated.

Collected stock of *Botia dario*



Experimental set up for effect of photoperiod and temperature on gonadal development of broodstock

31. Evaluation of flesh quality of *Pangasianodon hypophthalmus* and development of value added products (2014-17)

A. R. Sen and P. Sardar

Feeding practices of different farms were surveyed and feed samples were collected. Comparison of existing feeding pattern among various states showed that farmers of Nimpith, West Bengal were using conventional mash feed consisting of mustard oil cake and rice bran in the ratio 1:1, whereas farmers of Kakdwip, West Bengal and Kaithal andKarnal, Haryana were using commercial pelleted feed for feeding pangas. Farmers of Kakinada, Andhra Pradesh culture pangas through integrated system with poultry without using the feed from extraneous source. Feed samples were analysed for proximate composition and gross energy. Mash feed contained less crude protein (22.73%) in comparison to the commercial pellets (28.07–29.74 %). *Pangasius* were collected from several ponds in Nimpith and Kakdwip region of West Bengal as well as from farms at Andhra Pradesh and Haryana. Meat quality of fish was evaluated from different farms and markets. The headless dressing percentage in carcass of *Pangasius* collected from AP varied from 63.42 % to 68.21 %. The fillet yield was observed to be 34.95% to 36.15%. In carcass of Pangasius collected from AP, the dissected fat percentage was nil. However, the fillet yield was comparatively lesser in carcass of *Pangasius* collected from Haryana which ranged from 27.10 to 30.32%. The head on dressing percentage was significantly higher in higher weight group as compared to lower weight group. The mesenteric fat percentage ranged from 0.39 to 2.87% and was directly proportional to the body weight. The pH and WHC was significantly ($P<0.01$) higher in imported basa fillet compared to pangasius fillet collected from fish market. The cook loss percentage of imported Vietnamese basa was lower (20.06%) as compared to indigenous market sample. The Vietnamese basa fillet was superior in terms of sensory parameters and rated significantly ($P<0.05$) higher compared to fillets of Pangasius collected from Haryana, AP and west Bengal. The moisture content of basa fillet was observed to be significantly ($P<0.05$) higher and ranged from 80.23 to 82.12 % than the Pangasius collected from market. The total ash content in market sample and basa fillet ranged from 1.11 to 2.32 %. The gel strength was higher in Vietnamese basa fillet as compared to fillet prepared from indigenous fishes. Amongst the texture profiles, the hardness, gumminess and chewiness were comparatively higher in basa fillet as compared to fillet prepared from our indigenous fishes.

Powarkheda Centre

32. Development of technology for breeding, hatchery installation and rearing of riverine cat fishes viz. *Clarias batrachus, Ompok pabda and Pangasianodon hypophthalmus* (2012-15)

C.S. Chaturvedi and Somdutt

Rearing of fish stock of *Pangasianodon hypophthalmus, Ompok pabda* and *Clarias batrachus* under this project is in progress. Installation of catfish hatchery was completed. The breeding and seed rearing of magur (*C. batrachus*) was done. About 13,500 larvae were produced , out of which 7600 fry and 1200 advanced fingerlings were raised However, the breeding of pangasius (*P. hypophthalmus*) and pabda (*Ompok pabda*) could not be taken up as the breeders of these species did not attain maturity. Training program on magur breeding and hatchery management was carried out from 2-7 July, 2015.

33. Stock comparison and development of base population of *C. batrachus* for selective breeding (2012-17)

S. Jahageerdar and Sunil Kumar Nayak

Preparation of experimental pond for rearing of broodstock of *C. batrachus* was completed. Fifty seven magur brooders were procured from Kakinada (A.P.) to produce base population of *C. batrachus* at this centre. Twenty families were produced by crossing Powarkheda and Kakinada stocks. Only 10 families could survive and the larvae of these families are being further reared.

Externally Funded Research Projects

National Fisheries Development Board, Hyderabad

1. Genetic conservation and live gene pool of Mahseer fish in Indrayani river (2010-15)

Personnel : **Gopal Krishna,** S. N. Ogale, N. K. Chadha, V. K.Tiwari, Rupam Sharma and Mahesh Mahajan

Budget : Rs.139 lakh

A project on Mahseer conservation and live gene banking was under operation during the year. The project aimed at developing the breeding technology for different Mahseer species in captivity and also rearing the stock in the river cages for ranching. The fingerlings were reared for a period of four to six month in river, cages and later released in the Indrayani river.

This was the first ever attempt to rear the fishes in cages in river of western Maharashtra for rehabilitation purpose. This was a successful attempt for rehabilitation and conservation. Under the project more than 50 thousand advance fingerlings were stocked in the river stretch. The participants of the final workshop, organized during August 2015 had witnessed the stock in the river. During the workshop it was documented that such consistent efforts will help in rejuvenation of the depleted Mahseer in various water bodies. It was also resolved that A Mahseer conservation society may be formed to take up the work on regular basis with the objective of conservation and with institutional support.

2. Fisheries enhancement in Maharashtra (District Thane) through seed production and pen culture in rivers Vaitarana and Bhatsa for livelihoods and nutritional security among the tribal community (2015-18)

Personnel: **Neelam Saharan,** A.K. Reddy, Chandra Prakash, A.K. Verma and M. H. Chandrakant

Budget: 130.19 lakhs

Project Launching cum awareness program was done at Gaydhara village. Site selection for hatchery and Pen installation was carried out. One pen has been installed at Ajnup village. Proposal on hatchery installation is being worked out. Stocking of pen was done with 40,000 frys of common carp.

3. National surveillance programme for aquatic animal diseases (2013-18)

Personnel: **Pani Prasad** and Gaurav Rathore

Budget: 149.70 lakhs

Four districts from Maharashtra and Gujarat were selected for sampling. Two species; *Litopenaeus vannamei* and *Penaeus monodon* were collected from the selected sites. Samples were collected from 25 farms (14 from Maharashtra and 11 from Gujarat). Total 540 PLs and 150 adults were collected from Maharashtra and 480 PL and 90 adults from Gujarat. Screening was done for all pathogens

using PCR as diagnostic tool. Samples were collected for detection of EHP. Results were as follows: IHHNV was detected in Thane, Maharashtra; MBV found in Valsad and Navsari; WSSV was found in Navsari and Raigad and EHP detected from Saffale, Maharashtra.

Board of Research in Nuclear Science, New Delhi

4. Studies on present status of marine radioecology and biodiversity at Tarapur coastal sites (2011-16)

Personnel: **Chandra Prakash** and Paramita Banerjee Sawant

Budget: 170 lakhs

Occurrence of corals at Varor (8km) and spotting of dolphin within 1km of TAPS 3 & 4 DP area during offshore survey were important observations during study period, which are indicative of non-polluted nature of the sampling area. Total 47 species of phytoplankton with dominant genera of *Navicula, Coscinodiscus, Pleurosigma, Thalassiosira, Melosira, Pseudo-nitzchia, Trichodesmium and Biddulphia* were identified, recorded and documented.

About 22 groups of zooplankton with a dominance of copepods, decapod larvae, chaetognaths and polychaetes were recorded and documented. Macrobenthos, comprising 71 species belonging to 31 groups were recorded, with dominance of polychaetes, amphipods, gastropods and isopods. A total of 39 species of polychaetes, 49 species of gastropods, 24 species of fish and 17 species of macroalgae were identified, recorded and documented. Radioisotopes like ^{214}Bi, ^{228}Ac, ^{40}K, and ^{137}Cs were analysed and calculated in Bq/kg at ESL, Tarapur using HPGe Gamma counter. In case of ^{90}Sr in sea water samples, it was below detectable level. The ^{137}Cs in seawater was 1.24 - 19.91 mBq/l, which is within the permissible limit. Sediments showed ^{214}Bi - 2.28-37.79 Bq/Kg dry, ^{137}Cs <0.5-72.8 Bq/Kg dry, ^{228}Ac 8.04-85.65 Bq/Kg dry and ^{40}K 11.53-929.34 Bq/Kg dry which is within permissible limit.

5. Studies on marine radioecology and biodiversity around nuclear power plot sites of Jaitapur (2011-16)

Personnel: **S.K. Chakraborty** and A.K. Jaiswar

Budget: 77.35 lakhs

Samples from intertidal and offshore locations were collected quarterly from Ratnagiri to Sindhudurg district as mentioned in the protocol. Plankton (Phytoplankton and Zooplankton) samples were collected seasonally from 2012 to 2014 and analysed. A total of 86 species of phytoplankton and 23 genera of zooplankton were recorded. Some of dominant genera observed in phytoplankton were *Skeletonema costatum, Nitzschia* spp., *Chaetoceros* spp., *Thalassionema* spp., *Alexandrium* spp., *Dinophysis* spp. and *Trichodesmium* spp. The macro benthic samples were collected from rocky and sandy shores each of 7 intertidal locations and 9 offshore locations. Totally 64 species were recorded which included Porifera, Molluscs, Crustaceans, Annelids, Echinoderms, Urochordates and Chordates. A total of 51 species of fin fishes and 29 species of shell fishes were collected and identified during the study period in and around Jaitapur NPP site. Sediment and biological samples were collected around proposed NPP sites of Jaitapur coastline from Ganeshgule

(NSW30Kms to Deogad (SSW30Kms) for Radio-chemical Analysis during 2012-2014. Total 109 sediment and 36 biological samples (finfish and shell fish) were collected and pre-processed and natural and global fallout radionuclides were analysed using Gamma spectrometry.Radioisotopes like ^{238}U, ^{226}Ra, ^{228}Ra, ^{228Th}, ^{40}K and ^{137}Cs were analysed at BARC Hospital, Mumbai using HPGe Gamma counter. Some of the natural radioisotopes were found from sediment as well as biological samples and activities were calculated in Bq/kg. Biological samples having Cs-137 ranged between <1.9 -7.83 Bq/Kg and K-40 ranged between <8-58.7 Bq/Kg and Cs-137 in offshore sediment samples showed radioactivity range from 3.4 to 6.7 Bq/kg.

6. Studies on present status of marine radioecology and biodiversity at Kalpakkam coastal site (2011-16)

Personnel: **A.K. Pal** (till 31 May 2015), S. Munilkumar, S. Rajaram and S. Sreedevi

Budget: 208.35 Lakhs

Diversity studies of benthos, crustacean, mollusk and fishes were conducted and diversity index ranged between 1.221-1.357, 2.005- 2.007, 1.76- 2.10, 3.21- 3.252 respectively in post monsoon samples and 1.513-1.533, 1.745-1.783, 1.89-2.09, 3.52-3.63 respectively in pre monsoon samples. Polychaets represented 50% of the total benthos with greater diversity compared to the remaining groups. They were represented by 21 species belonging to 16 genera and 10 families. The dominant polychetas encountered during this study were *Scolelepis squamata, Pseudoneries* sp., *Lumbrineris* sp., *Polydora ciliata* and *Prionospio pinnata.*

A total of 18 species of crustaceans were reported under 2 orders, 8 families and 10 genera, the family Portunidae dominated with 7 species and Penaeidae with 4 species, family Scyllaridae with 2 species, and families Calappidae, Epialtidae, Gecarcinidae, Dorippidae, Matutidae were represented with single species.

A total of 86 species of molluscs were reported under 3 classes, 15 order, 48 families and 64 genera. Class Gastropoda with 58 species of 31 families and the maximum number of families were observed in neogastropoda (18 families and 38 species), while class bivalves recorded 21 species includes 8 order, 13 families and maximum number of families were recorded Veneroidea (5 families and 9 species) and 7 species of class cephalopoda included 4 order, 4 families the maximum number of 4 species being recorded in Sepiidae family.

During premonsoon season, *Leiognathidae* was the dominant family having six different species such as *Leiognathus equulus, Leiognathus daura, Leiognathus dussumieri, Leiognathus splenders, Secutor ruconius* and *Secutor insidiator*. This was followed by Mullidae family having three different species, *Upeneus sulphureus, Upeneus moluccensis* and *Upeneus sandalias.*

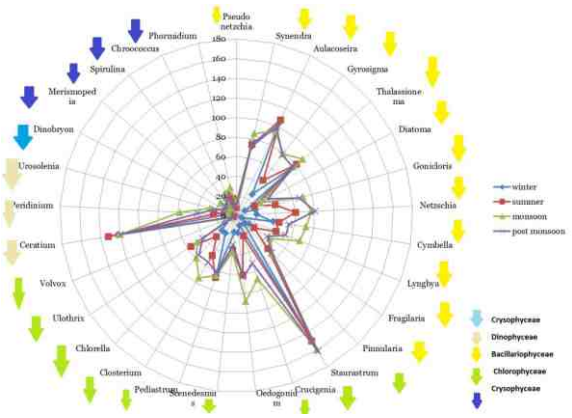
During postmonsoon season, Carangidae family was observed with 7 of species such as Alectis ciliaris, Caranx para, Caranx sp., *Selar crumenophthalmus, Atule mate, Carangoides chrysophrys* and *Megalaspis cordyla*. This was followed by family Engraulidae having four species, *Stolephous indicus, Stolephous commersonii, Thryssa mystax* and *Thryssa malabaric*a.

7. Base line riverine radioecology and biodiversity studies around the proposed NPP site at Jabalpur, Madhya Pradesh (2011- 16)

Personnel: **S. Dasgupta**, S.P. Shukla, P.M. Ravi and Manish K. Mishra

Budget: 202 lakhs

Concentration of natural radionuclides, such as lead, actinium and potassium in sediments, flora and fauna showed tempo-spatial variation. Lead Pb^{212} content of muscle of rohu, column feeder, was significantly higher than that of bottom dweller catfishes. Similar variation was observed in different aquatic macrophytes. Potassium K^{40} concentration was markedly higher in plants than fish muscle. Individual radionuclide exhibited spatial



variation in sediment samples. Sediment samples of Chutka showed higher concentration than that of other samples.

Generic distribution of phytoplankton in Narmada basin around NPP site at Chutka.

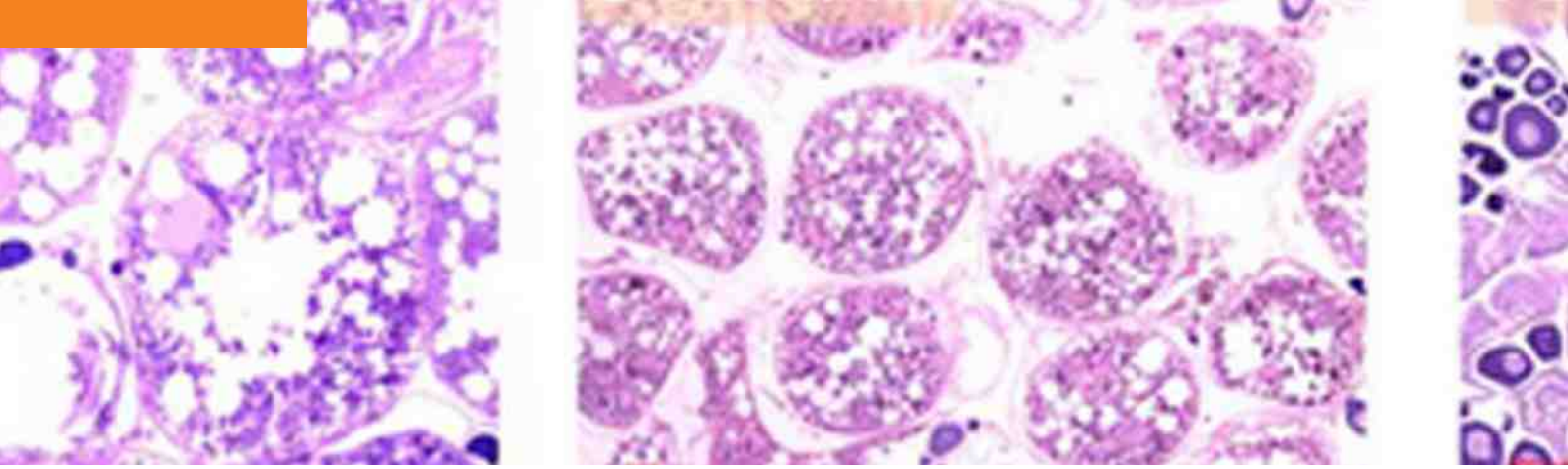
8. Optimum utilization of locally available plant-based ingredients for aqua feed through electron beam irradiation (2012- 15)

Personnel: **Parimal Sardar**, G.H. Pailan and S. Ganesh

Budget: 18.035 Lakhs

A feeding trial of 45 days was conducted to assess optimum utilization of electron beam irradiated (25 kGy) *Jatropha curcas* kernel meal (IJKM) in the diet of *Pangasionodon hypophthalmus*. Six isonitrogenous (34% CP) and isoenergetic (400 kcal/100 g) diets were prepared with inclusion of 0% (T0P), 5% (T5P), 10% (T10P), 15% (T15P), 20% (T20P) and 25% (T25P) of IJKM by replacing fish meal and soybean meal. During the last 15 days of experiment, 0.5% chromic oxide was mixed external marker in all the experimental diets for the digestibility study. Three hundred and sixty acclimatized pangas fingerlings (weight range from 7.21-7.27 g) were randomly distributed in six treatment groups in triplicates each comprising 20 fishes per tank and fed with respective experimental diets to satiation level twice a day (once in the morning and another in the evening) throughout the experimental period.

Digestibility of dry matter, crude protein, ether extract and energy did not differ between the pangas of T0P and T5P, but fish of T10P, T15P, T20P and T25P groups exhibited lower digestibility. Significantly lower weight gain, SGR, PER, ANPU, HSI, ISI and survival rate and increased FCR were observed in fish fed diet containing more than 5% IJKM in the experimental diet of pangas. Serum ALT, AST and glucose levels increased, whereas serum total protein, albumin, globulin and A:G ratio decreased at higher inclusion level of IJKM in the diet. It was observed that Hb, PCV, TEC decreased but TLC increased in fish fed diet with higher inclusion level of IJKM. Higher inclusion level of IJKM in the diet decreased liver catalase and SOD activity in fish. The respiratory burst activity (NBT reduction) of



neutrophils decreased with the increasing inclusion level of IJKM in the diet. Thus, pangas fingerlings can tolerate IJKM up to 5% that may be due to reduction of PE in the diet through irradiation.

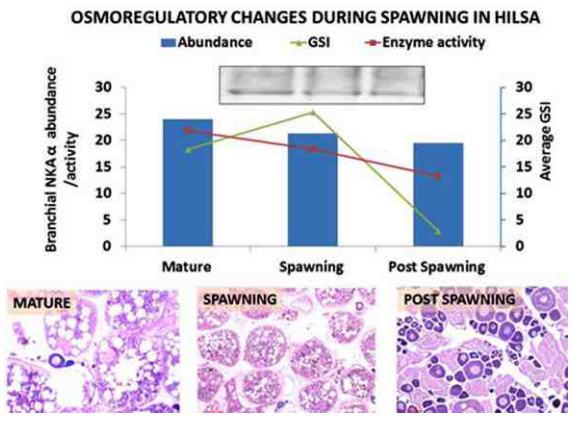
National Agricultural Science Fund, New Delhi

9. Stock characterization, captive breeding, seed production and culture of Hilsa, (*Tenualosa ilisha*) (2012-17)

Personnel: **S. Dasgupta** and G.H.Pailan

Budget: 139.83 lakhs

Changes in osmoregulatory parameters during final maturation and spawning are elucidated in migratory hilsa in Hooghly-Bhagirathi river system. Plasma concentration of Na, K, Cl increased marginally during ovulation at stage VI, thereafter sharply decreased after spawning and remained similar to post-spawning phases. Analysis of branchial NKA protein abundance and enzyme activity clearly revealed down-regulation after spawning of female hilsa. Abundance of NKCC protein showed similar fashion like NKA. In female hilsa plasma concentration of DHP remained low during January and late June to July and increased rapidly with the onset of spawning, reached its maximum during March & May and September & October, which coincided with the spawning phase. Whereas in male hilsa plasma 11KT remained at low levels during immature stages (January and June to early July) thereafter, the value increased gradually with progress of development in late January to early February and July and remained at high levels during spermatogenesis period. Plasma T4 level sharply increased at stage IV and remained similar till maturation, i.e. stage V thereafter, further increased at stage VI when ovulation and spawning occurred. The level was markedly decreased at basal level after spawning took place. Plasma T3 level exhibited similar fashion with the progress of maturation and spawning. Preliminary observation revealed that plasma cortisol level in migrating hilsaranged between 10ng/ml and 200 ng/ml. The plasma cortisol level was lower in marine water compared to that of freshwater.



Osmoregulatory changes during spawning in hilsa.

National Fund for Basic, Strategic and Frontier Application Research in Agriculture, New Delhi

10. Defence genes of tiger shrimp (*Penaeus monodon*) with respect to bacteria (*Vibrio harveyi*) and white spot virus (WSSV) infection (2012-16)

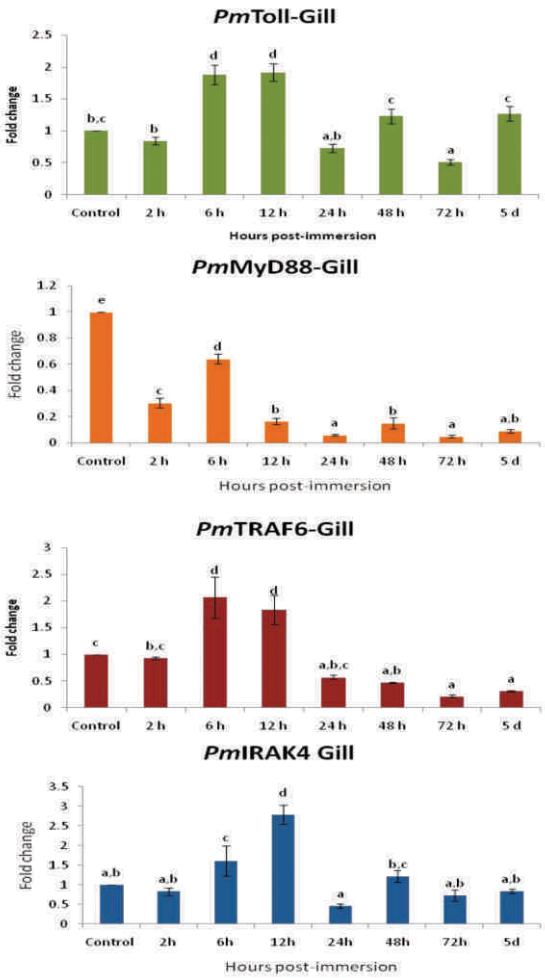
Personnel: **K.V. Rajendran**

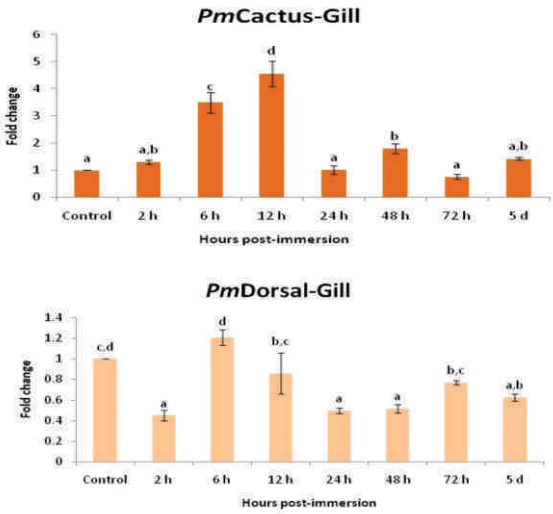
Budget: 71.45 lakhs

Full-length sequences of Toll-receptor ligand, Spatzle, and partial sequences of Cactus (mammalian I&B homologue) and Dorsal (mammalian NF-kB homologue) were generated. Normal expression of these genes and PmRelish, a gene in the IMD pathway, in different tissues as well as in different life

stages, was investigated. Further, responses of these genes to acute infection in juveniles and chronic infection in juveniles and post-larvae with WSSV were studied, besides investigating the *in vitro* response in haemocyte culture. Responses of PmToll, PmMyD88, PmIRAK-4, PmTRAF6, PmCactus, PmDorsal and PmRelish were also investigated in juveniles (immersion and injection) and post-larvae (immersion) against *Vibrio harveyi* infection. Experiment was also carried out to understand the responses of these genes to dual infection with WSSV and *Vibrio harveyi*.

The experimental results showed that Toll-pathway and IMD pathway in shrimp respond to *Vibrio* infection.





Response of immune genes involved in the Toll-pathway in juvenile shrimp subsequent to immersion challenge with *Vibrio harveyi*.

11. Capture and removal of ammonia from fish processing waste water by using archaea (2011-16)

Personnel: **B B. Nayak** and L. Manjusha

Budget: 238.4 lakhs

Three isolates viz. *Lysini bacillus* sp. HT13, Alcaligenes sp. HT15 and Proteus sp. HT37 isolated from fish processing effluent and having a C/N ratio of 2, removed 218, 169 and 400 µg cell/day/$NH4^+$ -N, respectively without subsequent buildup of nitrite or nitrate. Further, when supplemented to fish processing wastewater containing 234 ppm total Kjeldahl's nitrogen, *Lysini bacillus* sp., *Alcaligenes* sp. and *Proteus* sp. could remediate 95.74, 86.17 and 76.6% nitrogen, respectively in 48 h. This is the first report of a *Lysini bacillus* sp. carrying out aerobically the process of simultaneous nitrification and denitrification. The results demonstrate the

potential of the isolates for use in treatment of fish processing effluents and efficient removal of ammonia. A consortium of these three bacteria were grown as biofilm on MBBR carriers, which exhibited better remediation of ammonia (200–600ppm and 50mM) than the individual isolates. The mixed biofilm set on the carriers was used for nitrogenous waste removal from fish processing wastewater in 2 and 20 L set-ups. The total nitrogen estimated by elemental analysis showed complete remediation from 250 ppm in both 2 and 20L waste water systems within 48 h. The usual toxic nitrogenous components ammonia, nitrite and nitrate were also remediated efficiently. A new method for isolation of slow growing ammonia oxidizing archaea and bacteria was developed from activated sludge using 'Plate-under-plate' method. The usual hurdles faced with the isolation of slow growing microorganisms on solid media are buildup of toxins and drying up of agar. These hurdles were overcome by devising a method for continuous exchange of nutrients between the main isolation agar plate and a replenishing broth outside, and this broth can be changed aseptically, periodically, thereby reducing the effect of toxins besides preventing the agar plate from drying. Using this method, three cultures were isolated from an activated sludge sample collected from a Ratnagiri waste water treatment plant on10th day of inoculation in a 1mM ammonia media. The isolates were positive for archaeal and bacterial 16S and later identified as *Pseudomonas* sp., *Pigmenti phagadaeguensis* sp. nov., and *Lysini bacillus fusiformis*. The isolation and identification of *P. phagadaeguensis* is going to be the first report from the source of fish processing effluents.

ICAR-All India Network Project, New Delhi

12. All India Network Project on Fish Health (2015-19)

Personnel: **K. Paniprasad**

Budget: 40.0 lakhs

Farm survey was done in selected states and information on drugs, probiotics and antibiotics used in aquaculture was collected. About 29,7,10,3 and 6 farms from Maharashtra, Goa, Andhra Pradesh, Punjab and Haryana respectively were selected for collection of baseline information. Preliminary work on antibiotic residues was initiated.

Department of Biotechnology, New Delhi

13. Improvement of safety and quality of transglutaminase mediated restructured fish products by bioactive phenolics and terpenoids (2012-16)

Personnel: **A. K. Balange,** Martin Xavier and K. Nagalakshmi

Budget: 58.47 lakhs

Textural properties of pink perch mince sausages were improved with inclusion of 1% microbial transglutaminase (MTGase) and 0.5% tannic acid (TA) which can be stored up to 12 days at refrigerated temperature. Pangasius mince emulsion sausages were successfully prepared to provide an alternative for pangasius fish utilization and to reduce the post-harvest losses. Results showed that the product was acceptable up to 240 days stored at -18^{0} C. Other products developed were fish chocolate, fish kebabs, fish cube and salt fermented anchovy.

14. Utilization of detoxified rubber seed cake in aqua feed (2014-17)

Personnel: **N. P. Sahu** and A.K. Pal

Budget: 19.92 lakhs

Preparation of rubber protein isolate: The protein isolate prepared from rubber seed was found to have 90.8% crude protein. The dry matter recovery was 17%. It was observed that the protein isolate prepared had lower amount of anti-nutritional factors, tannin and phytate, respectively as compared to the rubber seed cake. The tannin and phytate contents were reduced to almost 94 and 50% in the protein isolates prepared from rubber seed cake.

Evaluation of the toxicity of rubber seed as feed: After the sixty-day feed trial was conducted, the surviving fish were counted in the experimental tanks and the percentage survival was calculated for each experimental group. A sixty-day feed trial was conducted in order to evaluate the toxicity of rubber seed cake as feed ingredient in aqua feeds. One hundred and twenty *Cyprinus carpio* fingerlings of average weight 8.1 to 8.3 g were randomly distributed in four experimental groups each having three replicates. Three different inclusion levels of rubber seed meal (10%, 20% and 30%) were given to three experimental groups; T1, T2 and T3 respectively besides a control group, C which was fed 0% rubber seed meal. It was found that control group in which the fish were fed no rubber seed meal exhibited 100% survival. The other treatment groups showed decrease in the survival with increasing inclusion of rubber seed meal.

15. Three months national training in molecular biology and biotechnology for fisheries professionals (2015-18)

Personnel: **Aparna Chaudhari** and Gireesh Babu P.

Budget: 66.29 Lakhs

The first two batches of DBT sponsored three months National Training in Molecular Biology and Biotechnology for Fisheries Professionals' were organised during 15th May 2015 to 14thAugust 2015 and 2nd Nov 2015 to 31st Jan 2016. This is a unique program meant to promote the application of molecular tools to fisheries and aquaculture research. The program comprises course work of 45 days followed by a short project for each participant under the supervision of a faculty member. Resource persons included over 30 CIFE faculty members and guest faculty from NIO, NBFGR and CIBA. Seven participants from various SAUs and ICAR institutes were awarded certificates on successful completion.

16. Development of nanodelivery system of DNA based RNAi vaccine against WSSV in tiger shrimp, *Penaeus monodon* (2012-15)

Personnel: **Rupam Sharma**, Aparna Chaudhari and Gireesh Babu P.

Budget: 67.11 lakhs

WSSV DNA vaccine developed at FGB Division of this institute was nano-delivered using chitosan, PLGA, sodium- alginate, PGA and calcium phosphate nanoparticles. *P. monodon* juveniles vaccinated by dip treatment were challenged with WSSV and best survival was obtained with chitosan conjugated vaccine. Histological examination of selected tissues revealed no toxicity. The persistence of the vaccine was recorded till 40th day of the experiment.

17. Development of optical fibre based bacterial biosensors for heavy metal pollution(2013-16)

Personnel: **Aparna Chaudhari,** Ramkrishna Sen, Partha Roy Chaudhuri and Gireesh Babu

Budget: 44.08 lakhs

Bacterial biosensors responsive to toxic levels of Hg, Pb and Zn have been engineered at FGB Division. During this period, the Hg biosensor cassette was integrated into the *E. coli* genome to increase its stability. The minimum induction time of the biosensors was optimized at 3h for field use. The response of biosensors towards natural water samples polluted with heavy metals was studied. At the collaborator's lab, immobilization of the biosensors was tested using three agents, namely polyethylenimine, cellulose and pHEMA, where pHEMA showed higher survival of the biosensors for 16 days.

ICAR-CRP on Vaccines and Diagnostics, New Delhi

18. Development of bivalent vaccine for protection of *Labeo rohita* to bacterial pathogens *Flavobacterium columnare* and *Edwardsiella tarda* (2015-17)

Personnel: **Gaurav Rathore**, Kundan Kumar and Saurav Kumar

Budget: 32.50 lakhs

Two isolates of *E. tarda* and one isolate of *F. columnare* are being characterized by biochemical and molecular methods for identification. Trials on evaluation of pathogenicity of *F. columnare* have been conducted. Selection of bacterial strains, pathogenicity testing and their molecular validation was done. Out of 8 presumptive isolates, only one isolate could be confirmed as *F. columnare* using species specific PCR and the isolate of *F. columnare* belonged to genomovar II on the basis of 16s-rRNA PCR RFLP. Virulence test was performed and 66.66% cumulative mortality was observed on 7 days when bacterium inoculated $1.2X10^8$ cfu/ml.

ICAR-CRP on Nanotechnology, New Delhi

19. Development of nano sized delivery systems for nutraceuticals in aqua-feed (2015-17)

Personnel: **Subodh Gupta**

Budget: 45.0 lakhs

The nano-encapsulated trypsin with chitosan bio-potentiates its activity over bared form and protects delicate epithelial mucous of GI tract in *Labeo rohita*. A forty-five day feeding trial was conducted to study the effects of nano-encapsulated trypsin over bared form on plant protein digestion. The experimental animal fed with graded level of plant based protein with chitosan nano-encapsulated trypsin as well as bare trypsin against the control to find out growth parameters and protein utilization.

The nanoparticle of two methyl donors (methionine and lecithin) as nutraceuticals was prepared and characterized in order to compare the stress mitigating effect of these methyl donors in its bare methionine and lecithin against its nano form. Methionine encapsulated chitosan nanoparticle with methionine concentration of 30 mg/ml found to have loading efficiency of 87.22±1.86%

hadparticle size of 237±3.3 nm. Lecithin nanoparticles (lecithin in water emulsion) with particle size of 218.9±0.62nm were obtained.

20. Fish gelatin based nano-composite film for food packaging (2015-18)

Personnel: **B.B.Nayak** and K. Nagalakshmi

Budget: 15.0 lakhs

Among several species examined for the quality of gelatin, the croackers were selected for gelatin source because of their regular availability and relatively good gel strength. The gelatin was extracted from the skins of croackers by using methods of Koli et al (2011). The gelatin embedded with colloidal chitin was also tested for film making with the help of plasticizers. Chitinolyitic bacteria were isolated from the soils of pre-processing area. These bacteria were used for degradation of chitin polymer to smaller molecules and could be used as embedding material for the composite.

Department of Science & Technology, New Delhi

21. Development of functional fish sausage for promoting entrepreneurship (2016-18)

Personnel: **A. R. Sen,** P. Sardar, S. Datta and B.K. Mahapatra

Budget: 43.30 lakhs

An initial survey was conducted at three supermarkets in and around Kolkata. Among the ready-to-cook products, tilapia fish fillet and Basa (Vietnamese) fish fillets were more prevalent. Ready-to-eat products like fish finger, fish popcorn, prawn pops, prawn sticks, prawn torpedoes, prawn spring rolls, etc. were found in the supermarket, among which fish finger was more prevalent. However, no emulsion based fish product was found throughout the State.

22. Conservation of Indian mega fish: molecular taxonomy and phylogeography of mahseer fishes of India (2015-18)

Personnel: **Pavan Kumar**

Budget: 25.86 lakhs

Tor khudree, Tor tor and Tor mahanadicus samples were collected from their respective type locations. Morphometric and meristic characters were measured for all the collected samples. Complete mitochondrial genome of *Tor tor* was sequenced by NGS technology. Two distinct lineages of *Tor tor* were observed after reconstructing phylogeny tree with reported *Tor tor* sequences.

Mumbai Metropolitan Region - Environment Improvement Society, Mumbai

23. Developing an aquaponics and spirulina eco-park to demonstrate sustainable models of urban aquaculture and agriculture (2013- 15)

Personnel: **A.K. Verma**

Budget: 25.0 lakhs

Aquaponics unit was established at ICAR-Central Institute of Fisheries Education, New Campus, Mumbai. Three cemented tanks of 5000 litre capacity and an FRP tank of 5000 litre capacity were used for fish and bio filter respectively. Techniques of aquaponics; media filled bed, floating raft, nutrient film technics, and vertical tower techniques were used to grow the plants. The plants like Tomato, Chilly, Ladies finger, Brinjal, Spinach, Capsicum etc. were successfully grown in aquaponic system.

Total 1000 fishes (Tilapia) were stocked in May 2015. The initial average weight of the fishes was 24.5 gm. The average weight of fish was 200.0 gm after six months. The quality of water was analysed and it was found that the all parameters were within the permissible limit.

Ministry of Food Processing Industries, New Delhi

24. Biochemical composition of Bombay duck and the functional properties of its proteins (2014-17)

Personnel: **B. B. Nayak** and K. Balange

Budget: 21.60 lakhs

To study the biochemical composition of Bombay duck and its seasonal variations, the fish was analyzed during post-monsoon and

pre-monsoon periods for total moisture, crude protein, lipid and ash content. The components were analyzed for different body parts to check the variation along the body of fish. The fishes were also analyzed with respect to different length-class and maturity stages during this period. The total length and weight of fish samples ranged from 158 mm to 320 mm and 19.53 g to 281 g respectively during the sampling period from April 2015 to March 2016. Bombay duck attains a total length of 165 mm in the first year, 263.75 mm in the second year and 330 mm in the third year. It was observed that gonads with indeterminate stage were found not only in fishes of lower sizes but also in fishes of bigger sizes which showed that the fishes might be either in their second or subsequent spawning stage. The presence of gonadal maturity stages from I to VI in females, scattered across the sampling period reiterates that the Bombay duck is a continuous breeder. Though month wise variations were observed in proximate composition of the fish samples, it did not follow any specific pattern. This may be attributed to the narrow sampling period due to confined availability and non-homogenous sampling consisting of fishes of different length-class and maturity stages. The average moisture, protein, lipid and ash were in the range of 88.08-90.91%, 7.92-9.18%, 0.48-1.98% and 0.31-0.62% respectively.

Rajiv Gandhi Council for Science and Technology, Mumbai

25. Pilot scale demonstration of value added products from surimi (2014-17)

Personnel: **A. K. Balange** and Martin Xavier

Budget: 44.74 lakhs

Six training programmes on the "Preparation of value added products from surimi" were conducted for the fisher folks of Versova, Mumbai; Palghar district; Vashi, Panvel, Raigad district and Thane district. Total 204 trainees benefited from the training where the trainees were given demonstration on various fish products preparation i.e. prawn pickle, fish pickle, fish wada, fish chukly, fish shev, fish papad, fish cutlet etc.

26. Acelerated salt fermentation of Indian mackerel using fermentation microflora (2013-16)

Personnel: **B.B.Nayak** and L. Manjusha
Budget: 37.0 lakhs

The storage study of accelerated salt fermented Indian mackerel was carried out. Ordinarily, the product becomes over-mature and a sweet smell develops. However, in order to stop over maturation, the matured products were exposed to irradiation doses of 1-5KGy and the product quality was tested at monthly interval. The best result was obtained at exposure of 5KGy dose. Subsequent experiment was done at 5KGy dose and the product was found to be stable beyond 6 months of storage. The product has been evaluated in the markets of NE India at Agartala, Assam and Manipur with very good acceptability.

Extramural Research, ICAR-Education Division, New Delhi

27. Supply demand analysis of professional fisheries human capital in India (2016-17)

Personnel : **P.S. Ananthan,** Ramasubramanian V. and Krishnan M.

Budget : 21.5 lakhs

A comprehensive literature review was done on fisheries education in India and on the different methodologies available for supply and demand analysis of manpower in different sectors in India and abroad. Interview schedules were prepared targeting four major types of stakeholders namely Employers/Industry, Students, Alumni, Employees & teachers/scientists for forecasting supply and demand of fisheries professionals in India and broad. Methodology for manpower modeling and forecasting was finalized.They are being tested/validated before conducting the survey.

National Centre for Sustainable Coastal Management, Chennai

28. Assessment of extent of community dependence on coastal

ecologically sensitive areas (ESAs) in Achra-Ratnagiri, Maharashtra (2015-16)

Personnel: **Ananthan, P.S**. and Ramasubramanian V.

Budget: 13.15 lakhs

A framework for community based resource management of Critically Vulnerable Coastal Areas (CVCAs) in Achra-Ratnagiri regions of Maharashtra was formulated aiding conservation and sustainable use of ecologically sensitive areas (ESAs). For this, the community managed coastal areas were demarcated based on comprehensive assessment of dependence recognising the importance of both community and government roles by means of interview schedules filled-in by enumerators recruited for the purpose by eliciting information from the members residing in and around the vicinity of these areas. Information on natural resources available/ harvested/ perceived most important for livelihood/ time taken to reach/ time spent to harvest, process and market by the community, details of products harvested and money earned, monthly income on resource dependent jobs, duration of dependence, relative importance, direct and indirect benefits of resources, perception of household on natural resources in terms of various aforementioned items and also on environment protection and responsibility to manage resources, on rules and regulations etc. were collected on representing various indicators organized into two broad indices viz., resource dependency and governance ability of the community. The information obtained was directly fed in the entry forms of computer tablets specially designed for this purpose at the collection stage itself ensuring real time and place (geo-coordinates) identifications including media files. Thereafter the consistency of filled-in data was tested using Cronbach alpha measure before proceeding for further analysis. Thus the resource areas were assigned grades based on both dependence and governance indices. Finally, the CVCA threshold for a given resource area was arrived at by plotting these two indices against each other in the form of a decision matrix which can aid planning location-specific interventions. The outcome of this study will help in not only conserving natural resources but also in implementation of conservation management plans involving the community including the fisherfolk and also enable policy measures cum legislation enactments by Government.

Consultancy Project

Nuclear Power Corporation of India Ltd., Mumbai

29. Preliminary assessment of the temperature tolerance limits of selected fishes and shellfishes of Jaitapur coast around NPP site (2013-15)

Personnel: **W.S. Lakra,** A.K. Pal, S. Dasgupta, V.P. Joshi, R.S. Dalvi and D.I. Pathan

Budget: 32.75 lakh

The temperature tolerance of various marine poikilotherms including 10 fish fishes, 4 crustaceans (crabs and shrimps), 4 molluscs (bivalves and snails), and 1 echinoderm (sea cucumber) was determined. The CT_{Max} values of the fin fishes was lowest in Oil sardine (37.1 ± 0.5°C) and highest in tail eye gobi (*P. polynema*) (44.1 ± 0.1°C). The CT_{Max} for other fin fishes was in the range of 38.6 ± 0.3 (*Siganus javus*) to 42.3 ± 0.5 (*Mugil cephalus*). The reason for such drastic variation could be attributed to the vast differences in the habitats of these two species - the oil sardine being near shore pelagic and the gobies being shallow water benthic or intertidal. The CT_{Max} for crustaceans was in the range of 45.1± 0.5 in crab (*Metopograpsus* sp.) to 41.9 ± 0.6 in shrimp (*Fenneropenaeus merguiensis*). The CT Max values for gastropod molluscs was in the range of 42.7± 0.3 (*Telescopium telescopium*) to 39.6 ± 0.4 (*Nassarius olivaceus*).

Since temperature tolerance limits greatly vary depending on the animal's thermal history, investigations were conducted on the temperature tolerance at different acclimation temperature in selected species which were available in sufficient numbers including perch (*Terapon jarbua*), mud crab (*Scylla serrata*), fiddler crabs (*Uca dussumieri*), banana shrimp (*F. merguiensis*), olivaceous nassa (*N. olivaceus*), and horn snail, (*T. telescopium*).

Chapter

6 Extension Achievements

Training Programmes

CIFE, Mumbai (Headquarters)

Title	Date	No. of Participants
Attachment training for newly recruited ARS probationers	09 Apr-12 Jun, 2015	05
Fish seed production and hatchery management (state fisheries officers of Govt., of Chhattisgarh)	18-22 Jun, 2015	26
Value addition of fish products (Ganeshpuri, Navi Mumbai)	27 Aug, 2015	45
Techniques in aquatic animal health	7-12 Sep, 2015	20
Breeding and culture of ornamental fishes	28 Sep-4 Oct, 2015	20
Prawn hatchery management	12-17 Oct, 2015	25
Orientation programme for newly recruited ARS probationers	12 Oct-11 Nov, 2015	02
Value addition of fish products	03 Dec, 2015	11
Application of molecular markers in fisheries	30 Nov -5 Dec, 2015	06
Value addition of fish products (Panvel, Raigad)	16 Dec, 2015	20
Value addition of fish products (Raha, Nagon, Assam)	28-29 Jan, 2016	21
Value addition of fish products	01-02 Feb, 2016	19
Aquaculture in new and underutilized water bodies	28 Jan- 4 Feb, 2016	22
Value addition of fish products (Kohima, Nagaland)	04-05 Feb, 2016	18
Ornamental fish culture in cages and live feed culture	08-10 Mar, 2016	31
Water and soil testing for fisheries and aquaculture	08-10 Mar, 2016	28
Value addition of fish products (Datiiware, Palghar)	16 Mar, 2016	58
Value addition of fish products (Palghar)	17 Mar, 2016	38
Value addition of fish products (Thane)	Mar, 2016	36
Total		410

CIFE Kakinada Centre, Kakinada

Title	Date	No. of Participants
Fish and prawn culture (Bihar Farmers from Bhagalpur Dist)	06-15 Apr, 2015	29
Fish and prawn culture (Fish farmers from Department of Fisheries Haryana)	16-18 Apr, 2015	50
Fish and prawn culture (Bihar Farmers, Banka Dist.)	07-16 May, 2015	29
Fish and prawn culture (Bihar Farmers, Supaul Dist.)	03-12 Jun, 2015	29
Fish and prawn culture (Bihar Farmers, Samastipur Dist.)	01-10 Jul, 2015	30
Fish and prawn culture (Bihar Farmers, Begusarai Dist.)	21-30 Jul, 2015	30
Seed production and culture of Magur	03-14 Aug, 2015	09
Fish and prawn culture (Bihar Farmers, Darbhanga Dist.)	18-27 Aug, 2015	19
In-Plant training programme (students from College of Fisheries, AAU Raha, Assam)	01 Aug-27 Sep, 2015	18
Culture of alternative species in brackishwater aquaculture	01-09 Oct, 2015	18
Freshwater culture practices	12-17 Oct, 2015	18
Culture of brackishwater finfish and shellfish	14-20 Oct, 2015	11
Fish and prawn culture (Bihar Farmers, Purnia Dist.)	23 Nov-2 Dec, 2015	30
Fish and prawn culture f(Bihar Farmers, Nalanda Dist.)	04-13 Dec, 2015	30
Training programme on Fish culture and management practices (Telangana fish farmers)	14-17 Dec, 2015	26
Training programme on Fish culture and management practices (Telangana fish farmers	19-22 Dec, 2015	22
Fish and prawn culture for Bihar Farmers, (Kathihar Dist.)	15-24 Dec, 2015	30
Training programme on Fish culture and management practices (Telangana fish farmers)	28-31 Dec, 2015	25
Training programme on fish culture and management practices (Telangana fish farmers)	04-07 Jan, 2016	26
Disease diagnosis and control measures in aquaculture	02-08 Jan, 2016	07
Fish culture and management practices (Telangana fish farmers)	09-12 Jan, 2016	25
Fish culture and management practices (Telangana fish farmers)	19-22 Jan, 2016	20
Fish culture and management practices (Telangana fish farmers)	27-30 Jan, 2016	25
Fish culture and management practices (Telangana fish farmers)	02-05 Feb, 2016	24

Fish culture and management practices (Telangana fish farmers)	09-12 Feb, 2016	25
Exposure cum short-term training programme on Fish culture (Haryana)	15-19 Feb 2016	06
Fish culture and management practices (Telangana fish farmers)	16-19 Feb, 2016	17
Fish culture and management practices (Telangana fish farmers)	23-26 Feb, 2016	33
Fish culture and management practices (Telangana fish farmers)	01-04 Mar, 2016	32
Total		**693**

CIFE Kolkata Centre, Kolkata

Title	Date	Number of participants
Management of soil water and fish diseases in aquaculture (M.Sc. Microbiology students of Techno India and B.Voc. students of Asutosh College, Kolkata)	16-22 Apr, 2015	11
Mithe pani me machhli palan Nawada district of Bihar)	21-30 Apr, 2015	22
MithePani Me Machhli palan (Saharsa district of Bihar)	5-14 May, 2015	24
Freshwater aquaculture for B.Sc. (Ag) students from BHU, UP	10-19 Jun, 2015	45
Fish processing and development of value added fish products. B. Tech (Food Technology) students Techno India University, Kolkata)	23- 30 Jun, 2015	11
Training cum exposure visit programme on Freshwater aquaculture (Khasi Hills, Mawkyrwat, Meghalaya)	13-19 Jul, 2015	17
Better management practices in inland salinewater shrimp farming (Baraktullah University)	05-07 Oct, 2015	2
On-Job training programme on ornamental fish breeding and culture (IFF students of R.D.S. College, Muzzaffarpur, Bihar University)	20-24 Aug, 2015	23
On-Job training programme on fish processing technology and development of value added products (IFF students of R.D.S. College, Muzzaffarpur, Bihar University)	25- 29 Aug, 2015	23
Management of water quality and diseases for ornamental fish culture for the ornamental fish entrepreneurs	08-09 Sep, 2015	24
Aquaculture (fish farmers from Sunderban, W.B)	14-20 Sep, 2015	16
Quality improvement in ornamental fish	12- 17 Oct, 2015	16

Management of soil, water and fish diseases in aquaculture	27 Oct- 02 Nov, 2015	49
Adhuni upaye machher chash (Modern methods of fish culture) Sunderban, W.B.	28 Oct-03 Nov, 2015	25
Fish processing and value added fish products	03-09 Nov, 2015	25
Training cum exposure visit programme on Freshwater aquaculture (South West Khasi Hills, Mawkyrwat, Meghalaya)	18- 24 Nov, 2015	29
Fish nutrition and feeding strategies	01-07 Dec, 2015	23
Mithe pani me machhli palan (Lakhisarai, Bihar)	09- 15 Dec, 2015	24
Adhunik upaye machher chash (Modern methods of fish culture) farmers from Sunderban, W.B.	13-19 Jan, 2016	40
Culture of food organisms (students, fisheries officers, entrepreneurs from W.B. and Punjab	04-11 Feb, 2016	*39*
Mithe pani me machhli palan (Sitamarhi & Supaul, Bihar)	02-11 Feb, 2016	39
Mithe pani me machhli palan (Patna & Rohtas District of Bihar)	20-29 Feb, 2016	15
Field Exposure visit programme for Asst. Fisheries Officer, M.P.	27-29 Jan, 2016	
Field Exposure visit programme for fisheries Assistants from Tripura	16-20 Mar, 2016	23
Total		**565**

CIFE Rohtak Centre, Rohtak

Title	Date	Number of participants
Entrepreneurship development in ornamental fish breeding and culture	04-10 Aug, 2015	24
Community based aquaculture and inland saline shrimp farming (Haryana-NFDB Funded)	2-7 Nov, 2015	25
Total		49

CIFE Powarkheda Centre, Powarkheda

Title	Date	Number of participants
Fish and prawn culture (State Govt. Fisheries Dept. Bihar (Dist. Gopalganj)	7-16 Apr,2015	17
Fish and prawn culture (State Govt. Fisheries Dept. Bihar (Dist. Saharasa)	21-30 Apr, 2015	20
Magur (*Clarias batrachus*) breeding and hatching management (self finance)	02-07 Jul, 2015	06
Carp breeding and hatchery management (Self finance)	22-28 Jul, 2015	06
Fresh water prawn (*M. rosenbergii*) seed rearing and culture (Self finance)	20-25 Aug, 2015.	17
Carp culture practices and recent advantages (Self Finance and M. P. State Govt. Officers)	16-22 Sep, 2015	21
Fish and prawn culture (Dept. of Fisheries Bihar, Kisanganj)	29 Sep-08 Oct, 2015	18
Fish and prawn culture (Dept. of Fisheries Bihar, Chapara)	26 Oct-4 Nov, 2015	20
Fish and prawn culture (Dept. of Fisheries Bihar, Jamuai)	24 Nov-3 Dec, 2015	15
Fish and prawn culture (Dept. of Fisheries Bihar, Supole)	8-17 Dec, 2015	19
Fish and prawn culture (Dept. of Fisheries Bihar, Madhubani)	22-31 Dec, 2015	20
Fish and prawn culture (Dept. of Fisheries Bihar, Buxure)	04-13 Jan, 2016	10
Fish and prawn culture (Dept. of Fisheries Bihar, Kaumur)	20-29 Jan, 2016	20
Fish and prawn culture (Dept. of Fisheries Bihar, Gaya)	02-11 Feb, 2016	19
Fish and prawn culture (Dept. of Fisheries Bihar, Jahanabad)	17-26 Feb, 2016	16
Fish and prawn culture (Dept. of Fisheries Bihar, Arwal)	11-20 Mar, 2016	10
Total		**254**

Exhibitions Organized

Programme	Organized by	Place	Date
Agriculture Exhibition (Blue Revolution in Eastern India	CIFE, Mumbai	Motihari, Patna	20-21 Aug, 2015
National Seminar on Hilsa fisheries and conservation	Society of Fisheries Technologists, CIFT Junction, Matsyapuri, Cochin.	CIFRI, Barrackpore	18 Nov, 2015
Bengal Fish Festival	Fisheries Department, Govt. of West Bengal. Nalban, Salt Lake,	Kolkata, West Bengal	18-20 Dec, 2015
National Seminar on Aquaculture and Fisheries: Livelihood security, sustainability and conservation	North East Society for Fisheries and Aquaculture Lembucherra, Tripura and ASFIB, Mangalore, College of Fisheries, CAU, Lembucherra	CAU, Lembucherra,	21-22 Jan, 2016
Versova seafood festival	Versova co-operative Society	Versova, Mumbai	22-24 Jan, 2016
2nd International Symposium on Genomics in aquaculture (ISGA II) in Bhubaneswar	ICAR-CIFA	ICAR-CIFA Bhubaneswar	28-30 Jan, 2016
International Conference on Aquatic resources and sustainable management conference	Central Calcutta Science and Culture Organization for Youth, Kolkata	Science City, Kolkata	17-19 Feb, 2016
International Conference on Towards a sustainable blue economy: production, strategies and policies	AFSIB, Cochin	Radisson blue hotel, Cochin	04-06 Feb, 2016
CIFE-Industry day	ICAR-CIFE, Mumbai	CIFE centre, Kolkata	1 Mar, 2016
National Seminar on Seafood safety, trade and management	CUSAT, Cochin	School of Industrial Fisheries, CUSAT, Cochin	9-12 Mar, 2016
Aquabiz India 2016 International Seminar	APTDC and CII Vijayawada	Kakinada	12-14 Mar, 2016

AQUABIZ India 2016

On the occasion of the "AQUABIZ India 2016"- an International Conference & Exhibition on Sustainable Aquaculture held at Kakinada during 12-14 March, 2016, an exhibition stall was setup at the exhibition grounds of district sports stadium, Kakinada for three days. In this stall, 13 exhibits explaining salient research, academic achievements and some of the major activities of the ICAR-CIFE, Mumbai as well as ICAR-CIFE, Kakinada centre were displayed.

In addition to this, brackishwater & freshwater live animals like shellfishes, *L. vannamei, P. monodon,* Mud crabs; *Scylla serrata, Scylla tranquebarica,* Finfishes; *Osteobrama belangeri, Clarias batrachus, Heteropneustes fossilis,* respectively were displayed.

Farmer's Meet

Event	Venue	Date	Approx. No. of farmers
Fish farmers Mela	Motihari, Bihar	11 Apr, 2015	300
Review cum action plan workshop on fishery technology KVKs of Odisha, M.P. and Chhattisgarh states	CIFE, Kolkata Centre	23-25 Apr, 2015	50
Fisheries Seminar (Farmers of Bihar and Jharkhand)	Barhi, Jharkhand	27-28 Jun, 2015	50
Fish Farmers' Day	CIFE, Kakinada Centre	10 Jul, 2015	150
Fish Farmers' Day	CIFE, Mumbai	10 Jul, 2015	75
National Fish Farmers' Day	CIFE, Kolkata Centre	10 Jul, 2015	60
Farmer's meet during Workshop on Scientific fish culture for fish farmers of Sunderban	CIFE, Kolkata Centre	29 Jul, 2015	95
Awareness programs under surveillance project	Dahanu, Thane	23 Nov, 2015	12
Awareness programs under surveillance project	Palghar, Thane	25 Nov, 2015	10
Awareness program for the farmers under the scheme of *Mera Gaon Mera Gaurav*	Village Khardanda and Madh, Versova	21 Dec, 2015	90
Farmers meet during vyakhyan mala in hindi on Catfish (Magur) fisheries present status and future scope	CIFE, Powerkheda Centre	10 Feb, 2016	150
Awareness program for the farmers under the scheme of *era Gaon Mera Gaurav (Farmers from MP)*	Village Nigade, Talegaon	28 Mar, 2016	40

Fish Farmers Festival at Motihari, Bihar

A two-day "*Matsya Utpadan Hetu Kisan Mela*" was organized by ICAR-Central Institute of Fisheries Education, Mumbai and National Fisheries Development Board, Hyderabad at Motihari, Bihar during 11-12 April, 2015, which was inaugurated by Hon'ble Union Minister of Agriculture, Shri Radha Mohan Singh was the Chief Guest. The Hon'ble Minister emphasized on the potential and profits of fish farming which is compared to an ATM for a farmer and informed the gathering that the new initiatives of the Central government in Blue Growth - Blue Revolution will bring prosperity to the farmers in the country. Dr. S.Ayyappan, Director General, ICAR and Secretary, DARE presided over the function and motivated the farmers to enter into fish culture. More than 5000 farmers and officials and entrepreneurs participated in the programme. Dr. W.S. Lakra, Director and Vice-Chancellor, ICAR-CIFE, Mumbai, and Dr. Paul Pandian, Chief Executive, NFDB also spoke above the prospects of fisheries development in the Bihar state. The Scientists of different ICAR institutes CIFE, CIFA, CIFRI and NFDB, Hyderabad delivered lectures and interacted with fish farmers, entrepreneurs and state fisheries officials.

Radio Talk

Name of the faculty	Topic	Language	Programme	Aired on
B. K. Mahapatra	*Aquarium-e joloj udvit bosanor gurutwab*	Bangla	ETV Bangla Annadata Programme	20 Jul, 2015
V. Harikrishna	Fish culture	Telugu	Hello Kisan Doordarshan	02 Aug, 2015
Paramita B. Sawant	*Rang birangi machchli paalan : ek vyavsay*	Hindi	"Meri Sakhi" AIR, Mumbai	10 Aug, 2015
B. K. Mahapatra	*Punti macher pronodito projonon*	Bangla	ETV Bangla Annadata Programme	28 Aug, 2015
B. K. Mahapatra	Food of aquarium fish	Bangla	Radio programme	18 Oct, 2015
Balange A. K.	Fish processing and entrepreneurship development	Marathi	Zee 24 Tass Suvarna Konkan	22 Nov, 2015
B. K. Mahapatra	Breeding of anabas	Bangla	Radio, MPEDA programme	01 Dec, 2015
B. K. Mahapatra	Breeding of cory cat fish	Bangla	ETV Bangla Annadata Programme	06 Dec, 2015
Ashok Kumar	*Haryana mein jingha palan ke shambhavnay* (The sustainability of the shrimp farming in the salt affected soils of Haryana)	Hindi	All India Radio	9 Jan, 2016
CIFE, Powarkehda centre	*Ek divsiye vyakhyan mala* on subject 'catfish (Magur) Fisheries present status and future scope'	Hindi	DD Bhopal Doordarshan DD Kisan Channel, New Delhi	18-19 Feb, 2016

Transfer of Technology

Name of the technology:

Raising carp fingerlings in cages and pens

Where demonstrated:

Dimbhe Reservoir, Dist. Pune

Beneficiaries:

Tribal population of Dimbhe Reservoir area

Impact:

Installation of cages,practicing cage aquaculture and pen culture for *in situ* rearing of fingerlings of IMC was demonstrated in Dimbhe reservoir with community participation at each step of operation.They are able to rear fingerlings in cages and stock in the reservoir independently

Name of the technology:

Ornamental fish culture in cages

Where demonstrated:

Dimbhe reservoir, Dist. Pune

Beneficiaries:

Tribal women of Dimbhe reservoir

Impact:

Women are growing ornamental fishes in cages and selling them in the shop in the Dimbhe market

Name of the technology:

Feed based carp and prawn polyculture through FFTOT mode under the TSP programme

Where demonstrated:

Bali island, Sunderban

Beneficiaries:

20 farmers of Sunderban

Impact:

Feed based carp and prawn polyculture through FFTOT mode was successfully demonstrated

Name of the technology:

Integrated fish farming (CIFE Kolkata, centre)

Where demonstrated:

Kastodanga II Gram Panchayet, Haringhata Development Block, Dist. Nadia, West Bengal

Beneficiaries:

25 tribal fish farmers

Impact:

They are showing interest in taking up integrated fish farming

Print Media

CIFE, Kakinada Centre

1. *Chepala saagunu pariseelinchina Kerala masthyashaakha Adhikaarulu,* Eenadu District Edition. Krishna division, 6-08-2015 (in Telugu language)
2. *Kolleru chepala saagu Bhesh, Bihar raithula prashamsha,* Sakhshi District Edition, Kaikaluru division. 26-01-2016 (in Telugu language)
3. *Chepala pempakam vidhaanam baagu,* Eenadu District Edition, Anaparthi division, 30-01-2016 (in Telugu language)
4. *Parishodhanaphalam, Bahulardhaka prayojanaalu andisthunna chepala kendram*, Eenadu District Edition, East Godavari Division, 16-03-2016 (in Telugu language)

CIFE, Powerkheda Centre

The event of '*Ek divsiye vyakhyan mala* in Hindi on 'Caifish (Magur) Fisheries Present Status and Future Scope' arranged on 10th February, 2016 was well covered in local news papers.

Technical Guidance

- The Aquaculture division entertained about ten enthusiastic fish farmers queries regarding fish farming, integrated fish farming, Pearl culture, Ornamental fish culture, Cage aquaculture, Pen culture, reservoir fisheries development etc. Under farmers' Advisory services, seven recommendation reports for Soil Health Card were given to the farmers and entrepreneurs. Advisory services were provided to more than 20 farmers on fish and shrimp, prawn seed production and culture. Guidance on ornamental fish breeding and culture and aquarium fabrication was provided to farmers and unemployed youth
- Diagnostic services were provided to ornamental fish culturists by the Aquatic Environment and Health Management division.
- Technical guidance was rendered to the private entrepreneurs/ farmers/students on regular basis in all the sub-centres of CIFE pertaining to fish culture techniques, breeding etc.

Matsya Kisan Ghosti (Seminar) organized by CIFE, Mumbai and NFDB, Hyderabad

Bahri, Hazaribagh District, Jharkhand

The Hon' ble Union Agriculture Minister Shri Radha Mohan Singh inaugurated the Matsya Kisan Ghosti (Seminar) organized by CIFE, Mumbai and NFDB, Hyderabad and exhibition Hortysangam-2015 organized by National Horticulture Board.

Dr. W.S. Lakra, Director and Vice-Chancellor, CIFE, Mumbai welcomed distinguished dignitaries on the dais, official, farmers and fishers. On this occasion Hon' ble Union Minister Shri Radha Mohan Singh, in his inaugural speech, emphasized on the importance of 'Blue Revolution' and importance given by Hon' ble Prime Minister of India for its development. Shri Jayant Sinha, Hon' ble Union Minister of State for Finance narrated his own experience of culturing fish in his own agricultural land and stated that fish farming is also a highly profitable business. Hon'ble Minister for Agriculture and Fisheries, Jharkhand Shri Ranadhir Singh, spoke on the occasion and informed about the fisheries and aquaculture development in the state and government initiatives to support the sector. Dr. S. Ayyappan, Secretary, DARE & Director General, ICAR, New Delhi spoke on the importance of aquaculture and its benefits to the farmers of Jharkhand. The seminar was attended by Scientists from CIFE, Mumbai, Central Inland fisheries Research Institute, Barrackpore and NFDB, Hyderabad and Officials from Department of Fisheries, Government of Jharkhand, Fish Farmers Friends (Jharkhand) and fish farmers.

Dr. A.P. Sharma, Director, CIFRI spoke about fisheries development in open waters and relevant technologies. Dr. B.C. Jha, Senior Consultant, NFDB emphasized the importance

of inland fisheries with special reference to reservoir fisheries and role of NFDB for fisheries and aquaculture development. Shri. Rajeev Kumar, Director of Fisheries, Jharkhand spoke on the initiatives taken for the development of fisheries and aquaculture in the state, particularly on cage culture and its role in enhancement of fish production in the state and livelihood opportunities to the fishers. The efforts taken by Shri. Rajeev Kumar and his colleagues were appreciated by the dignitaries particularly on cage culture in reservoirs. On this occasion some of the progressive farmers explained their experiences and enormous financial benefits due to cage culture. Dr. A.K. Reddy, Principal Scientist spoke on the possibilities of freshwater prawn culture in Jharkhand and its benefits to the farmers. Dr. P.P. Srivastava, Principal Scientist briefed about the importance of feed in aquaculture. The programme ended with vote of thanks by Dr. S.N. Ojha, Principal Scientist.

Skill Development Programme

Application of Molecular Markers in Fisheries

A short term training program on "Application of Molecular Markers in Fisheries" was organized by Fish Genetics and Biotechnology Division, ICAR-CIFE from 30th Nov to 5th Dec 2015. The training was coordinated by Dr. A. Pavan Kumar and Dr. Gireesh Babu P, and directed by Dr. Aparna Chaudhari. Six faculty members and research scholars from Punjab University, Vikramasinghapuri University and Mumbai University participated. Theoretical aspects of selection of molecular markers for phylogeny and population studies, RAPD, PCR-RFLP, microsatellites and DNA barcoding were covered along with hands-on training on related techniques and software. A training manual was also provided to the trainees. During the valedictory function, Dr. Gopal Krishna, Director, ICAR-CIFE advised participants to apply innovative approaches to current research problems.

Skill Development Programme

Techniques in Aquatic Animal Health

The Skill development programme on "Techniques in Aquatic Animal Health" was organised during 7-12 September 2015. The programme was coordinated by Dr. Megha Kadam Bedekar, Ms. Jeena K. and Dr. Nalini Poojary. A total of 20 participants attended the programme. The participants comprised of Assistant Professors, Researchers, students and aspiring entrepreneurs. The course was practical oriented and the participants were exposed to different techniques from basic identification of disease to the latest molecular techniques. The topics covered were necropsy and haematological techniques, important bacterial and viral diseases of fin fish, aquatic animal health management, immunological assays, cell culture techniques in disease diagnosis, detection of shrimp virus and bacterial infection by molecular methods, parasites of fish and antiparasitic phyto therapies and trends in fish vaccines. A training manual on 'Techniques in Aquatic Animal Health' was also prepared for the benefit of the participants and the students and researchers.

Skill Development Programme

Breeding and Culture of Freshwater Ornamental Fishes

Division of Aquaculture organized a Skill Development Program on, "Breeding and culture of freshwater ornamental fishes" from 28 September - 5 October, 2015. The program was coordinated by Dr. Paramita B. Sawant, Senior Scientist under the able guidance of Dr. N.K. Chadha, Course Director and Head of Division. Lectures were organized on topics ranging from breeding and culture of freshwater exotic and high value ornamental fishes, aquarium fabrication and maintainence, water quality management for ornamental fish keeping, feed and health management for ornamental fish keeping, entrepreneurship development and microfinance in ornamental fish industry. A total of seventeen participants from officials from state governments, students from colleges, entrepreneurs and fishermen in search of alternative vocations attended the program. Hands-on practical sessions on aquarium construction, breeding techniques and water quality management well as visits to Taraporewala Aquarium and Kurla Wholesale market provided the participants with practical insights. Speaking on the occasion of the valedictory function, Dr. Gopal Krishna, Director, stressed upon the importance of ornamental fish culture as a vocation for unemployed youth and retired personnel, besides adding to aesthetic value of all kinds of architechture, be it offices, heritage buildings or homes. The program concluded with distribution of certificates and e-manuals to the participants.

NEH Tribal sub-plan activities by ICAR-CIFE, Mumbai

Management of Giant Freshwater Prawn Hatchery for the Officals of NE States

The ICAR-Central Institute of Fisheries Education has taken lead to initiate giant freshwater prawn *Macrobrachium rosenbergii* culture in the North Eastern States. As *M. rosenbergii* needs saline water to complete its life cycle, this institute has developed technology using artificial sea water. Seed is one of the prerequisites for prawn culture. Keeping in view of the potential resources for prawn culture, small scale hatcheries have been established in the states Tripura, Nagaland, Manipur, Assam and Mizoram using artificial sea water with the technical guidance of this institute. The hatchery technology has been regularly refined and upgraded to enhance the productivity. In order to transfer the innovations to various stakeholders this institute has been regularly organizing short duration skill development programmes. In this series, a skill development programme on "Management of Giant Freshwater Prawn Hatchery" was organized for the 14 Officials of NE States particularly for Tripura, Assam, Nagaland and Manipur to learn the recent innovations in hatchery operation to enhance the production of the hatcheries in the respective states during 12-17 October, 2015. The programme was inaugurated by **Dr. Gopal Krishna,** Director, CIFE on 12th October, 2015. The skill development programme was organized with hands-on-attachment mode by allotting larval rearing tanks in the hatchery where participants maintained water quality, feeding, identification of larval stages, health, estimation of larval population, etc.

The participants also learned Artemia cysts hatching and harvesting of nauplii, Moina culture, and preparation egg custard. In all 11 theory and 16 practical sessions were arranged during 6 days programme. The participants were highly satisfied with the programme. The programme was concluded with the valedictory function by distributing certificates through **Dr. R.K. Mittal**, Vice-Chancellor, Rajendra Agricultural University, Bihar as Chief Guest in the presence of Dr. Gopal Krishna, Director, CIFE and resource persons of the programme.

Refresher Course for NEH States

"Refresher Course on Fisheries and Aquaculture Development for Officers of NEH States". 12-17 October 2015, ICAR - CIFE, Mumbai.

Value Added Products Preparation from Freshwater Fish

Raha, Nagaon, Assam and Kohima, Nagaland

Two training programme were conducted at Raha, Nagaon, Assam and Kohima, Nagaland during 28-29 Jan, 2016 and 4-5 Feb, 2016 respectively. The programme at Raha, Nagaon Assam was inagurated by Dr. Krishna Kant Tamuli, Dean, College of Fisheries, Raha, Assam and the programme Kohima Nagaland Mrs. B.P. Chetri, Commissioner & Secretary Fisheries, Nagaland in the presence of Mr. Zenohol Angami, Director Fisheries, and Mr. Nitho, Deputy Director Fisheries, Nagaland. A total of 39 (21+18) participants were registered for both the training programes. A training manual of "Value added products preparation on 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. The trainees prepared different value added products like fish cutlet, fish pickle, prawn pickle, fish chukli, fish shevu and fish wada under the supervision of Dr. A.K. Balange, Sr. Scientist and other resources persons. They were also trained in packaging and labeling of the fish products.

Namsai, Arunachal Pradesh

A another training programme was conducted at the Fisheries Department Namsai, Arunachal Pradesh during 1-2 Feb, 2016. Total 19 participants were registered for the said training programme. The programme was inaugurated by Shri R. K. Sharma, Deputy Commissioner, Namsai district. A training manual of "Value added products preparation on fresh water fish was distributed to all the trainees. The valedictory function was headed by Shri M. K. Deori, Additional Deputy Commissioner, Namsai district.

Awareness Programme on Farm-made Feed for Aquaculture

The awareness-cum-hands on training programme was organized by ICAR-CIFE at Imphal, Manipur during 14-15 Mar, 2016 in collaboration with Department of Fisheries, Government of Manipur. The aim of this hands-on-training was raise awareness to their diverse stakeholder about the importance of feed based aquaculture in fisheries sector. The awareness programme was attended by 34 participants representing farmers, NGOs, tribal and fish farmers. A total of 55 participants were attended the programmes in which they gained skill and expertise on integrated fish farming system. The programme was supported b y Dr. Kiran Dubey, Nodal Officer, TSP.

The Director, Manipur, Mr.David appreciated efforts of Dr.Gopal Krishna, Director & vice chancellor in conducting training on this topics awith a divertse stakeholder group and choosing Fisheries Department, Maniopur for the conduct of the programme. He stressed that North East region in known for its vast potential of water resources coupled with rich diversity of feed ingredients. The workshop was attended by 35 and more participants representing farmers, NGOs, tribals and fish farmers.

Awareness Programme under TSP Integrated Fish Farming

Two days awareness programme under TSP "Integrated Fish Farming" was organized by ICAR-CIFE at Mamit District of Mizoram and Kolasib District of Mizoram on 16-17 March, 2016 in collaboration with Department of Fisheries, Government of Mizoram. Dr. P.P. Srivastava, Principal Scientist and Nodal Officer, NEH region, ICAR-CIFE & Programme organizer Principal Scientist and Nodal Officer, NEH Region welcomed the dignitaries and the partipcants of the awareness programme. The awareness programme was attended by 34 and 39 participants respectively. The programmes were represented by farmers, NGOs, tribal and fish farmers. They gained skill and expertise on integrated fish farming system. The programme was supported b y Dr. Kiran Dubey, Nodal Officer, TSP. Dr. A.K.Reddy, Principal Scientist explained about the programme in brief. He mentioned that this awareness programme on Integrated Fish Farming is in particular to Pig-cum-Fish and is a part tribal sub plan from of the The aim of this awareness programme was to raise awareness to the diverse stakeholders about the importance of integrated fish farming in fisheries sector. The Joint Director Manipur Fisheries, Mr. S.P. Singh appreciated contribution and continuous efforts of Dr. Gopal Krishna, Director & Vice Chancellor, CIFE Mumbai to conduct one days awareness programme on this topic with a diverse stakeholder group and choosing Fisheries Department, Mizoram for the conduct of the programme. He stressed that Pig-cum fish culture is very prominent in Mizoram state, however, the tribal farmers need to be supported for upliftment for their better livelihood. In this context the financial support from ICAR-CIFE, as Pigstys and Piglets, to the six tribal farmers of the Kolasib District of Mizoram was highly appreciated.

Workshop on Fisheries and Aquaculture Response in Emergencies for NEH Region

The inaugural programme of the 3 days Workshop on 'Fisheries and Aquaculture Response in Emergencies' was organized by ICAR-CIFE at Fisheries Research Centre, Assam Agriculture University (AAU), Jorhat on 10th March, 2016.

Dr. P.P. Srivastava, Principal Scientist and Nodal Officer, NEH region, ICAR-CIFE welcomed the dignitaries and the participantsof the workshop. He presented the activities undertaken by ICAR-CIFE specially for NEH region.

Dr. Arpita Sharma, Workshop Co-ordinator and Principal Scientist, CIFE, Mumbai explianed about the programme in brief. The aim of this workshop was to raise awareness to the diverse stakeholders about the vulnerability of the sector, current frameworks for response and the need to be better prepared through appropriate trainings. She mentioned that third workshop is being organized at FRC, AAU, Jorhat.

Hon'ble Vice Chancellor, AAU, Jorhat, Dr. K.M. Bujarbaruah, graced the occasion as the Chief Guest. In his inaugural speech, Dr. Bujarbaruah appreciated efforts of Dr. Gopal Krishna, Director& Vice Chancellor, CIFE Mumbai to conduct 3 days workshop on this topic with a diverse stakeholder group and choosing FRC, AAU for the conduct of the programme. He stressed that North East region is known for its vast potential of water resources coupled with rich diversity of flora and fish fauna but recurring floods cause havoc to the fishery resources and often making rural people homeless. Dr Bujarbaruah, said that it is an irony that we ourselves have created a situation for disaster to emerge like floods and droughts and then we try to find solutions to address the problems. He mentioned that there Damage Need Assessment in agriculture and animal husbandry has been done but not much in fisheries. This should be taken into consideration so as to have an integrated approach across sectors so as to have a road map to tackle disasters related to fisheries.

The workshop was attended by 34 participants representing NGOs like Dhan Foundation, Society for Rural Development (SORDEC), Indian Red Cross Society, Cheelbanda Beel Unyan Samiti, Kalanpur Yuva Sangh, Progressive fish farmers from Dakshin Beelgaon Sanghtan, College of Fisheries, Raha, ICAR-CICFRI, KVK, Department of Fisheries, Assam and Department of Fisheries Shillong. A total of 70 participants attended the inaugural programme with Dean (Home Science), Dean (Horticulture), Dean (Sericulture), Two sets of guidelines for fisheries and aquaculture sector on damage and needs assessment in emergencies and Fisheries and aquaculture emergency response guidance were provided to participants.

Jai Kisan Jai Vigyan Week

ICAR- Central Institute of Fisheries Education, Mumbai celebrated **"Jai kisan Jai vigyan week"** during 23-29 December, 2015. Various activities were organized to commemorate the occasion at its headquarters (Mumbai) and four centres (Kolkata, Rohtak, Kakinada and Powarkheda). Interactions between farmers, Fisheries Officers, students and scientists were organized. At Kolkata centre, on-field interaction with farmers and field demo-nstration programmes on feed-based freshwater prawn & carp polyculture were conducted at farmers ponds in far off locations such as Bali island, Sunderbans**.** At Rohtak centre, farmers were appraised with latest technological advancements in inland saline areas during the scientist farmers' interaction. At Kakinada, in addition to addressing the farmers' problems, they were exposed to ongoing farm activities at the Centre. Farmers were also appraised about community based aquaculture, cage culture in reservoirs and tank based aquaculture. Powarkheda centre also organized farmers' meet where 20 farmers from Bihar, who were undergoing training at the centre also participated, during which, scientists demonstrated and delivered lectures on modern farming techniques, management of carp and prawn hatchery. Quiz and Debate competitions were organized for the students on 28-29th December, 2015, at Mumbai. There was active participation from the students. Prizes were distributed to the winners and runners up by Dr. Gopal Krishna, Director and Vice Chancellor, CIFE, Mumbai, who stressed on tapping the potential of aspects of social and moral science for betterment of the society in general and farmers' community in particular. The overall programme was coordinated by Dr. N.K. Chadha, Head, Division of Aquaculture with active support from Dr. B.K. Mahapatra, OIC, Kolkata Centre, Mr. Harikrishna, OIC, Rohtak Centre, Dr. Murlidhar, OIC, Kakinada Centre, Dr. Somdutt, OIC, Powarkheda Centre and Dr. Paramita B. Sawant, Scientist, CIFE, Mumbai.

Chapter

7 Honours and Awards

Honours and Awards

Honours and Awards

Dr. W. S. Lakra

Membership of Professional Societies / Bodies the year

1. Member, Sectional Committee, National Academy of Agricultural Sciences (2015-16).
2. Member, State Level Technical Committee of Govt. of Tamil Nadu under the World Bank funded FIMSUL II project.
3. Member, Sectorial Committee of National Accreditation Board on Accreditation Norms and New Institutions and Programs, ICAR, New Delhi.
4. Member, Research Advisory Committee of Marine BioResoruce Centre (MBRC), Govt. of Gujarat, Jamnagar, Gujarat.
5. Member, UGC Expert Committee to evaluate the infrastructural and other facilities of Tamil Nadu Fisheries University (State University), Tamil Nadu.
6. Member, Planning Board of the Tamil Nadu Fisheries University, Tamil Nadu.
7. Chairman, ICAR for Niche Area of Excellence (NAE) on "Inland Aquaculture" GADVASU, Ludhiana.

AWARD / Rewards /Recognition received during the year

1. Elected to Executive Council, NASI, Allahabad, 2015
2. Sectional President (Biological Sciences), NASI, 2015

Dr. Gopal Krishna

Membership of Professional Societies / Bodies the year

1. Member of the Committee constituted to suggest Draft National Policy on Marine Fisheries (2015) under the chairman of Dr. S. Ayyappan.
2. Member of the Sectoral Committee of National Agricultural Education Accreditation Board (NAEAB) on "Curriculum and Equivalence" under the chairman of Dr. K. Ramasamy.
5. Member of the National Steering Committee of Consortium for e-Resources in Agriculture (CeRA) of ICAR under the chairman of DDG (Education).

राष्ट्रपति पुरस्कार

Dr. R.P. Uniyal, Deputy Director (O.L.) receiving the ***Rajbhasha Gaurav Puraskar*** from **Shri. Pranab Mukherjee,** Hon'ble President of India on 14 September 2015

Kalawati Devi medal

Dr. (Mrs.) Nalini Poojary was honoured with the **Kalawati Devi Medal** by Bioved Research Institute of Agriculture technology and Sciences during the18th Indian Agricultural Scientists and Farmers' Congress on "Prospects of Skill Development in Agriculture and Rural Development - A step towards make in India" on 21 Feb 2016.

Best poster presentation award

Dr (Mrs) Nalini Poojary received the Best poster presentation award during the 18th Indian Agricultural Scientists and Farmers' Congress on "Prospects of Skill Development in Agriculture and Rural Development - A step towards make inIndia" during 20-21 Feb. 2016 for the poster presentation titled: "Conservation of coastal ecosystems through community involvement: Status and prospects in Maharashtra" (Nalini Poojary, Dasari Bhoomaiah and P.S. Ananthan) The congress was organised by Bioved Research Institute of Agriculture Technology and Sciences at Bioved Krishi Prodyogi ki Gram, Moharab, Sringverpur, Allahabad.

Vimla Devi Medal

Dr (Mrs) Zeba Jaffer Abidi was honoured with the ***Vimla Devi Medal*** by Bioved Research Institute of Agriculture Technology and Sciences during the18th Indian Agricultural Scientists and Farmers' Congress on "Prospects of Skill Development in Agriculture and Rural Development" - A step towards make in India" on 21th Feb 2016 for her contributions to the fisheries and development of wetland conservation

Best oral presentation award

Dr. B. K. Mahapatra received the best oral presentation award during the International Conference on Aquatic Resources and Sustainable Management at Science City, Kolkata, held during 17-19 February, 2016 for his paper titled: Improvised natural system for mass scale Magur seed raising in ponds of Sundarbans (Milon Sinha and B. K. Mahapatra)

Dr. S. Dasgupta received the best oral presentation award during the International Conference on Aquatic Resources and Sustainable Management at Science City, Kolkata, held during 17-19 February, 2016 for his paper titled: Vasa homologue gene in Mrigal (*Cirrhinus mrigala*): Its expression during embryogenesis and isolation of spermatogonial cells. (S. Dasgupta,S. S. Roy, S. Bhattacharjee, G. Tripathi,A. K. Pal, N. P. Sahu and B. K. Mahapatra)

Prize for poster presentation

Sanap, B. N. received the second prize for poster presentation during the Technical Session of Uncoventional feed resources, ANSICON-2016 held at ICAR-NDRI, Karnal on 6-8 February, 2016for the paper titled: Utilization of Electron Beam irradiated Jatropha Kernel Meal in the diet of *Labeo rohita* (Hamilton, 1822) fingerlings. (Sanap, B. N., Sardar, P., Phulia, V., Sahu, N. P. Dasgupta, S., Pailan, G. H. and Datta, S.)

Others

Dr. M. Krishnan was elected as VICE PRESIDENT, Agricultural Economics Research Association, New Delhi during 23rd Annual Conference of the Agricultural Economics Research Association, ICAR-CIFE held on 2-4 December 2016

Dr. M. Krishnan was elected VICE PRESIDENT of Indian Society of Agricultural Marketing, Hyderabad 29th national Conference of the Indian Society of Agricultural Marketing, MPAUT, Udaipur held on 28-30 October, 2015

Dr. Nalini Ranjan Kumar was elected as Member of Executive Committee by the Agricultural Economics Research Association, New Delhi

Institutional Awards

In order to recognize the significant contributions by the faculty, staff members and students of the Institute/University, the following awards are announced for the year 2014-2015.

S.No	Category	Awardee
1	Best Scientist	Dr. B. K. Mahapatra
2	Best Young Faculty	Dr. Kundan Kumar
3	Best Teacher	Dr. Paramita Banerjee Sawant
4	Best Extension Scientist/Worker	Dr. P. P. Shrivastava
5	Best Division / Centre	CIFE Rohtak Centre
6	Best Technical Staff	Mrs. S. S. Gajbhiye
7.	Best Administrative Staff	Mr. C. N. Sahani
8.	Award for Institutional Building	Dr. (Mrs) Neelam Saharan
9.	Award for Hindi Publication	Dr. (Mrs) Megha Bedekar
10.	Award for Patent/IPR/Technology Generation/Commercialization	Dr. C. S. Chaturvedi
11.	Award for Best Publication of the year (Highest Impact Factor)	(i) Sipra Mohapatra, Tapas Chakraborty, Ashisa K. Prusty, Kurcheti Pani Prasad and Kedar Nath Mohanta (ii) Neeraj Kumar, Subodh Gupta, Nitish Kumar Chandan, Md. Aklakur, Asim Kumar Pal, Sanjay B. Jadhao (iii) Paramita Banerjee Sawant, Aritra Bera, Subrata Dasgupta, Bhawesh T. Sawant, Narinder K. Chadda and Asim Kumar Pal
12.	Award for overall Best M.F.Sc. Dissertation (2014-2015)	Mr. Raja Aadil Hussain Bhat and Mr. Deepak Agarwal
13.	Award for overall Best Ph.D. Thesis (2014-2015)	Dr. (Mrs) Nagalakshmi
14.	School Children - Highest Scorer in Class X (for children of employees of CIFE)	Master Shrinivas Hittinahalli S/o Mr. Chandrakant Hittinahalli
15.	School Children - Highest scorer in Class XII (for children of employees of the CIFE)	Ms. Madhurya Lakshmi Chandana D/o Mrs. M. Rama Mani

ICAR Zonal Sports Tournament 2015 (Western Zone) Overall Championship Award for West Zone

CIFE participated in the ICAR Zonal Sports tournament 2015 (Western Zone) held at CSWRI, Avikanagar, Rajasthan during 2-6 November, 2015 under the guidance of Gaurav Rathore as the *Chief-De-Mission* and won the following medals.

Athletics (women)

100 mt. women (Silver)	:	Megha Kadam Bedekar
100 mt. women (Bronze)	:	Nalini Poojary
200 mt. women (Gold)	:	Jeena K.
Long jump women (Gold)	:	Jeena K.
Long jump women (Silver)	:	Nalini Poojary
High jump Women (Gold)	:	Nalini Poojary
High jump Women silver	:	Jeena K.
Discus women (Gold)	:	Jeena K.
Javelin women (Gold)	:	Jeena K.
Shot put women (Gold)	:	Jeena K.
Best athlete (women)	:	Jeena K.

Badminton

Badminton Singles Champion	:	Megha Kadam Bedekar
Badminton (Silver)	:	Jeena K.
Badminton doubles champion	:	Megha Kadam Bedekar and Nalini Poojary

Table tennis (Women)

Table tennis(Single) Runner's up	:	Chandrarekha Khundol
Table tennis(Double)	:	Chandrarekha Khundol
	:	Fransisca Fernandes\

Athletics (Men)

1500 mts (Bronze)	:	Kunal Maan
800 mts (Bronze)	:	Kunal Maan
200 mts (Bronze)	:	Suraj Gupta

Kabbadi

Championship for west Zone

Best Athlete (Women)
Jeena K.







Overall Championship Award for West Zone

Goa

Mr. Dasari Bhoomaiah was felicitated by ***Smt. Mridula Sinha,*** Hon'ble Governor, Goa during the Silver Jubilee celebrations of ICAR-Central Coastal Agricultural Research Institute, Goa on 21st July, 2015 for designing Logo of ICAR-CCARI, Goa.

New Delhi

Mr. Dasari Bhoomaiah was felicitated on 27th November, 2015 by ***Shri Radha Mohan Singh,*** Hon'ble Union Minister of Agriculture and Farmers Welfare during the inauguration of National Conference on "Golden Jubilee of Green Revolution" for designing the logo.

Banda

Mr. Dasari Bhoomaiah was felicitated on 7th March, 2016 by ***Dr. Surender Lal Goswami,*** Vice- Chancellor, Banda University of Agriculture and Technology, Banda, Uttar Pradesh for designing the logo for BAUT in the presence of ***Dr. Narendra Singh Rathore,*** Deputy Director General (Education), ICAR.

Chapter 8

Linkages and Collaborations

8.1. Linkages

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

ICAR Institutes

- 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

Government of India Organizations

- 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
- Bhaba 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

CSIR Institutes

- 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

Indian Council of Medical Research (ICMR)

National Institute for Research in Reproductive Health, Mumbai

Universities

- 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
- Barkhatullah University, Bhopal
- Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur
- Chhattisgarh Kamdhenu Vishwavidyalya, Chhattishgarh
- Babasaheb Bhimrao Ambedkar University, Lucknow
- Centre of Agriculture University, Imphal

State Governments

Department of Fisheries of the following states:

Maharashtra
Haryana
Uttar Pradesh
Bihar
Tamil Nadu
Andhra Pradesh
Tripura
Arunachal Pradesh
Madhya Pradesh
Meghalaya
Nagaland
Assam
Manipur
Mizoram
Sikkim
Punjab

NGOs

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

Other Organizations

- 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
- APC Nutrient, Mumbai
- Godrej Agrovet Pvt. Ltd., Vijayawada
- Maharashtra Machimar Kriti Samiti, Mumbai
- Akhil Bhartiya Machimar Sanghatna, Mumbai
- Madhya Pradesh Fish Federation
- CPWD, Bhopal
- 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, Raigard, Maharashtra

International

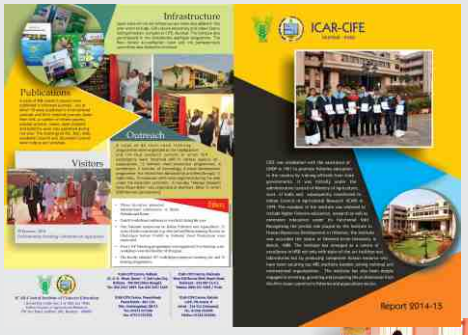
- University of Idaho, Moscow, Idaho, USA
- University of Kentucky, Lexington, KY, USA
- Curtin University, Australia

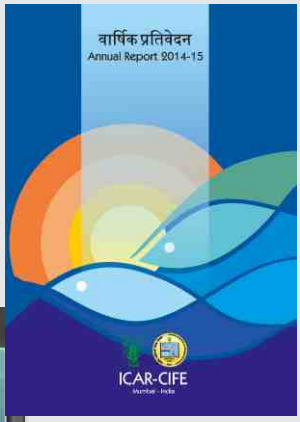
8.2. Collaboration

A Memorandum of Understanding was signed on 10th August 2015, between Kamdhenu University, Gandhinagar, Gujarat and ICAR-CIFE, Mumbai for academic and research collaboration. Prof. M. C. Varshneya, Vice Chancellor, KU, Gujarat hoped that students of KU would be greatly benefitted through video conferencing and collaborative research with CIFE. A series of lectures have been delivered through video conferencing since then.

Chapter

9 Publications


Infrastructure
Publications
Outreach
Visitors
ICAR-CIFE
Report 2014-15


वार्षिक प्रतिवेदन
Annual Report 2014-15
ICAR-CIFE
Mumbai - India


Aquatic Environment and Health Management Division


Do's
Don't
Hygienic Handling Of Fresh Fish


RESEARCH


Genetic Conservation and Live Gene Banking of Mahseer in Indrayani River
ICAR-Central Institute of Fisheries Education

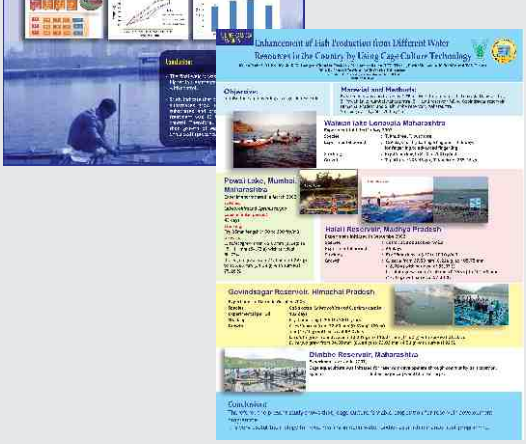

Research Thrust Areas
Research Highlights


ICAR-CIFE NEWS


Academic
Completed
Research
NE programmes


FRHPM
Fisheries Resource Harvest and Post-Harvest Management Division


SALIENT ACCOMPLISHMENTS


Enhancement of Fish Production from Different Water Resources in the Country by Using Cage Culture Technology
Powai Lake, Mumbai, Maharashtra
Walwan lake Lonavala Maharashtra
Hatoli Reservoir, Madhya Pradesh
Govindsagar Reservoir, Himachal Pradesh
Dimbhe Reservoir, Maharashtra

Publications

9.1 PUBLICATIONS: IN PEER REVIEWED JOURNALS

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Chapter
10

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

Dr. W.S. Lakra, attended the following Training / Refresher Course / Summer / Winter Institutes / Seminars / Conferences / Symposia / Workshops/Meetings attended within India and abroad

Sr.no.	Details of programmes	Date
1.	Academic Council Meeting at BHU, Varanasi	16 Apr, 2015
2.	Council Meeting of NASI, India at NIPGR, New Delhi	25 Apr, 2015
3.	6th meeting of Scientific Panel for Fish & Fisheries Product, New Delhi	7 May, 2015
4.	Annual Vice-Chancellors' Conference & Meeting, New Delhi	14-16 May, 2015
5.	Meeting at Education Division, ICAR, New Delhi	25-28 May, 2015
6.	Silver Jubilee and Foundation Day Programme of NAAS,New Delhi	3-4 Jun, 2015
7.	Meeting with DG, ICAR, New Delhi	9 Jun, 2015
8.	Meeting of Vice Chancellor and Directors of ICAR, Deemed University at ICAR, HQ related to the proposed Pan African University of Life and Earth Sciences at Ibadan, Nigeria	17 Jun, 2015
9.	Aquaculture and marine biotechnology Task Force Committee meeting at Dept. of Biotechnology, New Delhi	18-19 Jun, 2015
10.	ICAR programme at Barahi, Jharkhand	27-28 Jun, 2015
11.	87th ICAR Foundation Day and Award Ceremony	25-26 Jul, 2015
12.	First Meeting of the DAHDF, Govt. of India for drafting a National Policy on Marine Fisheries, New Delhi	6 Aug, 2015
13.	7 meeting of Scientific Panel of Fish & Fisheries Products, New Delhi	19 Aug, 2015

Dr. Gopal Krishna attended the following Training / Refresher Course / Summer / Winter Institutes/Seminars/Conferences/ Symposia / Workshops/Meetings attended within India and abroad

Sr.no.	Details of programmes	Date
1.	Meeting at DARE New Delhi regarding discussion with Ambassadors/ High Commissioners of African Countries at DARE, New Delhi	15 Sep,2015
2	Meeting with Joint Secretary (Fy.), KrishiBhavan, New Delhi regarding events and celebration of the World Fisheries Day	28 Sep,2015
3	*Rajbhasha Karyanve Samiti*	29 Sep, 2015
4	Meeting regarding freshwater fisheries development and management in Vidarbha with Dr. Nirupama Dange, Additional Commissioner and Member Secretary, Vidarbha Development Corporation, Nagpur	09 Oct, 2015
5	One day workshop on preparation of road map for agricultural development, Central Coastal Agricultural Research Institute, Goa	15 Oct, 2015
6	Meeting with DDG(Edu.) with respect to Ph.D. admission and eligibility at Agricultural Education Division at ICAR, New Delhi	21 Oct, 2015
7	Meeting with DG, ICAR regarding Ph.D. Admission at ICAR, New Delhi	28 Oct, 2015
8	Participated in a Workshop on Eastern coast plains & hills region at ICAR-CIBA, Chennai	29 Oct, 2015
9	National Workshop on Coldwater endemic fishes of North Eastern Himalaya: Avenues and challenges, Gangtok, Sikkim	04 Nov, 2015

10	Meeting of ICAR-Fisheries Institute Directors of CIFE for Collaboration in academic and research programme	10 Nov, 2015
11	Attended the Refresher Course on Fisheries and aquaculture development for officers of the NEH State (NEH Programme)	12 Nov, 2015
12	National Seminar on Hilsa fisheries conservation at CIFRI, Barrackpore	18 Nov, 2015
13	5th International Symposium on Cage Aquaculture in Asia CAA5 at Kochi, Kerala	25-26 Nov, 2015
14	Meeting with DG, ICAR regarding NFDB Project	3 Dec, 2015
15	Interactive meet of AS&FA, DARE/ICAR with the Finance Heads of ICAR Institutes of West Zone	7 Dec, 2015
16	National Workshop on Development of fisheries vis-à-vis blue revolution and value addition in Himachal Pradesh, Bilaspur	12 Dec, 2015
17	Meeting of national steering committee of consortium for e-Resources in agriculture (CeRA) at ICAR, New Delhi	22 Dec, 2015
18	*Vishva Hindi Divas* (Hindi) as Chief Guest	10 Jan, 2016
19	Committee meeting constituted to suggest draft national policy on marine fisheries, New Delhi	21 Jan, 2016
20	Meeting with DDG (Fy) regarding the Cadre Strength, Budget Outlay and Expenditure	25 Jan, 2016
21	Vice-chancellors' and Director's Conference, New Delhi	23-24 Jan, 2016
22	Training programme in Nagaland, Arunachal Pradesh and 2nd International Symposium on Genomics in Aquaculture (ISGA II) AT Bhubaneswar.	27 Jan, 2016
23	Model training Course : Aquaculture in New and underutilized water bodies	28 Jan, 2016

Name of the faculty	Programme attended	Venue	Date	Organized by
Neelam Saharan Sikendra Kumar	5th International Symposium on Cage Aquaculture in Asia	ICAR-CMFRI, Kochi	25-28 Nov, 2015	ICAR-CMFRI Kochi and AFS
K. Pani Prasad	Farmers Meet (Horti Sangam 2015)	Motihari, Bihar	10-12 Apr, 2015	Department of Horticulture, New Delhi
All Scientist of Kolkata Centre	Review cum Action Plan Workshop on Fishery Technology	CIFE Kolkata Centre	23-25Apr,2015	ICAR-CIFE Mumbai
B. K. Mahapatra	Workshop on Indian Wastewater Sector	Kolkata	30 Apr, 2015	University of Kalyani, West Bengal
Annam Pavan Kumar	TRUSS Workshop	ICAR-CIBA, Chennai	18-19 May, 2015	ICAR-CIBA, Chennai
Sunil Nayak R. K. Upadhyay	Krishi Mela (Rath Meeting)	Agriculture Training Centre, Powarkheda	21 May, 2015	State Agriculture Dept., M.P.
Kiran Dube Rawat	ICAR Regional Committee No III meeting, Agartala, Tripura	Pragana Bhawan, Agartala, Tripura	22-23 May, 2015	ICAR Research Complex for NEH Region
Latha Shenoy	Workshop on ICAR Accreditation Process for Agricultural Universities and Role of Regional Centres	NASC Complex, New Delhi	25 May, 2015	Education Division, ICAR
Arun Sharma J. Krishna Prasad	Workshop on Fisheries, Aquaculture, Oil & Natural Gas and Tourism Sector Policy level plans	EGREE, Rajahmundry	25 May, 2015	EGREE, Rajahmundry
B. K. Mahapatra	Seminar on Need of Livestock in Context of West Bengal	WBUA & FS, Kolakata	29 Jun, 2015	WBUA&FS, West Bengal
Chandra Prakash	Writeshop on Aquatic Environment Management	ICAR- CIFE, Mumbai	7-9 Jul, 2015	ICAR-CIFE, Mumbai
Gayatri Tripathi	International Conference on Electron Microscopy and XXXVI Annual Meetings of the Electron Microscope Society of India	CIDCO Mumbai	8-10 Jul,2015	BARC, Mumbai
N.K. Chadha	10th National Symposium on Innovative Approaches Harnessing Agricultural Sciences for Society	`MPKV, Rahuri	21-23 Jul, 2015	MPKV, Rahuri & IAUA
Neelam Saharan Chandra Prakash	Awareness Workshop on Aquaculture for Tribals in Shirol, Shahpur, Thane Dist.	Gaydhara village, Shirol, Shahpur, Maharashtra	29 Jul, 2015	ICAR-CIFE Mumbai
B. K. Mahapatra S. Datta and P. Sardar	Workshop on Scientific Fish Culture on Farmers of Sunderban	ICAR-CIFE Kolkata Centre	29Jul, 2015	ICAR-CIFE Kolkata Centre
Faculty of CIFE	National Conference on Social Security and Skill Development for Fisherwomen	ICAR-CIFE, Mumbai	19 Aug, 2015	National Federation of FISHCOPFED, New Delhi and ICAR-CIFE, Mumbai

Muralidhar P. Ande	ICAR-Regional Committee Meeting for the Eastern region	ICAR-CIFRI, Barrackpore	19 Aug, 2015	ICAR-CIFRI, Kolkata
B. K. Mahapatra	Workshop on Soil	FAO	20 Aug, 2015	FAO
N.K. Chadha	Workshop on Mahseer Fisheries: Conservation strategies and way forward	TPC, Lonavala	21-22 Aug, 2015	ICAR-CIFE, Mumbai
Shrinivas Jahageerdar	Strategies for Adopting Technology Enhanced Learning in Agricultural Education	NAARM, Hyderabad	26-27 Aug, 2015	ICAR-NAARM, Hyderabad
Arun Sharma	Workshop on Training Needs and Harmonization of Aqua-lab Operations in AP	SIFT, Kakinada	4 Sept,2015	SIFT, Kakinada
R. K. Upadhyay Hasan Javed	One day Karyashala on Unicode Narakas Karyashala	RCBC, Collectorate, Hoshangabad	08 Sep, 2015	NARAKAS
B. K. Mahapatra	Brain-storming Meeting on Lower Gangetic Plan Region	ICAR-CIFRI, Barrackpore	10 Sep, 2015	ICAR-CIFRI, Barrackpore
B. K. Mahapatra	Mid-Term Review Meeting of ICAR Regional Committee-II	ICAR-CIFRI, Barrackpore	19 Sep, 2015	ICAR-CIFRI, Barrackpore
B. K. Mahapatra	2nd Meeting of SAC of the Sasya Shyamala KVK	KVK, Narendrapur	23 Sep, 2015	KVK, Narendrapur
Muralidhar P. Ande	Board of Studies Meeting	P.R. Govt. College, Kakinada	26, Sep, 2015	P. R. Govt. College, Kakinada
Kiran Dube Rawat Neelam Saharan	NFDB Meeting for the Review of the Projects	NFDB, Hyderabad	29 Sep, 2015	NFDB
Megha Kadam Bedekar	6th World Conference on Biotechnology	New Delhi	5-7 Oct,2015	Omics group of Conference
Megha Kadam Bedekar	Conference on Recent Advances in Veterinary and Animal Science and Role of Women Veterinarian	Pune	8-10 Oct, 2015	MAFSU, Maharashtra
Neelam Saharan	Workshop on Preventive Vigilance	New Delhi	28 Oct, 2015	ICAR, New Delhi
K. Pani Prasad	2nd Indo Global Summit and Expo on Veterinary 2015	Hyderabad	26-28 Oct, 2015	OMICS International Conferences, USA
M. Krishnan	29th National Conference of the Indian Society of Agricultural Marketing	MPAUT, Udaipur	28-30 Oct, 2015	Indian Society of Agricultural Marketing, Hyderabad and MPUAT, Udaipur
Karthireddy Syamala	Workshop on Global Reporting Initiatives (GRI) on Strategies for Incorporating Coastal and Marine Biodiversity Conservation Consideration Into Sector Policies and Guidelines of Production sectors in EGREE	Hotel Royal Park, Kakinada, AP	30, Oct, 2015	EGREE
B. K. Mahapatra	Workshop on Lower Gangetic Plains Region	ICAR-CIFRI, Barrackpore	31Oct, 2015	ICAR-CIFRI, Barrackpore

V.K. Tiwari	Coldwater Endemic Fishes of North East	Himalaya- Avenue and Challenges" Gangtok, Sikkim	5-6 Nov, 2015	ICAR-DCFR, Bhimtal
J. Krishna Prasad	Workshop on Mainstreaming Coastal and Marine Biodiversity Conservation in to Production Sectors	Visakhapatnam	05-07, Nov, 2015	EGREE
All Scientist of Kolkata Centre	National Seminar on Hilsa Fisheries & Conservation	ICAR-CIFRI, Barrackpore	18 Nov, 2015	ICAR-CIFRI, Barrackpore
Md. Aklakur Sikendra Kumar	National Workshop & Training on "Feed and Feed Technologies for Responsible Aquaculture	Bhubaneswar	18-19 Nov, 2015	ICAR-CIFA, Bhubaneswar
Somdutt	Rajbhasha Karyanvayan Samiittee	Office of the Station Master, Dept. of Railway, Hoshangabad	20 Nov, 2015	Rajbhasha Karyanvayan Samiittee
Gopal Krishna Aparna Chaudhary Somdutt R. K. Upadhyay	Meeting with the Principal Secretary and the Director, M.P. State Fisheries Dept.	Secretariat, Bhopal	20 Nov, 2015	Secretariat, Bhopal
Kiran Dube Rawat	5th International Symposium on Cage Aquaculture in	ICAR-CMFRI Kochi, Kerala	25-28 Nov, 2015	AFS, Asia CAA5
Shrinivas Jahageerdar	Workshop on Development of Brood bank for Amur Common carp	ICAR Research complex, NEH Region, Umiam, Barapani, Hebbal, Bengaluru Meghalaya	2-4 Dec,2015	KVAV & FSU-KWDP and Directorate of Fisheries and Government of Meghalaya
Faculty of CIFE	23rd, AERA Conference on Inter and Intra-sectoral Dynamics for Transforming Indian Agriculture	ICAR-CIFE, Mumbai	2-4 Dec, 2015	AERA, India
Somdutt R. K. Upadhyay	Nagar Rajbhasha Karyanvayan Samiittee	SPM, Hoshangabad M.P.	10 Dec, 2015	Rajbhasha Karyanvayan Samiittee, M.P.
V.K.Tiwari	Development of Fisheries vis a vis Blue Revolution and Value Addition in Himachal Pradesh	Bilashpur, H.P.	12 Dec, 2015	Department of Fisheries, H.P.
SujataSahoo	International symposium on Targeted Proteomics	IIT, Bombay	13-14 Dec, 2015	IIT, Bombay and Society of Proteomics India
Ramasubramanian V.	69th Annual Conference of the Indian Society of Agricultural Statistics (ISAS)	University of Kota, Kota, Rajasthan	14-16, Dec, 2015	ISAS
Faculty of CIFE	Workshop on ICAR-Unified Messaging and Web Hosting Solution	ICAR-CIFE, Mumbai	16 Dec, 2015	ICAR-CIFE, Mumbai
Faculty of CIFE	Workshop on Fisheries and Aquaculture emergency response	ICAR-CIFE, Mumbai	18 Dec 15	ICAR-CIFE, Mumbai

Faculty of CIFE	Workshop on Development of Academic management Module for CIFE	ICAR-CIFE, Mumbai	18-20 Dec, 2015	ICAR-CIFE, Mumbai
B. K. Mahapatra	8th Institute Management Committee	ICAR-ATARI, Kolkata	22 Dec, 2015	ICAR-ATARI, Kolkata
Kiran Dube Rawat	Meeting on Action Plan for 24 Lakes in Navi Mumbai	NMMC office, CBD Belapur, Navi Mumbai	5 Jan, 2016	NMMC, Navi Mumbai
Muralidhar P. Ande P. Srinivasa Rao	Workshop on Inspection & Quality Monitoring of Shrimp Hatcheries	SIFT, Kakinada	07 Jan, 2016	SIFT, Kakinada
N.K. Chadha N.P. Sahu A.K.Reddy Faculty at CIFE Kakinada Centre	Workshop on Syllabus Finalization for One Year & 6 Months SDP Programs for Kakinada and Rohtak	ICAR-CIFE, Kakinada	12 Jan, 2016	ICAR-CIFE Mumbai
Ashok Kumar	Livestock Expo, 2015	Shri Mukatsar Sahib, Punjab	8-12 Jan, 2016	Punjab
Faculty and technical officers of Kakinada Centre	Write-shop on One Year Skill Development Certificate Course on Fish Farming and Hatchery Management	ICAR-CIFE, Kakinada Centre	12 Jan, 2016	ICAR-CIFE, Kakinada Centre
B. K. Mahapatra	National Seminar on Resource Based Inclusive Agriculture & Rural Development: Opportunities & Challenges	IRDM Faculty Centre of Ramakrishna Mission Vivekananda University	15 Jan, 2016	Ramakrishna Mission, Vivekananda University, Kolkata
K.V. Rajendran K. Pani Prasad	National Consultation on the Management of the Emerging Pathogen, Enterocytozoon Hepatopenaei (EHP), and Related Issues in Indian Shrimp Aquaculture Sector	ICAR-CIBA, Chennai	19 Jan, 2016	ICAR-CIBA, Chennai
A.K. Verma K.V. Rajendran	National Seminar on Fisheries and Aquaculture: Livelihood Security, Sustainability and Conservation	College of Fisheries, Lembucherra, Agartala,Tripura	21-22 Jan 2016	North East Society for Fisheries and Aquaculture (India) and ASFIB
Shrinivas Jahageerdar	4th NKN Workshop	JNTU (Kukatpally), Hyderabad	21-22, Jan 2016	Hyderabad
Gireesh Babu P. Md. Aklakur Manish Jayant	Second International Symposium on Genomics in Aquaculture	ICAR-CIFA, Bhubaneswar	28-30 Jan, 16	ICAR-CIFA, Bhubaneswar
Annam Pavan Kumar	National Level Young Scientist Meet on Research Innovations in Aquatic Genomics and Biotechnology – An Indian Perspective	University of Calcutta, Kolkata	4-6 Feb, 2016	ZSI, Kolkata
G. H. Pailan Parimal Sardar	XVI Biennial Conference (ANSICON 2016)	ICAR-NDRI Karnal	6-8 Feb, 2016	NDRI Karnal

B. K. Mahapatra	Assessment Committee Meeting for Technical Officials of CIFRI, Barrackpore under the functional group "Field & Farm Technical" (Category-II)	ICAR-CIFRI Barrackpore Kolkata	10 Feb, 2016	ICAR-CIFRI, Barrackpore Kolkata
Aparna Chaudhuri A.K. Verma Shrinivas Jahageerdar	Workshop on Vykhayanmala; Magur Matshiykee (Catfish) Vartmaan sthithievam Bhavee Sankalpnaye	Powarkheda, Centre of CIFE	10 Feb, 2016	ICAR-CIFE, Mumbai
Gaurav Rathore	Training Workshop of HRD Nodal officers at ICAR-NAARM	ICAR-NAARM, Hyderabad	10-12 Feb, 2016	HRM Unit, ICAR
B. K. Mahapatra	Stakeholders Meeting for Development of Fisheries and Aquaculture in Manika Maun & Balua Chaur	DOF, Patna	15 Feb, 2016	DOF, Patna
Geetanjali Deshmukhe	International Conference on Ecosystem Services of Wetlands- "Ardrabhumi: 2016"	Thane, Mumbai	16 Feb, 2016	V.P.M.S.B.N. College of Science, Thane
All Scientist of Kolkata Centre	International Conference on Aquatic Resources and Sustainable Management	Science City, Kolkata	17 – 19 Feb, 2016	Central Groundnut Board Kolkata
A.K. Verma Ashuthosh Deo	Multi-Disciplinary International Conference on Science, Sustainability and the Society in Current Scenario: Challenges & Opportunities	Vikas College of Arts, Science & Commerce, Mumbai	20 Feb, 2016	Vikas College of Arts, Science & Commerce, Mumbai
Ramasubramanian V.	18th Annual Conference of Society of Statistics, Computer and Applications (SSCA)	University of Jammu, Jammu	18-20 Feb, 2016	SSCA, Jammu
Faculty of CIFE	National Brainstorming on Ornamental Fisheries	ICAR-CIFE, Mumbai	29 Feb,2016	NFDB, Hyderabad
All Scientists & All Technical Officers of Kakinada centre	AQUABIZ, INDIA 2016 International Conference & Exhibition on Sustainable Aquaculture	Kakinada	12-14 Mar, 2016	APTDC & CII
Zeba Jaffer Abidi	Workshop on Database of Fisheries Co-operatives	ICAR-CIFE, Mumbai	16 Mar 2016	FISHCOPFED, New Delhi and ICAR-CIFE, Mumbai
Ramasubramanian V.	National Seminar on Human Resource Management in Indian Dairy Sector	SMC College of Dairy Science, Anand.	17 Mar, 2016	AAU, Anand
V.Harikrishna ArunSudhagar. S. Pankaj Kumar Ashok Kumar Satyender Singh Gyani Ram	Krishi Unnati Mela	ICAR-IARI, New Delhi	19-21 Mar, 2016	ICAR, New Delhi

Arpita Sharma and WFF	Workshop on Capacity Building for the Implementation of the Voluntary Guidelines for Securing Sustainable Small Scale Fisheries (SSF) Guidelines	India International Centre, New Delhi	21-22 Mar, 2016	ICSF, IFAD, WFFP
Latha Shenoy	17th Consultative Committee meeting	FSI, Mumbai	22 Mar 2016	FSI, Mumbai
B. K. Mahapatra and S. Datta	Conference on Sustainable Development and Management of Aground Water Resources, its Remedial Measures for Emerging Crisis and Climate Change in West Bengal	Salt Lake, Kolkata	28 Mar, 2016	Kolkata
Muralidhar P. Ande	Member in the Selection Committee for Recruiting Farm Manager in NaCSA, Bhimavaram	NaCSA, Bhimavaram	29 Mar, 2016	NaCSA, Bhimavaram West Godavari Dist. A.P.

Visits Abroad

Dr. K. Pani Prasad delivered Key note address as Conference Chair during the International conference on Fisheries and Aquaculture - ICFA 2015 held ar Colombo, Sri Lanka on 25-27 Aug, 2015

Dr. S. Munilkumar visited Curtin University of Technology, Perth, Australia during 9th July to 10th November 2015 for Post-Doctoral Research programme under Endeavour Research Fellowship sponsored by Education Dept, Australian Government

Name of the person who underwent training	Name of the Programme	Duration	Organized by
Pankaj Kumar	Professional Attachment Training	3 months	ICAR-CIFRI
Arun Sudhagar. S	Exposure to Cobia breeding and farming, Pozhiyur, Kerala	11-20 Apr, 2015	RGCA, Muttom, Tamil Nadu
Ashok Kumar	Exposure to Pampano rearing	7-12 May, 2015	Mandapam CMFRI Regional Centre, Mandapam
Sikendra Kumar	DBT– National Training in Molecular Biology and Biotechnology for Fisheries Professionals	15 May - 15 Aug, 2015	ICAR-CIFA, Bhubaneswar
Shamna N.	HRD training on Green Nanosynthesis	4-16 Jun, 2015	MG University, Kerala
Shamna N.	DBT –National Training in Molecular Biology and Biotechnology for Fisheries Professionals	1 Jul - 30 Aug, 2015	CMFRI- Kochi
R. K. Upadhyay	Summer school on Aquaculture Diversification Towards Boosting Pond Productivity and Farm Income	08 - 2 Jul, 2015	ICAR-CIFA, Bhubaneswar
Shashi Bhushan	DBT –National Training in Molecular Biology and Biotechnology for Fisheries Professionals	1 Jul - 30 Sep, 2015	Kochi, Kerala
Dhamotharan K	Training programme for local competent authority on Health Certification of Ornamental Fishes for Export	28 - 30 Sept, 2015	NCAH, Kochi
Babitha Rani A..M	Molecular Biology and Biotechnology for Fisheries Professionals	1 Nov, 2015 – 31 Jan, 2016	ICAR-CMFRI, Kochi
MD Aklakur Manish Jayant	DBT –National Training in Molecular Biology and Biotechnology for Fisheries Professionals	01 Nov, 2015 - 31 Jan, 2016	ICAR-CIFA, Bhubaneswar
Dhamotharan K	DBT- Sponsored 3 months National training in molecular biology & biotechnology for fisheries professionals	1 Nov, 2015 - 31 Jan, 2016	ICAR-CMFRI, Kochi
Saurav Kumar	DBT sponsored 3 month Training on Molecular Biology & Biotechnology for fisheries professionals	15 May - 14 Aug, 2015	ICAR-CIFA,Bhubaneswar
Husne Banu	Professional Lab Attachment training	15 May - 14 Aug, 2015	NIV, Pune
A. Biswas	Certification of Ornamental Fish for Export	28 - 30 Sep, 2015	NCAH, Kochi
B. K. Mahapatra	Management Development Programme on Leadership Development	30 Nov - 11 Dec, 2015	NAARM, Hyderabad
Neha Wajahat Qureshi	CAFT Training Programme on Quantitative Techniques for Agricultural Policy Research	18 Feb - 9 Mar, 2016	Division of Agricultural Economics, ICAR-IARI, Pusa, New Delhi
A. R. Sen,D. K. Singh A. Biswas	CAFT training programme on Ornamental Fish Breeding and Culture	2-22 Mar, 2016	ICAR-CIFE, Kolkata

Category-wise trainings attended by ICAR-CIFE employees during 2015-16 under HRD

S.No.	Name of employee	Designation	Discipline /Section	Name of training programme	Duration (days)	Organizing Institution
1	Mrs Shamna N	Scientist	FNB	Training program on nanotechnology in nutrient delivery	04 - 16 Jun, 2015	MG university, Kottayam, Kerala
2	Dr Sanath Kumar	Senior Scientist	PHT	Agricultural research management	13 - 25 Jul, 2015	NAARM, Hyderabad
4	Dr V.K. Tiwari	Principal Scientist	AQ	Training program on consultancy projects management	03 - 07 Aug, 2015	NAARM, Hyderabad
5	Dr. A.K. Verma	Senior Scientist	AQ	Analysis of experimental data	17 - 22 Aug, 2015	NAARM, Hyderabad
6	Mr Dhamotharan	Scientist	AAH	Training for empanelment of official as LCA for issuing health certificates	28 - 30 Sept, 2015	CUSAT, Kochi
7	Dr Subodh Gupta	Principal Scientist	FNB	Basic training on nanotechnology	05 - 16 Oct, 2015	TNAU, Coimbatore
8	Shri Mujahid Khan	Scientist	FGB	Training programme on quantitative techniques for analysis of breeding experiments	02 - 07 Nov, 2015	NAARM, Hyderabad
9	Mr Sikendra Kumar	Scientist	FNB	National workshop and training on feed and feed technologies for responsible aquaculture	18 -19 Nov, 2015	CIFA, Bhubaneswar
10	Dr B. K. Mahapatra	Principal Scientist	AQ	MDP on leadership development	30 Nov - 11 Dec, 2015	NAARM, Hyderabad
11	Dr S. Dasgupta	Senior Scientist	FNB	Recent advances in NGS data analysis	08 - 18 Jan, 2016	IASRI, New Delhi
12	Ms Neha Qureshi	Scientist	FEES	Training program on qualitative techniques	18 Feb - 09 Mar, 2016	ICAR-IARI
13	Dr. M. K. Chouksey	Technical	PHT	Training Programme on 'Spectropic and chromatographic techniques for material characterization'	02 - 05 Mar, 2016	ICAR-CIRCOT, Mumbai
14	Mr. Md.Sadiq Mohd Mulla	Technical	Works	AD/DC Drive and speed control of electrical motors	15 - 26 Jun, 2016	Advance Training Institute, Kanpur
15	Mrs. Reshma Kalpesh Raje	Technical	FGB	Technique in aquatic animal health skill development programme	07 - 12 Sept, 2015	CIFE, Mumbai
16	Mr. Ram Shinde	Admin	Accounts	ERP training on finance	05 - 7 Oct, 2015	IASRI, New Delhi
17	Mr. Ravindra R. Kadam	Admin	Accounts	ERP training on finance module	06 - 7 Oct, 2015	IASRI, New Delhi
18	Mr. Suresh Chandra	Admin	Accounts	MDP of procurement policy	05 - 10 Oct, 2015	NIFM, Faridabad

RE 2015-16 for HRD : 5 lakhs
Actual Expenditure 2015-16 for HRD : 4.89 lakhs

Chapter
11

Meetings/Workshops/Seminars/ Summer/Winter Schools etc. organized

Workshops/seminars/meetings organised

Event	Date	Funded by
Workshop on Scientific fish culture on farmers of Sunderban, CIFE Kolkata Centre	29 Jul, 2015	CIFE Kolkata Centre
National Conference on Social security and skill development for fisherwomen	19 Aug, 2015	National Federation of Fishers Cooperatives FISHCOPFED, New Delhi and ICAR-CIFE, Mumbai
23 Annual Conference of the Agricultural Economics Research (AERA) on "Inter and intra-sectoral dynamics for transforming indian agriculture	2-4 Dec, 2015	ICAR-CIFE, Mumbai with AERA, New Delhi
Workshop on *Vykhayanmala; Magur Matshiykee* (Catfish) *Vartmaan sthithi evam Bhavee Sankalpnaye*, Powarkheda, Centre	10 Dec, 2015	ICAR-CIFE, Mumbai
Workshop on ICAR-Unified messaging and web hosting solution	16 Dec, 2015	ICAR-CIFE, Mumbai
Workshop on Fisheries and aquaculture emergency response	18 Dec, 2015	ICAR-CIFE, Mumbai
Launch workshop on Development of academic management module for CIFE	18 Dec, 2015	ICAR-CIFE, Mumbai
National brainstorming on Ornamental fisheries	29 Feb, 2016	NFDB, Hyderabad
Interactive session on Implementation of RTI Act	18 Mar, 2016	ICAR, New Delhi
Database on fisheries cooperatives	16 Mar, 2016	ICAR-CIFE, Mumbai

Workshop on Fisheries and Aquaculture Response in Emergencies

ICAR-Central Institute of Fisheries Education (CIFE), Mumbai organized a Workshop on Fisheries and Aquaculture Response in Emergencies on 18 December 2015 for diverse stakeholder group. The training workshop was as per the recommendations of FAOs Emergency Response and Guidance in Fisheries and Aquaculture prepared by Cattermoul, Brown and Poulain (2014). In response to the disasters, the state of Maharashtra has a plan for emergency response in place through various agencies and in this workshop effort was made to involve the agencies involved with this work. Care was taken to have representation from Central and State Government, NGOs, fishery cooperatives, academicians, researchers and youth. The aim of the workshop was to raise awareness among the diverse stakeholders about the vulnerability of the sector, current frameworks for response and the need to be better prepared through appropriate trainings.

The workshop started with the inaugural address by Dr.Gopal Krishna, Director and Vice Chancellor, ICAR-CIFE, Mumbai. He emphasized that a workshop on this topic was very apt as responding to emergencies and disasters, whether natural or human-made, has become an increasingly important part of the mandate of organizations over the past decades. Dr. Narendra Singh Rathore, Deputy Director General (Education) was the Chief Guest of this workshop and mentioned in his address the importance of judicial use of resources and disasters due to climate change. The workshop was done under an Institute funded project and was coordinated by Dr. Arpita Sharma, Principal Scientist Addressing the participants she stressed the vulnerability of fisheries sector and current frameworks for response and the need for trainings for this. Dr. S.K. Chakraborty, Head, Division of Fisheries Resource Management, ICAR-CIFE, Mumbai presented the Profile of Marine Fisheries of India and the state of Maharashtra. Dr. M. Krishnan, Head, Division of Social Science, ICAR-CIFE, Mumbai explained the emergency response and priorities in fisheries and aquaculture. Sri Mahesh Narvekar, Chief Officer, Disaster Management, Municipal Corporation of Greater Mumbai (MCGM), Mumbai detailed the Role of MCGM in Disaster Management. Deputy Inspector General (DIG) Anbarasan, from Indian Coast Guard, Regional Headquarters, (Western Region), Mumbai discussed the Role of Indian Coast Guards. Sri Mahesh Nalwade, Assistant Commandant from National Disaster Response Force (NDRF), Mumbai discussed how the NDRF is involved in emergency response. Sri Sanjay Shivaji Narvekar, Senior Inspector, Marine/Sagari Police, Gorai, Mumbai. Sri. Nitin Naik, District Disaster Management Officer of Palghar District gave live demonstrations about the sea safety device for fishers and how the District Disaster Management Office is helping the fishers. This was followed by a detailed view of export potential of India Fisheries by Ms.Sheetal Hazare, Assistant Director from Marine Product Export Development Authority (MPEDA) Regional Office, Mumbai. Role of NGOs in emergency response was highlighted by Sri Sudhirsinh Potdar from Anirudh Academy of Disaster Management, Mumbai. Highlighting the role of small scale fish farmers and the importance of emergency response in fisheries, Ms. Shudhi Peke of International Collective In Support of Fish Workers (ICSF) spoke about the small scale fisheries guidelines and the frameworks. Ms. Lubaina Rangwala from an International NGO, World Resource Institute (WRI) with one office in Mumbai discussed the vulnerability and adaptation initiatives taken up by WRI. Representatives from Vesava Macchimar Cooperative Society, Ms. Ujjawala Patil and her team from Maharashtra Macchhimar Kriti Samiti and representatives from Reliance Foundation expressed the concerns of fishing community and lauded the efforts of CIFE to have a workshop of this kind. Amongst the academicians were Assistant Professors of Ratnagiri Fisheries College and researchers were from ICAR-CIFE Mumbai along with youth scholars from CIFE.

After the Vote of thanks participants had a lively discussion and reflections were collected from the participants. A short live video clip of the workshop was prepared and displayed. Participants appreciated the workshop and mentioned that it was able to fulfill its objectives. The deliberations of the workshop were fruitful as diverse stakeholder group came together at one platform for one cause. The workshop was successful in strengthening participants' skills.

Workshop on Mahseer Fisheries Conservation Strategies and Way Forward

The Workshop on Mahseer Conservation Strategies and Way Forward was held in Lonavala during 21-22nd August 2015 Lonavala. It was jointly organized by ICAR-CIFE, Mumbai and TATA Power Company Ltd with the support of NFDB, Hyderabad and Friends of Nature Association (FONA), Talegaon. About 50 participants representing all stakeholders namely, experts from ICAR and SAUs working on Mahseer, Senior Officers including Directors of State Fisheries Departments, conservationists, NGO and community representatives, industry representatives, students and media actively deliberated for two days. The workshop was inaugurated by Mr. Vivek Talwar, Vice-President, Tata Power; Dr. Dilip Kumar, Chief Technical Advisor, FAO-NAPA program in Myanmar & Former Director & VC, CIFE; Mr. K. N. Kumar, IAS, Chief Executive, NFDB; and Dr. Gopal Krishna, Joint Director, CIFE & the Project Leader.

The workshop, 7th in the series on Mahseer beginning 1986 between Tata Power & CIFE, Mumbai, reviewed the progress in the art and science of Mahseer conservation since the 2006 Workshop. The Mahseer breeding program initiated at Lonavala Mahseer farm has taken wings and as many as 14 hatcheries have come up across the country leading to increased seed production and more number of river ranching programs. While advances in molecular tools were found to effectively resolve many taxonomy related issues, studies on population dynamics, physiology and nutrition especially in Golden Mahseer (Tor putitora) are helping unravel not only the inherent limitations in Mahseer breeding programs but evolve solutions as well. It was heartening to record the success of Mahseer sanctuaries as conservation strategies in Karnataka (Coorg region) and Himachal Pradesh. The field visit to the Project site in Dehu and Telegaon was a witness to the success of Mahseer river ranching program that was made possible with synergistic partnership of the research institution (ICAR-CIFE), conservation oriented NGO (FONA) and the local community. The barren stretch of Indryani river where Mahseer and other fishes disappeared in late 1980s has been restored with flourishing Mahseer population due to project interventions.

The deliberations brought out LONAVALA DECLARATION 2015 that contained actions points as Way Forward in Mahseer conservation: establishing a multi-stakeholder nodal body 'National Mahseer Conservation Society' for promoting and coordinating Mahseer conservation in India; undertake joint programs with neighbouring countries involving SAARC and BIMSTEC; taxonomic and molecular study of Humpback Mahseer in Cauvery River of Karnataka to verify its relation with Tor khudree; initiate multi-disciplinary and multi-institutional R&D program in mission mode to address slow maturity of females and related concerns in Mahseer; update the 2006 book on 'Art and Science of Mahseer Conservation' and its wider circulation; establishment of Mahseer hatcheries in public sector with NFDB support for large scale seed production, both for supporting conservation as well as culture programs. Dr. W.S. Lakra, Director & VC, CIFE and Mr. Sethi, Director, Tata Power who promised to upscale the Lonavala Fish Farm into Tata Mahseer Centre, graced the valedictory function along with other dignitaries. The program concluded amidst the idyllic charm of Walvan dam backwaters with the resolve to conserve mighty Mahseer, the tiger of rivers.

23rd Annual Conference of the Agricultural Economics Research Association

Dr. Ramesh Chand, Member, NITI Ayog, Government of India, inaugurated 23rd Annual Conference of the Agricultural Economics Research Association on Inter- and Intra-Sectoral Dynamics for Transforming Indian Agriculture at ICAR-CIFE, Mumbai on 2nd December, 2015. In his inaugural, Dr. Chand emphasised that the association should serve as a platform for discussing new knowledge in the area and also to identify research priorities based on extreme social relevance. He also stressed that the agriculture sector has many paradoxes and myths which require critical scrutiny so that scientific evidences and practical solutions can be evolved. He added that current sectoral scenario is complex with many new challenges and reality which require new approaches and economic tools with inter-disciplinary support which would help in achieving the national goals.

Dr. Harsh Kumar Bhanwala, Chairman, NABARD, Chief Guest of the function urged the delegates to make agricultural economics more broad-based with emphasis on rural development. He highlighted many areas such as IT application in agriculture, conservation of natural resources, agricultural exports, shifting of the small and marginal farmers to other non-farm professions, priorities of investment and land leasing etc. in the sector which require attention of researchers, institutions and policy makers.

Earlier, Dr. Gopal Krishna, Director, ICAR-CIFE welcomed the dignitaries and delegates and said that the conference would provide an excellent opportunity for the researchers to exchange ideas.

In his presidential address, Prof. Chengappa, President, AERA, stated that though the declining agricultural growth is a matter of great concern, there is tremendous transformation happening in the sector which include the shift in demand towards high value commodities and progressive growth in agricultural exports. He expressed that this occasion should be used to build the network among the agricultural economists for agricultural growth.

Later, Dr. P.K.Joshi, Director-South Asia, IFPRI, New Delhi, delivered the presidential address on 'Pathways to improve food security and reduce poverty in emerging India' in which he highlighted the challenges such as food and nutritional security, impact of climate change on agricultural production and emphasised that the economic growth should be more inclusive and nutrition sensitive. As a way forward for more inclusive growth, he outlined Food Security Framework with production, availability, access and affordability as core components within a larger circle of policies, institutions, governance, markets and infrastructure, besides best practices from all over the world such as direct cash transfers and transparent e-governance measures.

Dr.M.Krishnan, Head, Social Sciences Division, CIFE and Organising Secretary proposed the vote of thanks.

The three day conference was organised by Agricultural Economics Research Association (India) in association with ICAR-Central Institute of Fisheries Education, Mumbai. More than 250 delegates are participating in the conference in which ~176 papers will be presented and deliberated.

Launch Workshop of CIFE-Academic Management System (CIFE-AMS)

ICAR-Central Institute of Fisheries Education (CIFE), (Deemed University) Mumbai in collaboration with Division of Computer Applications of ICAR-Indian Agricultural Statistical Research Institute (IASRI), New Delhi is working on 'CIFE-Academic Management System' (CIFE-AMS) to strengthen the academic activities of the Institute. A total of five modules are being created to cater the needs of the Students, Faculty, Dean, Registrar and Administrators for performing assigned duties. In this regard, a launch workshop was organized on 18th Dec., 2015 at CIFE. The workshop was inaugurated by Dr. N.S. Rathore, Deputy Director General (Education), ICAR, New Delhi. Dr. Rathore, appreciated the initiative taken by CIFE to develop CIFE-AMS and advised to keep in place the essential infrastructure for implementing the CIFE-AMS. He also stressed the need to conduct the training for staff and students periodically to keep them up-to-date of the system. A brochure containing the features of the CIFE-AMS was also released on this occasion by the DDG (Education).

Writeshops organized

Name of writeshop	Date	Venue
Fish vaccinology	24-25 Apr, 2015	ICAR-CIFE, Mumbai
Fisheries marketing and price analysis	01-03 Jul, 2015 06-07 Jul, 2015	ICAR-CIFE, Mumbai
Aquatic environmental management	07-09 July, 2015	ICAR-CIFE, Mumbai
Fish immunology	18-19 Nov, 2015	ICAR-CIFE, Mumbai
Write-shop on One year skill development certificate course on fish farming and hatchery management	12 Jan, 2016	CIFE, Kakinada Centre

CAFT Training Programmes

Name	Venue	Period	Participants
Ornamental fish breeding and culture	ICAR-CIFE, Kolkata Centre	02-22 Mar, 2016	13
Nutrigenomic approaches in fish nutritional research	ICAR-CIFE, Mumbai	08-18, Dec, 2015	17

CAFT Training on 'Nutrigenomic Approaches in Fish Nutritional Research'

A total of 17 participants from universities and ICAR institutes attended the CAFT training programme on ***'Nutrigenomic Approaches in fish Nutritional Research'*** from 8-18 December 2015. The program was inaugurated by **Dr. S.D. Singh**, ADG (I. Fy.), ICAR New Delhi on 8th December, 2015. In his address Dr. Singh emphasized on CIFE's role in capacity building in specialized and upstream areas to fulfill the dream of Blue Revolution in the country.

Dr. Gopal Krishna, Director stressed upon the goal of Blue revolution to be activated by using newer technologies like molecular techniques, selective breeding, nutrigenetics and most recent nutrigenomic studies. In the training programme the topics covered included Nutrigenomics in Fish Nutrition Research, Fundamental of Fish Nutrigenomics, Functional Genomics Research and their Utility in Fish Nutrigenomics, Genomics and Proteomics, Immunostimulant and Gene, Impact of Climate Change on Fisheries and Aquaculture etc.The programme was concluded in the presence of **Dr. N.S.Rathore,** Deputy Director General (Education), ICAR, New Delhi on 18th December, 2015.

DBT HRD

Name of the programme	Date
National training in Molecular biology and biotechnology for fisheries professionals, Batch I (DBT sponsored)	15 May to 14 Aug, 2015
National training in Molecular biology and biotechnology for fisheries professionals, Batch II (DBT sponsored)	2 Nov, 2015 to 31 Jan, 2016

National Training in Molecular Biology & Biotechnology for Fisheries Professionals

Sponsored by: DBT, New Delhi

Duration: 3 Months

Participating institutes:
ICAR- CIFE (Nodal Centre), ICAR-CIFA & ICAR-CMFRI

National Coordinator: Director, CIFE

PI (CIFE): Dr. Aparna Chaudhari
Co-PI (CIFE): Dr. Gireesh Babu P.

This is a unique program meant to promote the application of molecular tools in fisheries and aquaculture research. The program comprises of 45 days of course work followed by a short project for each participant under the supervision of a faculty member. Resource persons included over 30 CIFE faculty members and guest faculty from NIO, NBFGR and CIBA. Three participants Mr. Gajanan Ghode, Assistant Professor in College of Fisheries, Ratnagiri, Ms. Reshma Janardhan, Scientist, CMFRI and Ms. Rakhi Kumari, Scientist, CIFA were awarded certificates on successful completion.

Meetings

Meetings	Date
Annual IRC Meeting	4-6 April, 2015
Academic Council meeting	18 April, 2015 and 15 March, 2016
Meeting of ICAR Fisheries Institutes' Directors for collaboration in academic and research programs	10 November, 2015
RAC Meeting	26-27 February, 2016
XXI Extension Council Meeting of CIFE	30 January, 2016
RFD Committee Meeting	28 April, 2015
QRT meeting	7-8, July 2015

Academic Council Meeting

Meeting of ICAR Fisheries Institutes' Directors

RAC Meeting

Extension Council Meeting

Chapter 12 Distinguished Visitors

12.1. Dignitaries from Abroad

Visit of Delegates from Spain

A team of four personnel from University of Las Palmas de Gran Canaria, Spain, while returning from World Aquaculture Society (WAS) Annual Meet from South Korea visited CIFE, Mumbai on 3 June, 2015. The team consisting of **Prof. (Dr.) S.J. Kaushik**, European Research Area Chair, University of Las Palmas de Gran Canaria and former, Director Research, INRA; **Prof. (Dr.) Marisol Izquierdo,** Director of the Aquaculture and Marine Genetics Department in University of Las Palmas de Gran Canaria, former Director of Canarian Institute of Marine Sciences, Director of Scientific Policy of ULPGC; **Prof. (Dr.) Ricardo Haroun,** Director of Biodiversity and Conservation of EcoAqua Institute University of Las Palmas de Gran Canaria and **Prof. (Dr.) Rosario Berriel,** Vice-President of foreign affairs for Internatinalization and Cooperation from Las Palmas University. The team visited the labs of CIFE and discussed the prospects of fisheries development in both the countries.

Visit of Delegates from China

On 4th May 2015, a six member delegation from China led by H.E. Mr. HAN Changfu, the Hon'ble Minister of Agriculture, China visited CIFE on the invitation from Department of Agriculture and Cooperation (DOAC), Ministry of Agriculture (MOA) on Monday. The team consisted offollowing members:

Mr. HAN Changfu (MOA), P. R. China (MOA) Minister

Mr. TANG Ke, Dept. of S&T and Education, MOA Director General

Mr. QU Sixi, Dept. of International Cooperation, MOA Counsel

Mr. LIU Junyong, General Office, Director, MOA

Mr. YE Anping, Dept. of International Cooperation, Director, MOA

Mrs. LIN Huifang Center of International Cooperation Service, MOA Deputy Chief

A presentation was made about the teaching, research and extension activities of CIFE. Possible collaboration in different areas were discussed.

Bangladesh Delegates

A team of senior most officials of the fisheries sector of Govt. of Bangladesh visited CIFE on 27th October 2015 to build cooperation between the two countries in the field of fisheries education and research. The team visited the facilities and infrastructure of CIFE and discussed about the possible collaboration in different areas. The team members were as follows:

1. **Mr.Md Anisur Rahman**, Additional Secretary (Fisheries), Ministry of Fisheries & Livestock
2. **Mr.Syed Arif Azad**, Director General (Fisheries), Department of Fisheries
3. **Mr.Sk. Mostafizur Rahman**, Principal Scientific Officer, Department of Fisheries
4. **Mr.Mohamed Zaher,** Principal Scientific Officer, Department of Fisheries
5. **Md. Monwar Hossain,** Director, Ministry of Foreign Affairs

Shri Gajanan Kirtikar
Member of Parliament, Maharashtra
15 June, 2015

Dr (Mrs) Bharti Hemant Lavekar
Member of the Legislative Assembly, Maharashtra
15 June, 2015

Smt. Vanita Kailash Marucha
Corporator, BMC, Maharashtra
15 June, 2015

Shri Yashodar Phanse
Corporator, BMC, Maharashtra
15 June, 2015

Name of the Visitor	Name Position/Address	Date
Prof R. K. Saha	Dean, COF, CAU, Agartala, Tripura	14 April, 2015
Dr. S.C. Mukherjee	Ex- Jt. Director, ICAR-CIFE, Mumbai	18 April, 2015
Dr M. Premjit Singh	VC, CAU, Imphal	21 April, 2015
Dr. C.D. Mayee	Ex-Chairman, ASRB, New Delhi	15 June, 2015
Dr Gurbachan Singh	ASRB, Chairman, New-Delhi	22 June, 2015
Dr M. V. Rao (IAS)	Chairman, BENFISH, Kolkatta	15 July 2015
Dr S. V. Nagachan	Director, ICAR, RC, NEH	26 July, 2015
Dr Prabhushankar (IAS)	Asst. Secretary, DARE, ICAR	15 October, 2015
Dr J. R. Dhanze	Dean, College of Fisheries, CAU, Tripura	26 November, 2015
Prof P.G.Chengappa	President, Agricultural Economics Research Association, New Delhi	2 December, 2015
Dr P.K. Joshi	Director-South Asia, IFPRI, New Delhi	2 December, 2015
Dr Ramesh Chand	Member, NITI Ayog, Government of India	2 December, 2015
Dr Harsh Kumar B.	Chairman, NABARD, Mumbai	2 December, 2015
Dr S.D. Singh	ADG (I-Fy.) ICAR, New Delhi	8 December, 2015
Dr G. Venkateswarlu	ADG, Education Division, ICAR, New Delhi	15 January, 2016
Dr Radha Goyal	Professor, Indian Institute of Technology, New Delhi	18 January, 2016
Dr J. K. Jena	Director, ICAR-NBFGR ,Lucknow	18 February, 2016
Dr P. C. Mahanta	Ex-Director ICAR-DCFR, Bhimtal	20 January, 2016
Dr N. Sarnagi	Ex-Director, ICAR-CIFA, Bhubaneshwar	21 January, 2016
Dr A. K. Singh	Director, ICAR-DCFR, Bhimtal	22 January, 2016
Dr A.K. Singh	DDG (Extension), ICAR, New Delhi	30 January, 2016
Dr M. Gaikwad (IAS)	Commissioner of Fisheries, Maharashtra	30 January, 2016
Dr S. Tikadar	Director , Marine National Park , Jamnagar	30 January, 2016
Dr Sheenan Harpaz	Professor, Volcani Centre, Israel	20 February, 2016
Dr K. Gopakumar	Ex -DDG(Fy), ICAR, New Delhi	27 February, 2016
Prof B.C. Mal	VC, JIS University, Kolkata	27 February, 2016
Dr J.K. Batra	Deputy Director, National Institute of Immunology, New-Delhi	27 February, 2016
Dr A.D. Diwan	Ex- ADG (M-Fy.), ICAR, New Delhi	27 February, 2016
Dr (Mrs) Krishna Srinath	Former Director, ICAR-DRWA, Bhubaneswar	27 February, 2016
Dr Meena Kumari. B.	Former DDG, Fisheries, ICAR, New Delhi	29 February, 2016
Dr N.S. Rathore	DDG Education, ICAR,New-Delhi	15 March, 2016
Dr T.J. Pandian	National Professor	15 March, 2016
Dr P. Jayshankar	Director, ICAR-CIFA, Bhubaneswar	15 March, 2016
Dr K.K. Vijayan	Director, ICAR-CIBA, Chennai	15 March, 2016
Dr C. Ravishankar	Director, ICAR-CIFT, Cochin	15 March, 2016

Chapter 13 Others

54th Annual Day Celebrations

The 54th Annual day celebrations of the ICAR-Central Institute of Fisheries Education, Mumbai was held on 15 June, 2015. Dr. W.S. Lakra, Director & Vice Chancellor in his welcome address briefed the audience on the achievements of various academic programmes, research activities as well as outreach programs undertaken by the institute recently. The Chief Guest, Shri Gajanan Kirtikar, Member of Parliament in his address appreciated the contribution of ICAR-CIFE, the premier institute in fisheries for its role in HRD and fish production in India. He emphasized on the potential of fisheries development in coastal and in land states including Maharashtra. He reminded the responsibility of institute to be fisher/ farmer friendly and urgend to develop programmes for them. Dr. C.D. Mayee, Chairman (Retd.) Agricultural Scientists Recruitment Board, New Delhi in his Presidential address emphasized creation of responsible human resources in fisheries especially in the light of climate change and global developments. Smt. Vanita Kailash Marucha, Shri Yashodar Phanse, BMC Corporators and Dr. Bharti Hemant Lavekar, Member of the Legislative Assembly were also present on the occasion. Institute Awards were distributed to the students and staff for excellence in academics and sports on the occasion. Shri G.R. Deshbandhu, Senior Registrar proposed the vote of thanks.

Library

This ICAR-CIFE Institute library has been identified as "National Library for Fisheries and Allied Sciences" based on its rich collection and status as "The First Deemed University Library in Fisheries and Allied Sciences" in South East Asia. It has very rich collection of books on subjects like Fish and Fisheries, Aquaculture, Biotechnology, Genetics, Ecology, Pollution, Nutrition, Food Processing Technology, Remote Sensing, Limnology, Zoology, Microbiology, Computer Science, Law of the Sea, Economics, Statistics, Extension, Soil Science, Water Quality Management, Biochemistry, Agriculture and Management of Co-operatives etc.

Details of library Collections:

S.No.	Category	Collections
1.	Books	36771
2.	e-books	135
3.	CIFE, Priced Publication	42
4.	Foreign Journals subscribed	29
5.	Indian Journals subscribed	61
6.	Back Volume (Foreign Journals)	8759
7.	Back Volume (Indian Journals)	4228
8.	Ph.D. theses	232
9.	M. F. Sc. theses	1071
10	D. F. Sc. theses	722
11	M.Sc.	32
	Total	**52082**

Endowment Award Function


CIFE Faculy with Endowment Awardees

In order to recognize the significant contributions of Fisheries Students, Researchers, Scientists and Fish Farmers from the Fisheries University, Institute, Aquaculturists and Fisheries Aquapreuners, under the Endowment Awards at ICAR-CIFE, we give cash awards or Gold Medals to the progressive fish farmers, best students, researchers and scientists for their contribution in the field of Fisheries and Fisheries Allied Sciences. These awards are meant to reward selected talent and promote high quality research in Fisheries Sciences including basic & applied research in the fields of Fisheries, Aquaculture, Pisciculture, Marine conservation, Ichthyology etc. and also to honour the selected progressive fish farmers from across the country. Among these awards, some are given at institute level and some at the National level, under various Endowments namely viz: Dr Hiralal Chaudhari, Dr.C.V.Kulkarni, Dr.D.R.Jalihal and Prof.K.H. Alikunhi. The function was held on 31st Aug , 2015

Dr. Hiralal Chaudhuri Best Scientist Award

2013-14

Dr. Janmejay Parhi
Assistant Professor,
College of Fisheries, CAU, Lembucherra

2014-15

Dr. Rajeev Kumar Singh
Senior Scientist,
ICAR- NBFGR, Lucknow

Professor K.H. Alikunhi Gold Medal for Best Ph.D. Student

2013-14

Dr. S. Chowdhary
Babasaheb Bhimrao Ambedkar University
(A Central University), Lucknow

2014-15

Dr. Mohd. Ashraf Rather
Project Personnel
ICAR-CIFE, Mumbai

Dr. C.V. Kulkarni best Ph.D. Student Research Award

2013-14

Dr. Praveen Rai
Punjalkatte Post, Karnataka

2014-15

Dr. Nagalakshmi K
Scientist, ICAR-CIFE, Mumbai

Dr. C.V. Kulkarni Best Young Scientist Award

2013-14

Dr. Sullip Kumar Majhi
Senior Scientist, ICAR-NBFGR, Lucknow

2014-15

Dr. Gauranga Biswas
Scientist, Kakdwip Research Centre
ICAR-CIBA, Kakdwip

Smt. Nirmala C. Kulkarni Best M.F.Sc. Girl Student Research Award

2013-14

Ms. Neha Wazahat Qureshi
Scientist, ICAR-CIFE, Mumbai

2014-15

Ms. Misha Soman
ICAR-CIFE, Mumbai

Dr.C.V. Kulkarni Best M.F.Sc. Student Research Award

2013-14

Mr. Tanveer Hussain
ICAR-CIFE, Mumbai

2014-15

Mr. Asem Sanjit Singh
ICAR-CIFE, Mumbai

Dr. D.R. Jalihal Gold Medal

2013-14

Mr. Amitava Ghosh
C/o Late Shri Swapan Kumar Ghosh,
Village & Post : Simhat, Nadia

2014-15

Mr. Raja Adil Hussain Bhat
ICAR-CIFE, Mumbai

Dr. Hiralal Chaudhuri Best Fish Farmer Award

2013-14

Shri S. Murali Krishna
Aquaculturist, Gandlapalli Village,
Anantapuramu District A.P.

Shri Harendra Kumar
S/o Yashpal Singh,
Village: Peerkheda,
Muzaffarnagar, Uttar Pradesh

2014-15

Shri Shiv Prasad Sahani
S/o Late Mathura Sahani,
Village : Mohhamdpur,
Distt : Siwan-841 224, Bihar

Quinquennial Review Team (QRT) for the period of 2009-14 the final meeting took place under the chairmanship of **Dr. R. Ramamurthi**, Former Vice Chancellor Shri Venkteshwara University, Tiripathi, during 7-8, July 2015 and the recommendations were finalized and the report was submitted to ICAR.

New Facilities Added

A state of art Cell Culture Lab was designed, equipped and made functional for the CIFE staffs & students. The Central Facility is also open for the researchers from other Institutes and Universities as well.

State-of-Art lecture Series

State-of-Art Lecture series for students was organized during 17-18 Aug, 2015. All HoDs 6 divisions delivered lectures on their area of expertise.

Orientation Programme for M.F.Sc. (2015-17) Students

National Conference on Social Security and Skill Development for Fisherwomen 19-20, August, 2015.

A program to commemorate the '153rd Birth Anniversary of Swami Vivekananda' was organized on Friday the 15th January, 2016.

Dr M.S. Rathod, DDG Education, ICAR Inaugurated Biochemistry Lab on 18 Dec, 2015.

Science Club

Under the science club activities the following lectures were delivered by the faculty

Dhamotharan K. Scientist, CIFE, Mumbai	Bacterial Guillotine of Lamarckian Evolution	07 Apr, 2015
Dr. Madhavi Indap Professor, Marine Biotechnology, Ruparel College, Mumbai	Angiogenesis : Creating New Possibilities for Life	30 May, 2015
Dr. Lavleen K. Gupta of IgY Immunologix,	IgY chicken polyclonal antibodies in biological research : An alternative to mammalian antibodies	19 Dec, 2015
N.K. Chadha CIFE Mumbai	Mega Project formulations concept note on multidisciplinary project	05 Feb, 2016
Dr. Sathees C. Raghavan Associate Professor, IISc, Bangalore	DNA repair and Cancer	10 Feb, 2016
Dr. Labh (Visiting fellow from Nepal)	Antioxidant and immunomodulatory properties of Lapsi when given as fish feed and Fisheries and Aquaculture in Nepal	11 Mar, 2016
Dr. Ananthan CIFE Mumbai	'A Sunrise Sector ? Assessing Growth, GDP Contribution and Investment in Indian Fisheries' and 'Highlights from Global Conference on Inland Fisheries' held at Rome	21 Mar, 2016

International Yoga Day

International Yoga Day was observed on 21 June 2015. At CIFE, an introductory lecture on Brahmvidya, that is a school of Yoga teaching Shwaas-Yoga (Yoga for breathing) was organised on Sunday, 21st June 2015.

Agriculture Education Day

Like every year, 5th September 2015 was observed as Agriculture Education Day. In this context one debate competion on **'GIFT Tilapia will be a Boon to Indian Aquaculture**' was held among the students in English and hindi.

Hindi Saptah

Hindi saptah was organised in September, 2015. Various competitions like hindi essay writing, shudh lekhan, drawing, debate, bhashan pratiyogita etc. was conducted and prizes were distributed on the samapan samroh diwas.

Chapter
14 Personalia

RMP

Director
Dr W.S. Lakra (till 31.08.2015)
Dr Gopal Krishna (officiating from 1.9.2015)

Joint Director
Dr A.K. Pal (till 31.5.2015)
Dr Gopal Krishna (from 4.8.2015)

Scientific Staff

Head of Division
1. Dr Gopal Krishna (till 3.8.2015)
2. Dr M. Krishnan
3. Dr N.P. Sahu
4. Dr N.K.Chadha
5. Dr K.V.Rajendran
6. Dr Aparna Chaudhari (from 10.12.15)
7. Dr S.K. Chakraborty(acting)

Principal Scientist
1. Dr K.K. Jain
2. Dr Neelam Saharan
3. Dr Kiran Dube Rawat
4. Dr S.N. Ojha
5. Dr Latha Shenoy
6. Dr Naresh S. Nagpure
7. Dr Nalini Ranjan Kumar
8. Dr Geetanjali Deshmukhe
9. Dr P.K. Pandey (on deputation)
10. Dr B.B. Nayak
11. Dr S. Jahageerdar
12. Dr V.K. Tiwari
13. Dr Arpita Sharma
14. Dr K. Pani Prasad
15. Dr A.K. Reddy
16. Dr P.P. Srivastava
17. Dr Gaurav Rathore
18. Dr R.P. Raman
19. Dr Ramasubramanian V.
20. Dr Ashok Kumar Jaiswar
21. Dr Chandra Prakash
22. Dr Rupam Sharma
23. Dr Gayatri Tripathi
24. Dr C.S. Chaturvedi
25. Dr Satya Prakash Shukla
26. Dr Swadesh Prakash
27. Dr Subodh Gupta

Senior Scientist
1. Dr Mukunda Goswami
2. Dr Zeba Jaffer Abidi
3. Dr Asha T. Landge
4. Dr Ajit Kumar Verma
5. Dr Ashutosh D. Deo
6. Dr P.S. Ananthan
7. Dr Sanath Kumar H.
8. Dr Megha Kadam Bedekar
9. Dr Rama Sharma
10. Dr A.K. Balange
11. Dr Paramita Banerjee Sawant

Scientist
1. Mrs Vidyashree Bharati
2. Dr Babita Rani A.M.
3. Dr A. Pavan Kumar
4. Dr Gireesh Babu Pathakota
5. Dr Kundan Kumar
6. Mr Vinod Kumar Yadav
7. Dr Sujata Sahoo
8. Dr Nagalakshmi K.
9. Mrs Manjusha L.
10. Dr Martin Xavier K.A.
11. Dr Md. Aklakur
12. Mr Sikendra Kumar
13. Ms Jeena K.
14. Mr Saurav Kumar

15. Ms Tincy Varghese
16. Mr Mujahidkhan Ajamalkhan Pathan
17. Mr Shashi Bhushan
18. Ms Shamna N.
19. Mr Dhamotharan K.
20. Mr Karankumar K. Ramteke
21. Ms Rathi Bhuvaneswari G.
22. Ms Layana P
23. Mr Manish Jayant
24. Ms Neha Wajahat Qureshi
25. Ms Husne Banu
26. Mr Angom Lenin Singh

Technical Staff

Chief Technical Officer (T-9)
1. Mr R.D. Tandel
2. Dr S.K. Pandey
3. Mr Alkesh Dwivedi
4. Dr M.K. Chouksey
5. Mr S.S. Kamat
6. Dr. S.G.S. Zaidi (till 26.09.15)

Asstt. Chief Technical Officer (T-7/8)
1. Dr Chandrakant M.H.
2. Mr D.R. Khogare
3. Mr S.K. Sharma
4. Mr Dasari Bhoomaiah
5. Mr Ram Singh
6. Mr P.K. Das
7. Dr (Mrs) Nalini Poojary
8. Mr Subhash Chand

Sr. Technical Officer (T-6)
1. Mr A.K. Padmanabhan
2. Ms Revati B. Dhongde
3. Mrs Rekha Nair
4. Mr C.B. Kareer
5. Mrs Rajani H. Khandgale

Technical Officer (T-5)
1. Mrs Madhavi Pikle
2. Mr R.G. Kudale
3. Mr Bhagat Singh Rawat
4. Mrs S.M. Bagwe
5. Mr B.G. Mandhare
6. Mr J.M. Koli
7. Mrs S.P. Nalawade
8. Mr S. Maity
9. Mr B.J. Rathod
10. Mr N.K. Aglave
11. Mr S.R. Bandkar
12. Mrs Bharati Ghagare
13. Mr Avinash Sable

Sr.Technical Assistant (T-4)
1. Mr Sanjeevan Kumar
2. Mr Baburam Jaiswar
3. Mr Suryakant L. Koli
4. Mr B.T. Phande
5. Mr Anil Kumar Kulsange
6. Mr Sagar Suresh Sawant
7. Mr Rajarshee Moitra
8. Mr Yogesh Jadhao
9. Mr K. Dhana Raju
10. Mr Pawan Kumar
11. Mr Mohd. Baqar

Technical Assistant (T-3)
1. Mr A.L. Kokane
2. Mr A.P. Dhawde
3. Mr Sikandar S. Hussain
4. Mr K.V. Rajendran
5. Mr V.G. Dhindore
6. Mr Arun Puri Gosavi
7. Mr R.D. Deshmukh
8. Mrs. Reshma K. Raje
9. Mr Dhanpat Singh Rawat
10. Mr V.K. Bhave

Technician (T-1)
1. Mr Mohd Sadiq M. Mulla
2. Mr Abhijeet Vijay Jadhav
3. Ms Nisha A. Lade
4. Mr T.G. Gaikwad
5. Mr Pranaya Kumar Biswal

Non-Ministerial Staff
1. Mr Kamaraju

Administrative Staff

Joint Director (Admn) & Registrar
1. Mr Ashish Roy (from 17.06.15)

Senior Registrar
1. Mr. G.R.Deshbandhu (upto 16.06.15)

Chief Finance & Accounts Officer
1. Mr Suresh Chandra

Sr. Administrative Officer
1. Mr Mahesh B. Khubdikar

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

Asstt. Admn .Officer
1. Mr B.L. Kokkula
2. Mrs N.Y. Raorane
3. Mrs Sushma Singh
4. Mrs Poonam N. Behl
5. Mrs S.R. Wadhavkar

Private Secretary
1. Mr G.S. Fernandes
2. Mrs S.R. Arutla

Personal Assistant
1. Mr P.R. Ninawe
2. Mrs Pragati R. Gadre

Assistant
1. Mrs F.G. Fernandes
2. Ms C.S. Khundol
3. Mr D.S. Ingale
4. Mr R.R. Kadam
5. Mrs Swati S. Koli
6. Mr V.S. Kuveskar
7. Mr Suraj Gupta
8. Mr D.V. Raorane
9. Mrs A.U. Joshi
10. Mr A.G. Kolambkar
11. Mrs S.V. Pawar

Upper Division Clerk
1. Mrs Sanyuja S. Parab
2. Mr B.P. Chauhan
3. Mr N.L. Ghane
4. Mr P.G. Angne
5. Mr M.B. Waghela
6. Mrs C.C. Raut
7. Mrs Anu Grover

Lower Division Clerk
1. Mr S.H. Bhosale
2. Mr Shirish P. Malvankar
3. Mr R.N. Kamble
4. Mr Prasenjit P. Sonawane
5. Mr Ram A. Shinde
6. Mr Kunal Maan

Skilled Support Staff
1. Mr B.N. Sukur
2. Mr Madhu Wasnik
3. Mr G.G. Zendekar
4. Mr Surajbali R. Jaiswar
5. Mr B.S. Tamankar
6. Mr Ashok R. More
7. Mr D.B. Gaikwad
8. Mr Sitaram B. Padyal
9. Mrs K.R. Ahire
10. Mr J.K. Makhwana
11. Mrs Kamala Jai Kishore
12. Mr Bandu R. Chavan
13. Mr Ankush R. Dore
14. Mr M.P. Kotian
15. Mr G.B. Kamble
16. Mr Ashok R. Shingade
17. Mr Jagdish N. Dhanu
18. Mr Vasant N. Ondkar
19. Mr Arvind M. Lavande
20. Mr Vinod Kumar Yadav
21. Mrs R.H. Chavan
22. Mr Ankush N. Joyashi
23. Mr Ganesh N. Zendekar
24. Mr Anil D. Sonawane
25. Mr Fakirmayan U. Mullaji
26. Mr Ninad V. Kandalgaonkar
27. Mr Sambhaji Shelke
28. Mrs Reshma Naik
29. Mrs Revati Venkateshvaran
30. Mrs Ujjawala V. Tiwari
31. Mr Rohit S. Koduri
32. Mrs Sabita Devi

CIFE Kolkata Centre

Scientific Staff

Officer Incharge/Principal Scientist
1. Dr B.K. Mahapatra

Scientific Staff
Principal Scientist
1. Dr Arup Ratan Sen
2. Dr G.H. Pailan
3. Dr Shubendu Dutta
4. Dr Parimal Sardar
5. Dr S. Munil Kumar

Senior Scientist
1. Dr S. Dasgupta

Scientist
1. Mr Dilip Kumar Singh

Technical Staff

Chief Technical Officer (T-9)
1. Dr Asok Biswas

Technical Officer (T-5)
1. Mr R.K. Mondal
2. Mr P.K. Patra
3. Mr S.K. Das

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

Technical Assistant (T-3)
1. Mr T.K. Ghosh

Administrative Staff

Personal Secretary
1. Mrs Kaberi Biswas

Assistant
1. Mr C.N. Sahani

Upper Division Clerk
1. Mr P.K. De

Lower Division Clerk
1. Mr Ram Milan Singh
2. Mr Kishore Bose

Skilled Support Staff
1. Mr T.C. Balmiki
2. Mr R.N. Prasad
3. Mr Ramesh Chowdhary
4. Mrs Suman Pandey

CIFE Rohtak Centre

Scientific Staff

Officer Incharge/Scientist
Mr V. Hari Krishna

Scientist
Mr Arun Sudhagar S.
Mr Pankaj Kumar

Technical Staff

Sr. Technical Officer (T-6)
Mr Ashok Kumar

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

Technical Assistant (T-3)
Mr Krishan Kumar

Administrative Staff

Assistant
Mr V.K. Sinha

CIFE Kakinada Centre

Scientific Staff

Officer Incharge/Scientist
1. Dr Muralidhar P. Ande

Scientist
1. Mrs Karthireddy Syamala
2. Dr Arun Sharma
3. Dr Thongam Ibemcha Chanu

Technical Staff

Asstt. Chief Technical Officer (T-7/8)
1. Dr J.K. Prasad
2. Dr. P. Srinivas Rao
3. Mr K. Murli Mohan
4. Mr V.N. Acharyulu
5. Mr R.R.S. Patnaik

Technical Assistant (T-3)
1. Mr M. Satyanarayana

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

Technician
1. Mr V. Shivaji

Administrative Staff

Assistant
1. Mr B. Laxman Rao

Upper Division Clerk
1. Mrs M. Rama Mani

Skilled Support Staff

1. Mr Sheikh Nana Saheb
2. Mr K. Niranjan
3. Mr K. Prasad
4. Mr O. Veera Raju
5. Mr T. Satyanarayana
6. Mr P.V.K. Reddy
7. Mr P.D. Reddy
8. Mr Sheikh Valisha
9. Mr S.S. Reddy
10. Mr Y. Buchilingam
11. Mr M. Govindu
12. Mr M.A. Rao
13. Mr G.V.V. Satyanarayana

CIFE Powerkheda Centre

Scientific Staff

Officer Incharge/ Scientist
1. Dr Somdutt (Till 31.03.2016)
2. Dr Sunil Kumar Nayak (From 1.04.2016)

Scientist
2. Mr Dhalongsaih Reang

Technical Staff

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

Sr. Technical Officer (T-6)
1. Mr L.P. Bamalia

Technical Officer (T-5)
1. Mr Hasan Javed
2. Mr Gurubachan Singh

Technical Assistant (T-3)
1. Mr Anup Singh

Sr. Technician (T-2)
1. Mr Raghuvir Prasad

Administrative Staff

Asstt. Administrative Officer
1. Ms Asha Dhurve

Skilled Support Staff

1. Mr Lallu Prasad
2. Mr Vishnu Lal
3. Mr Mangli Prasad
4. Mr Surendra Kumar
5. Mr Shambhu Dayal
6. Mr Hari Singh
7. Mr Manoharlal
8. Mr Ram Swaroop
9. Mr S. Prajapati

Appointments

S. No.	Name	Designation	Date of Joining
1	Mr Pankaj Kumar	Scientist	09.04.2015
2	Mr Manish Jayant	Scientist	09.04.2015
3	Ms Husne Banu	Scientist	09.04.2015
4	Ms Layana P.	Scientist	09.04.2015
5	Ms Neha Wajahat	Scientist	09.04.2015
6	Mr Ashish Roy	Jt. Director (Admn) & Registrar	17.06.2015
7	Dr Gopal Krishna	Joint Director	04.08.2015
8	Mr Angom Lenin Singh	Scientist	09.10.2015
9	Mr Dhalongsaih Reang	Scientist	12.10.2015
10	Dr K.V.Rajendran	Head	20.11.2015
11	Dr Aparna Choudhari	Head	10.12.2015

Retirements

Sl. No.	Name	Designation	Date of Retirement
1	Dr A.K. Pal	Joint Director	31.05.2015
2	Mr V.M. Patil	Skilled Support Staff	31.05.2015
3	Mr S.M. Shinde	Tech. Officer (Driver)	31.05.2015
4	Mr Hari M. Potpose	L.D.C.	30.06.2015
5	Mr S.L.Kotian,	T-9	31.08.2015
6	Dr P. Rami Reddy	T-9, Kakinada Centre	31.12.2015
7	Mrs S.S. Gajbhiye	Tech.Officer (T-5)	29.02.2016
8	Mr N.V. Ramana	Skilled Support Staff	29.02.2016
9	Mrs V.J. Tambe	Skilled Support Staff	29.02.2016
10	Dr Suryakant Patil	Scientist (SS) - VRS	01.03.2016
11	Dr Somdutt	Principal Scientist	31.03.2016
12	Mr V.K. Sinha	Assistant	31.03.2016

Transfers to CIFE

Sl. No.	Name	Transfer from	Date of Joining
1	Dr Mukunda Goswami, Sr. Scientist	ICAR-NBFGR, Lucknow	17.04.2015
2	Mrs Karthireddy Syamala, Scientist	ICAR-CMFRI-RC, Mumbai	27.04.2015
3	Mr Karankumar K. Ramteke, Scientist	ICAR-CIFT, Kochi	01.05.2015
4	Mr Pranay Kumar Biswal, Technician	ICAR-CARI, Port Blair	05.05.2015
5	Mrs Sabita Devi, Skilled Support Staff	ICAR-NBFGR, Lucknow	04.06.2015
6	Mr Dilip Kumar Singh, Scientist	ICAR-CIFA, Bhubaneshwar	31.08.2015
7	Dr Naresh S. Nagpure, Principal Scientist	ICAR-NBFGR, Lucknow	07.12.2015

Transfers from CIFE

Sl. No.	Name	Transfer to	Date of Relieving
3	Dr. M.Makesh, Sr. Scientist	ICAR-CIBA, Chennai	28.04.2015
4	Dr Suresh Babu P.P., Scientist	ICAR-CMFRI, Kochi	30.04.2015
5	Dr K.V.Rajendran, Principal Scientist	ICAR-CIBA, Chennai	12.05.2015
6	Mr G.R. Desh Bandhu, Sr. Registrar	ICAR HQ	16.06.2015
7	Mr Kunal Maan, L.D.C.	ICAR HQ	24.06.2015 09.09.2015 (Rejoined)
8	Dr S.G.S. Zaidi, CTO	ICAR-DCFR, Bhimtal	26.09.2015

Promotion

Sl. No.	Name	From	To	w.e.f.
1	Dr Asok Biswas	Asstt.Chief Tech. Officer	Chief Tech. Officer (T-9)	21.07.2009
2	Dr S. Dasgupta	Sr. Scientist	Sr. Scientist RGP 9000/-	10.06.2012
3	Dr Asha Landge	Sr. Scientist	Sr. Scientist RGP 9000/-	17.06.2012
4	Mrs Vidya Shree Bharati	Scientist	Scientist RGP 7000/-	27.06.2012
5	Dr Ramasubramanian V.	Sr. Scientist	Principal Scientist	05.06.2013
6	Dr Ashok Kumar Jaiswar	Sr. Scientist	Principal Scientist	06.07.2013
7	Dr Chandra Prakash	Sr. Scientist	Principal Scientist	26.07.2013
8	Dr S. Munil Kumar	Sr. Scientist	Principal Scientist	30.07.2013
9	Dr Rupam Sharma	Sr. Scientist	Principal Scientist	30.07.2013
10	Dr Gayatri Tripathi	Sr. Scientist	Principal Scientist	03.08.2013
11	Dr S. P. Shukla	Sr. Scientist	Principal Scientist	31.08.2013
12	Dr Swadesh Prakash	Sr. Scientist	Principal Scientist	07.12.2013
13	Dr Sujata Sahoo	Scientist	Scientist - RGP 7000/-	15.12.2013
14	Dr Kundan Kumar	Scientist	Scientist - RGP 7000/-	23.12.2013
15	Dr Paramita B. Sawant	Scientist	Sr. Scientist RGP 8000/-	01.01.2014
16	Dr Subodh Gupta	Sr.Scientist	Principal Scientist	23.07.2014
17	Mrs Rajani H. Khandagale	Tech. Officer	Sr. Tech. Officer	01.08.2014
18	Dr P.S. Ananthan	Sr. Scientist	Sr. Scientist RGP 9000/-	18.10.2014
19	Dr K. Nagalakshmi	Scientist	Scientist - RGP 7000/-	15.12.2014
20	Mr Vinod Kumar Yadav	Scientist	Scientist - RGP 7000/-	15.12.2014
21	Dr Sanath Kumar H.	Sr. Scientist	Sr. Scientist RGP 9000/-	28.12.2014
22	Dr Megha Kadam Bedekar	Sr. Scientist	Sr. Scientist RGP 9000/-	28.12.2014
23	Mr C.B. Kareer	Tech. Officer	Sr. Tech. Officer (T-6)	01.01.2015
24	Mr R.R.S. Patnaik	Sr. Tech.Officer	Asstt.Chief Tech. Officer	01.01.2015
25	Mr P.K. Patra	Sr. Tech. Assistant	Technical Officer (T-5)	01.01.2015
26	Mr B.J. Rathod	Sr. Tech. Assistant	Technical Officer (T-5)	01.01.2015
27	Mr N.K. Aglave	Sr. Tech. Assistant	Technical Officer (T-5)	01.01.2015
28	Mr S.R.B andkar	Sr. Tech. Assistant	Technical Officer (T-5)	01.01.2015
29	Mrs Bharati Ghagre	Sr. Tech. Assistant	Technical Officer (T-5)	01.01.2015
30	Mr Rajarshee Moitra	Technical Asstt.	Sr.Technical Asstt. (T-4)	24.02.2015
31	Mr Yogesh Jadhao	Technical Asstt.	Sr.Technical Asstt. (T-4)	04.03.2015
32	Mr Krishan Kumar	Sr. Technician	Technical Asstt. (T-3)	13.04.2015
33	Mr K.D. Raju	Technical Asstt.	Sr.Technical Asstt. (T-4)	24.04.2015
34	Mr S.K. Das	Sr. Tech. Assistant	Technical Officer (T-5)	29.06.2015
35	Mr Subhash Chand	Sr. Tech. Officer	A.C.T.O. (T-7/8)	09.07.2015
36	Mr A.N. Sable	SSr. Tech. Assistant	Technical Officer (T-5)	16.07.2015
37	Mr Satyendra Singh	Technical Asstt.	Sr. Tech. Assistant (T-4)	17.07.2015
38	Mr Lokesh Kumar	Technical Asstt.	Sr. Tech. Assistant. (T-4)	21.07.2015
39	Mr V.K. Bhave	Sr. Technician	Technical Asstt. (T-3)	01.08.2015
40	Mr Pawan Kumar	Technical Asstt.	Sr. Tech. Assistant. (T-4)	07.08.2015
41	Mrs G.Aruna Devi	Technical Asstt.	Sr. Tech. Assistant (T-4)	16.08.2015
42	Mr Prakash Kumar Behera	Technical Asstt.	Sr. Tech. Assistant (T-4)	26.08.2015
43	Mr Mohd. Baqar	Technical Asstt.	Sr. Tech. Assistant (T-4)	09.10.2015
44	Dr Rama Sharma	Sr. Scientist	Sr. Scientist + RGP 9000/-	16.03.2016
47	Mrs. Shahila Iftekar	Sr. Technician (Retired)	Technical Assistant (T-3)	08.01.2012

OBITUARY

Sl. No.	Name of the Employee	Date of Death
1	Mr A.L.Reddi, Skilled Support Staff, Kakinada Centre	19.07.2015
2	Mr Ramkewal Prasad, Skilled SupportStaff, Powerkheda Centre	03.01.2016

Chapter
15 हिन्दी प्रगति प्रतिवेदन

यह लोगो नगर राजभाषा कार्यान्वयन समिति, उत्तर मुंबई (कार्यालय) के लिए एक प्रतियोगिता के अंतर्गत इस संस्थान के **श्री डी. भुम्मैया,** वरिष्ठ तकनीकी अधिकारी ने बनाया ।

राष्ट्रीय संगोष्ठी

संस्थान के पवारखेड़ा केन्द्र में **मागुर मात्स्यिकी (कैटफिश): वर्तमान स्थिति एवं भावी संकल्पनाएं** विषय पर दिनांक 10 फरवरी 2016 को एक दिवसीय राष्ट्रीय संगोष्ठी का आयोजन किया गया । संगोष्ठी का उद्घाटन **डा. गोपाल कृष्णा**, निदेशक, केन्द्रीय मात्स्यिकी शिक्षा संस्थान एवं अन्य गणमान्य अतिथियों के कर-कमलों से दीप प्रज्वलन कर किया गया । इस अवसर पर अतिथि विशेष के रूप में परिषद के सहायक महानिदेशक (अंतरस्थलीय मात्स्यिकी) **डा. सुधीर रायजादा**, मध्यप्रदेश मात्स्यिकी विभाग के निदेशक **श्री यू. के. पुरोहित**, मत्स्य विशेषज्ञ **डा. ए.के. साहू**, होशंगाबाद जिला के ए डी एम (A D M) **श्री एच. एस. मीणा**, संस्थान के जैव प्रौद्योगिकी संकाय की विभागाध्यक्ष एवं पवारखेड़ा केन्द्र के नोडल अधिकारी **डा. अपर्णा चौधरी**, पवारखेड़ा केन्द्र के प्रभारी **डा. सोमदत्त** भी उपस्थित थे । मध्य प्रदेश के विभिन्न जिलों से आए अधिकारियों एवं मत्स्य पालकों को मागुर पालन के विभिन्न पहलुओं से अवगत कराने के लिए विशेषज्ञों ने दस व्याख्यान दिए एवं उनके सवालों के उत्तर दिए । स्थानीय दैनिक समाचार पत्रों और दूरदर्शन ने संगोष्ठी का उल्लेख किया । इस अवसर पर संस्थान से प्रकाशित दो प्रकाशन क्रमश: **''मागुर पालन की वर्तमान स्थिति एवं भावी संकल्पनाएं''** तथा गृह पत्रिका **जलचरी** के 22 वें अंक का विमोचन भी किया गया ।

पुरस्कार

मुंबई की सुप्रसिद्ध साहित्यिक - सामाजिक - सांस्कृतिक संस्था आशीर्वाद द्वारा प्रतिवर्ष मुंबई स्थित भारत सरकार के केन्द्रीय कार्यालयों को राजभाषा हिन्दी में सर्वाधिक कामकाज के लिए पुरस्कृत किया जाता है । इस वर्ष भा.कृ.अनु.प.- केन्द्रीय मात्स्यिकी शिक्षा संस्थान को हिन्दी में सर्वाधिक काम करने पर **आशीर्वाद संस्था** द्वारा **विशेष पुरस्कार** प्रदान किया गया । यह पुरस्कार बुधवार, दिनांक 23 सितम्बर 2015 को मुंबई विश्वविद्यालय के सभागृह में **डा. गोपाल कृष्णा** संस्थान के निदेशक / कुलपति महोदय एवं **डा. वी. के. तिवारी,** प्रधान वैज्ञानिक व **डा. राजेश्वर उनियाल,** उप निदेशक (राजभाषा) ने प्राप्त किया ।

नगर राजभाषा कार्यान्वयन समिति, उत्तर मुंबई (कार्यालय)

यह संस्थान नगर राजभाषा कार्यान्वयन समिति, उत्तर मुंबई का अध्यक्षीय कार्यालय भी है । समिति की प्रत्येक छमाही में एक बैठक होती है । नगर राजभाषा कार्यान्वयन समिति, उत्तर मुंबई (कार्यालय) की सत्रहवीं छमाही बैठक मंगलवार, दिनांक 18 अगस्त 2015 को **डा. वजीर एस. लाकड़ा,** निदेशक / कुलपति भा. कृ. अनु. प.- केन्द्रीय मात्स्यिकी शिक्षा संस्थान की अध्यक्षता में सम्पन्न हुई । समिति द्वारा संचालित राजभाषा पुरस्कार (2012-13 तथा 13-14) विजयी प्रतिभागियों को प्रदान की गई । बैठक के मुख्य अतिथि **डा. पूर्ण सिंह डबास,** भूतपूर्व हिन्दी प्रोफेसर, दिल्ली विश्वविद्यालय थे ।

राजभाषा पुरस्कार समारोह में राजभाषा पुरस्कार योजना (2012-13 व 2013-14) में विजयी प्रतिभागियों को **डा. पूर्ण सिंह डबास** जी के करकमलों से पुरस्कार प्रदान कर

सम्मानित किया गया और इसके पश्चात **डा. पूर्ण सिंह डबास** जी ने अपना व्याख्यान प्रस्तुत किया । तत्पश्चात बैठक **डा. गोपाल कृष्णा,** संयुक्त निदेशक की अध्यक्षता में सम्पन्न हुई ।

नराकास, उत्तर मुंबई (कार्यालय) की अठारहवीं छमाही बैठक बुधवार, दिनांक 24 फरवरी 2016 को प्रात: 11.00 बजे भा.कृ.अनु.प.-केन्द्रीय मात्स्यिकी शिक्षा संस्थान, पंचमार्ग, यारी रोड, वरसोवा के तृतीय तल स्थित सम्मेलन कक्ष में सम्पन्न हुई। समिति के अध्यक्ष **डा.गोपाल कृष्णा**, निदेशक/कुलपति, भा.कृ.अनु.प.-केन्द्रीय मात्स्यिकी शिक्षा संस्थान के दौरे पर होने के कारण बैठक **डा. वी.वी.सिंह**, प्रभारी, केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान का मुंबई अनुसंधान केन्द्र की अध्यक्षता में आयोजित की गई ।

नगर राजभाषा कार्यान्वयन समिति, उत्तर मुंबई (कार्यालय) कार्यशाला - नगर राजभाषा कार्यान्वयन समिति, उत्तर मुंबई (कार्यालय) के तत्वावधान में दिनांक 20 नवम्बर 2015 को समस्त सदस्य कार्यालयों में कार्यरत अधिकारियों व कर्मचारियों हेतु एक दिवसीय विशेष कार्यशाला का आयोजन किया गया । इस कार्यशाला में कुल तीन सत्र संचालित किए गए । प्रथम सत्र में **श्री राजेन्द्र रावत** जी ने राजभाषा हिन्दी के व्यवहारिक पक्ष पर प्रकाश डाला । द्वितीय सत्र में क्षेत्रीय कार्यान्वयन (कार्यालय) बेलापुर, नवी मुंबई के प्रतिनिधि **डा. एम. एल. गुप्ता**, उप निदेशक (कार्यान्वयन) ने भोपाल में आयोजित विश्व हिन्दी सम्मेलन के अपने अनुभव व्यक्त किए तथा राजभाषा - नीति - समस्याएं एवं समाधान पर व्याख्यान प्रस्तुत किया तथा तृतीय सत्र में केन्द्रीय सचिवालय हिन्दी परिषद, मुंबई के प्रतिनिधि **श्री कलीम उल्लाह खान**, ने संसदीय राजभाषा समिति के निरीक्षण के दौरान आनेवाले महत्वपूर्ण मुद्दों पर चर्चा की । इस कार्यशाला में नराकास, उ.मु. (कार्यालय) के सदस्य कार्यालयों से आए 41 प्रतिभागियों ने भाग लिया।

कार्यशाला

संस्थान में शनिवार, दिनांक 26 सितम्बर 2015 को संस्थान के अधिकारियों / कर्मचारियों के साथ ही संस्थान के एम. एफ. एस. सी. सत्र 2015-17 के प्रथम वर्ष के समस्त छात्र-छात्राओं को कम्प्यूटर पर हिन्दी में काम करना आसान हो, इसलिए यूनिकोड की कार्यशाला आयोजित की गई । यह कार्यशाला तीन सत्रों में आयोजित की गई। प्रथम सत्र में एम. एफ. एस. सी. सत्र 2015-17 के प्रथम वर्ष के हिन्दी भाषी 28 छात्र-छात्राओं ने भाग लिया। द्वितीय सत्र में एम. एफ. एस. सी.सत्र 2015-17 के हिन्दी इतर भाषी 47 छात्र-छात्राओं ने भाग लिया। इसी के साथ तृतीय सत्र में संस्थान के अधिकारियों / कर्मचारियों के लिए आयोजित किया गया था, जिसमें संस्थान के 8 अधिकारियों ने भाग लिया ।

प्रकाशन

भाकृ.अनु.प. - केन्द्रीय मात्स्यिकी शिक्षा संस्थान का 54 वां वार्षिक दिवस समारोह दिनांक 15 जून 2015 को मनाया गया। इस अवसर पर संस्थान से प्रकाशित निम्नलिखित हिन्दी/मराठी प्रकाशनों का विमोचन किया गया ।

i) **कृषि की आधुनिक प्रौद्योगिकी की उपलब्धियां एवं चुनौतियां** विषय पर दिनांक 16 दिसम्बर 2013 को आयोजित राष्ट्रीय संगोष्ठी में प्रस्तुत प्रमुख लेखों व शोध पत्रों के साथ ही कार्यवाही तथा प्रमुख संस्तुतियों का संकलन - हिन्दी - प्रकाशन की तिथि - वर्ष 2015, पृ. 308

ii) **रायपुर, छत्तीसगढ़ की मात्स्यिकी में स्वयं सहायता समूहों का योगदान** - हिन्दी पुस्तक - प्रकाशन की तिथि - वर्ष 2014, पृ. 121

iii) **गोडया पाण्यातील कोळंबी शेती** - मराठी पुस्तिका - प्रकाशन की तिथि - वर्ष 2014 , पृ. 25

iv) **निमखा-या पाण्यातील कोळंबी शेती** - मराठी पुस्तिका - प्रकाशन की तिथि - वर्ष 2014, पृ. 24

v) दिनांक 10 फरवरी 2016 को संस्थान क पवारखेड़ा केन्द्र में आयोजित राष्ट्रीय संगोष्ठी के उपलक्ष्य में **मांगुर बीज पालन तकनीक** नामक पुस्तक का विमोचन किया गया । प्रकाशन की तिथि - 10-02-2016, पृ. 58

vi) संस्थान की गृह पत्रिका **जलचरी अंक - 22** का विमोचन दिनांक 10 फरवरी 2016 को किया गया। प्रकाशन की तिथि - 10-02-2016, पृ. 86

vii) माननीय संसदीय समिति हेतु बुलेटिन एवं प्रपत्र आदि ।

शैक्षणिक हिन्दी जलवाणी

संस्थान के एम. एफ. एस. सी. सत्र - 2015-17 के प्रथम वर्ष के छात्र-छात्राओं हेतु हिन्दी जलवाणी एक क्रेडिट कोर्स की कक्षाएं नियमित रुप से संचालित की गई । इस पाठयक्रम में हिन्दी जाननेवाले, हिन्दी का ज्ञान नहीं रखनेवाले छात्रों के

साथ ही विदेशी छात्रों के लिए भी अलग-अलग कक्षाएं संचालित की गई । जनवरी 2016 में अंतिम परीक्षा संचालित की गई।

राजभाषा कार्यान्वयन समिति की बैठक

संस्थान की राजभाषा कार्यान्वयन समिति की 78 वीं बैठक दिनांक 8 अप्रैल 2015 को संस्थान के संयुक्त निदेशक, **डा. ए.के.पाल जी** की अध्यक्षता में सम्पन्न हुई । इसके साथ ही 79 वीं 80 वीं एवं 81वीं बैठक संस्थान के निदेशक महोदय **डा. गोपाल कृष्णा जी** की अध्यक्षता में क्रमश: दिनांक 29 सितम्बर 2015, दिनांक 1 दिसम्बर 2015 एवं दिनांक 11 मार्च 2016 को सम्पन्न हुई । बैठक में लिए गए निर्णयों पर अनुवर्ती कार्रवाई की जा रही है ।

हिन्दी में अनुवाद

- संस्थान का वार्षिक प्रतिवेदन (2014-15) का हिन्दी अनुवाद उपलब्ध कराया गया ।
- संस्थान के एम.एफ़ एस.सी.एवं पी. एचडी. के छात्र-छात्राओं के शोध निबंधों का सारांश हिन्दी में अनुवाद कर प्रस्तुत किया ।

प्रतिनिधित्व

भारतीय कृषि अनुसंधान परिषद, पूसा, नई दिल्ली के नास काम्पलेक्स के लेक्चर हाल में दिनांक 7 नवम्बर 2015 को **'वैज्ञानिक संस्थानों में राजभाषा कार्यान्वयन: प्रयोग व प्रोत्साहन'** विषय पर आयोजित एक दिवसीय राजभाषा संगोष्ठी में सुश्री रेवती धोंगडे, वरिष्ठ तकनीकी अधिकारी ने भाग लिया ।

अन्य उपलब्धियाँ

भा.कृ.अनु.प.- केन्द्रीय मात्स्यिकी शिक्षा संस्थान द्वारा हिन्दी के प्रचार प्रसार हेतु कई उल्लेखनीय कार्य भी किए जा रहे हैं । इसी के तहत संस्थान में सोमवार, दिनांक 21 दिसम्बर 2015 को मुंबई स्थित के.सी. कालेज (मुंबई विश्वविद्यालय) के हिन्दी विभाग के एम.ए. के प्रथम एवं द्वितीय वर्ष के छात्र/छात्राओं हेतु एक दिवसीय विशेष कार्यशाला का आयोजन किया गया। इस कार्यशाला में कुल चार सत्र संचालित किए गए । प्रथम सत्र में संस्थान की वरिष्ठ तकनीकी अधिकारी, **श्रीमती रेखा नायर** द्वारा संस्थान की हिन्दी प्रगति का (पावर प्वाइंट) प्रस्तुतिकरण किया गया । द्वितीय सत्र में **डा. राजेश्वर उनियाल**, उप निदेशक (राजभाषा) ने भारत की राजभाषा नीति एवं हिन्दी पर अपना व्याख्यान प्रस्तुत किया । तृतीय सत्र में **श्री प्रताप कुमार दास**, सहा. मुख्य तक. अधिकारी ने अनुवाद, सिद्धांत एवं प्रक्रिया पर व्याख्यान प्रस्तुत किया । चौथा सत्र छात्र/छात्राओं के हिन्दी का ज्ञान परखने हेतु प्रायोगिक रूप में था, जिसे **सुश्री रेवती धोंगडे**, वरिष्ठ तकनीकी अधिकारी द्वारा संचालित किया गया । इस कार्यशाला में मुंबई स्थित **के.सी. कालेज** के साथ ही **विल्सन कॉलेज** के 29 छात्र-छात्राओं ने भाग लिया । इस अवसर पर **के.सी. कॉलेज** (मुंबई विश्वविद्यालय) के हिन्दी विभाग के विभागाध्यक्ष **डा. शीतला दुबे** के साथ ही **सुश्री सत्यवती चौबे** व **श्री आय कुमार राय** भी उपस्थित थे । अंत में सभी प्रतिभागियों ने इस कार्यशाला संबंधी अपने विचार व्यक्त किए । यह कार्यशाला सभी के लिए लाभदायक रही। तद्पश्चात सभी प्रतिभागियों को प्रमाणपत्र प्रदान कर कार्यशाला समाप्त कर दी गई ।

हिन्दी पुस्तक मेला

हिन्दी के सुप्रसिद्ध व्यंग्यकार शरद जोशी जी के 85 वें जन्मदिवस के उपलक्ष्य में आयोजित **'शरदोत्सव 16'** के अन्तर्गत संस्थान में दिनांक 30-31 जनवरी 2016 को भा.कृ.अनु.प.- केन्द्रीय मात्स्यिकी शिक्षा संस्थान एवं हिन्दुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड (राजभाषा अनुभाग) के संयुक्त तत्वावधान में हिन्दी पुस्तक मेला का आयोजन किया गया, जिसमें दिल्ली, मुंबई तथा कई अन्य शहरों के प्रकाशकों की पुस्तकों, बाल-साहित्य के साथ ही हिन्दी की विभिन्न विधाओं की प्रदर्शनी की गई ।

व्यक्ति विशेष

संस्थान के लिए विशेष हर्ष की बात है कि संस्थान के **डा. राजोश्वर उनियाल,** उप निदेशक (राजभाषा) को "हिन्दी लोक साहित्य का प्रबंधन" नामक पुस्तक हेतु भारत के **माननीय राष्ट्रपति महोदय जी** के कर कमलों से दिनांक 14 सितम्बर 2015 को राजभाषा गौरव-2014 से पुरस्कृत किया गया ।

- इसी के साथ **डा. राजेश्वर उनियाल,** उप निदेशक (राजाभाषा) को महाराष्ट्र राज्य हिन्दी साहित्य अकादमी द्वारा महाराष्ट्र राज्य **हिन्दी साहित्य अकादमी** के **सदस्य** के रुप में नियुक्त किया गया ।

ACRONYMS

AAU	Anand Agricultural University
AIIMS	All India Institute of Medical Sciences
AMAAS	Alberta Media Arts Alliance Society
ANGRU	Acharya N. G. Ranga Agricultural University
ANI	Asian News International
ANN	Artificial Neural Networks
APAARI	Asia Pacific Association of Agricultural Research Institutions
ARS	Agricultural Research Service
ASRB	Agricultural Scientists Recruitment Board
ATMA	Agricultural Technology Management Agency
AU	Andhra University
BARC	Bhabha Atomic Research Centre
BBSRC	Biotechnology and Biological Sciences Research Council
BHU	Banaras Hindu University
BITS	Birla Institute of Technology & Science
BOLD	Barcode of Life Data
BoM	Board of Management
BPSMV	Bhagat Phool Singh Mahila Vishwavidyalaya
BRNS	Board of Research in Nuclear Sciences
BSNL	Bharat Sanchar Nigam Limited
CAA	Coastal Aquaculture Authority
CAFT	Centre for Advanced Faculty Training
CCRF	Code of Conduct for Responsible Fisheries
CCS	Chaudhary Charan Singh
CDOM	Colored Dissolved Organic Matter
CGM	Chief General Manager
CIAE	Central Institute of Agricultural Engineering
CIBA	Central Institute of Brackishwater Aquaculture
CIDCO	City and Industrial Development Corporation
CIFT	Central Institute of Fisheries Technolgy
CIRCOT	Central Institute for Research on Cotton Technology
CMFRI	Central Marine Fisheries Research Institute
CPWD	Central Public Works Department
CVsc	College of Veterinary Science
DAE	Department of Atomic Energy
DARE	Department of Agricultural Research and Education
DBT	Department of Biotechnology
DDG	Deputy Director General
DG	Director General
DGM	Deputy General Manager
DHA	Docosahexaenoic acid
DPPH	2,2-diphenylpicrylhydrazyl
DST	Department of Science and Technology
EPA	Eicosapentaenoic Acid
ERP	Enterprise resource planning
ES	Embryonic Stem
ESBL	Extended-Spectrum Beta-Lactamases
FA	Financial Adviser
FFDA	Fish Farmers' Development Agency
FISHCOPFED	National Federation of Fishermen's Cooperatives LTD
FRP	Fiberglass Reinforced Plastic
GAPDH	Glyceraldehyde 3-Phosphate Dehydrogenase
GADVASU	Guru Angad Dev Veterinary and Animal Sciences University
GBPUAT	Govind Ballabh Pant University of Agriculture and Technology
GCMS	Gas Chromatography Mass Spectrometry
GIS	Geographic Information System
GIS	Geographical Information System
GSI	Gonado Somatic Index
HRD	Human Resource Development
HRMS	Human Resources Management System
IARI	Indian Agricultural Research Institute
IASRI	Indian Agricultural Statistics Research Institute
IASRI	Indian Agricultural Statistics Research Institute
ICSSR	Indian Council of Social Science Research
ICT	Information and Communications Technology
IFS	International Foundation for Science
IIT	Indian Institute of Technology
IIT-K	Indian Institute of Technology Kanpur
IJATCSE	International Journal of Advanced Trends in Computer Science and Engineering
IPR	Intellectual Property Right
IRC	Institute Research Council
IT	Information Technology
ITMU	Institute Technology Management Unit
ITMU	Institute Technology Management Unit
IVRI	Indian Veterinary Research Institute
JNKVV	Jawaharlal Nehru Krishi Vishwa Vidyalaya
ISEC	Institute for Social and Economic Change
KVK	Krishi Vigyan Kendras
LLRUASU	Lala Lajpat Rai University of Veterinary & Animal Sciences
MDR	Multi Drug Resistant
MDU	Maharshi Dayanand University
MFV	Mechanized Fishing vessel
NAARM	National Academy of Agricultural Research Management
NAAS	National Academy of Agricultural Sciences
NABARD	National Bank for Agriculture and Rural Development
NAIP	National Agricultural Innovation Project
NAR	Nucleic Acids Research
NASC	National Agricultural Science Centre Complex
NBAIM	National Bureau of Agriculturally Important Microorganisms
NBFGR	National Bureau of Fish Genetic Resources
NCBI	National Center for Biotechnology Information
NDM-1	New Delhi metallo-beta-lactamase-1
NEH	North Eastern Hill
NETFISH	Network for Fish Quality Management & Sustainable Fishing
NFBSRA	National Fund for Basic, Strategic and Frontier Application Research in Agriculture
NFDB	National Fisheries Development Board
NFF	National Farmers' Federation
NGS	National Geodetic Survey
NIO	National Institute of Oceanography
NMR	Nuclear Magnetic Resonance
NPCIL	Nuclear Power Corporation of India Limited
Oct-4	Octamer-binding transcription factor 4
PCR	Polymerase Chain Reaction
PFZ	Potential Fishery Zone
PIT	Passive Integrated Transponder
PME	Priority Setting, Monitoring and Evaluation
RAC	Research Advisory Committee
RAKVK	Ramakrishna Ashram Krishi Vigyan Kendra
RBI	Reserve Bank of India
RGSTC	Rajiv Gandhi Science and Technology Commission
RIF	Rural Innovation Fund
RVSKVV	Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya
SPM	Security Paper Mill
SVPUAT	SardarVallabhbhai Patel University of Agriculture and Technology
TAAS	Trust for Advancement of Agricultural Sciences
TIFR	Tata Institute of Fundamental Research
TNUVAS	Tamil Nadu Veterinary and Animal Sciences University
UNDP	United Nations Development Programme
USIEF	United States-India Educational Foundation
VSU	Vikram Simhapuri University
WSSV	White Spot Syndrome Virus
ZIET	Zonal Institute of Education & Training
ZSI	Zoological Survey of India

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