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ICAR-Central Institute of Coldwater Fisheries Research

Bhimtal-263136, Nainital, Uttarakhand, India

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प्रस्तावना

भारतीय हिमालयी क्षेत्र अपनी विशिष्ट जलवायु परिस्थितियों एवं समृद्ध जलीय जैव विविधता के कारण विभिन्न प्रकार के शीतजल पारितंत्रों का पोषण करता है, जो पारिस्थितिक संतुलन, मत्स्य संसाधनों तथा पर्वतीय क्षेत्रों में निवास करने वाले समुदायों की आजीविका के लिए अत्यंत महत्वपूर्ण हैं। शीतजल जल कृषि विशेषकर ट्राउट पालन एवं कार्प संवर्धन, सतत् अनुसंधान एवं विकास के माध्यम से निरंतर महत्व प्राप्त कर रहे हैं। भा.कृ.अनु.प. शीतजल मात्स्यिकी अनुसंधान निदेशालय का उन्नयन होकर भा.कृ.अनु.प. केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान (ICAR- CICFR) बनना एक महत्वपूर्ण उपलब्धि है, जो संस्थान के विस्तारित दायित्वों तथा देश में शीतजल मत्स्यिकी एवं जल कृषि के क्षेत्र में इसके बढ़ते योगदान को दर्शाता है।



वर्ष 2025 के दौरान, भा.कृ.अनु.प. केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान (ICAR-CICFR) ने एकीकृत एवं बहु-विषयक दृष्टिकोण अपनाते हुए विभिन्न अनुसंधान क्षेत्रों में उल्लेखनीय प्रगति की। मत्स्य संसाधन प्रबंधन के क्षेत्र में महत्वपूर्ण उपलब्धियाँ हासिल की गई, इसके अन्तर्गत भू-स्थानिक उपकरणों का विकास, मानकीकृत पर्यावरणीय मूल्यांकन प्रोटोकॉल तैयार करना तथा जैव विविधता, आनुवंशिकी एवं माइक्रोप्लास्टिक जैसी उभरती हुयी पारिस्थितिक चिन्ताओं की समझ को बेहतर बनाना शामिल है।

जल कृषि के क्षेत्र में, संस्थान ने लार्वा पालन प्रणालियों में नवाचार, तालाब प्रजनन प्रोटोकॉल तथा देशी एवं विदेशी शीतजल मत्स्य प्रजातियों के संवर्धन के लिए उन्नत तकनीकों के माध्यम से वैज्ञानिक हस्तक्षेपों को सुदृढ़ किया।

मत्स्य पोषण एवं आहार नवाचार के क्षेत्र में संस्थान ने आरएएस प्रणाली हेतु विशिष्ट आहार विकसित किए तथा आहार प्रदर्शन एवं पोषक तत्वों के उपयोग के सटीक मूल्यांकन हेतु मानकीकृत पद्धतियाँ स्थापित कीं। इसके साथ ही, आणविक आनुवंशिकी एवं जैव प्रौद्योगिकी के क्षेत्र में अत्याधुनिक अनुसंधान के माध्यम से टीकों का विकास, मत्स्य कोशिका रेखाओं का प्रमाणीकरण तथा पुनः संयोजक प्रजनन हार्मोन पर अनुसंधान की शुरुआत की गई, जिससे संस्थान की वैज्ञानिक क्षमता में वृद्धि हुई। रोग निगरानी एवं स्वास्थ्य प्रबंधन कार्यक्रमों के अन्तर्गत रोगाणुरोधी प्रतिरोध (AMR) की निगरानी तथा बड़े पैमाने पर फार्म आधारित रोग आकलित किए गए जिन्होंने सतत् शीतजल मत्स्य पालन मछलियों के लिए महत्वपूर्ण जानकारी एवं मार्ग प्रदर्शन प्रदान किया।

बाह्य वित्तपोषित परियोजनाओं ने जलवायु अनुकूलन, जीनोमिक विशेषताओं का अध्ययन, वैकल्पिक उपचार पद्धतियाँ, आजीविका उन्मुख जल कृषि तथा जलविद्युत परियोजनाओं के लिए मत्स्य प्रबंधन योजनाओं के विकास जैसी प्रमुख चुनौतियों का समाधान करते हुए संस्थान के प्रभाव को और सुदृढ़ किया। एक्वाफेज थेरेपी, स्वदेशी (ऑटोजेनस) टीके तथा कम लागत वाली आरएएस प्रणालियों जैसे नवाचार संस्थान की सतत् एवं किसान हितैषी तकनीकों के विकास के प्रति प्रतिबद्धता को दर्शाते हैं। इसके अतिरिक्त, पेटेंट फाइलिंग, ट्रेडमार्क पंजीकरण तथा प्रौद्योगिकी के व्यावसायीकरण एवं जागरूकता को बढ़ावा देने के माध्यम से बौद्धिक संपदा प्रबंधन को भी सुदृढ़ किया गया।

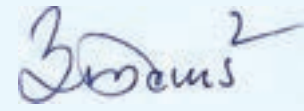
संस्थान ने विस्तार, प्रशिक्षण एवं जनसंपर्क कार्यक्रमों के माध्यम से बड़ी संख्या में किसानों, हितधारकों एवं छात्रों तक पहुंच बनाई। क्षेत्रीय प्रदर्शन, परामर्श सेवाओं एवं क्षमता निर्माण के माध्यम से प्रौद्योगिकी के प्रसार, कौशल विकास एवं अनुसंधान तथा व्यवहारिक अनुप्रयोग के बीच संबंधों को मजबूत करने में महत्वपूर्ण योगदान दिया गया।

इन उपलब्धियों को प्राप्त करने में आईसीएआर का निरंतर सहयोग एवं मार्गदर्शन अत्यंत महत्वपूर्ण रहा है। मैं डॉ. एम. एल. जाट, सचिव, डेयर एवं महानिदेशक, आईसीएआर; डॉ. जे. के. जेना, उप महानिदेशक (मत्स्य विज्ञान); डॉ. सुभदीप घोष

एवं डॉ. देविका पिल्लई, सहायक महानिदेशकों का उनके सतत् प्रोत्साहन एवं नेतृत्व के लिए हार्दिक आभार व्यक्त करता हूँ। साथ ही, अनुसंधान सलाहकार समिति के अध्यक्ष एवं सदस्यों के बहुमूल्य मार्गदर्शन के लिए भी मैं उनका आभारी हूँ।

मैं भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान के सभी वैज्ञानिकों, तकनीकी कर्मचारियों, प्रशासनिक कर्मियों एवं शोधार्थियों के समर्पण एवं कड़ी मेहनत की सराहना करता हूँ। उनके सामूहिक प्रयासों ने इस वार्षिक प्रतिवेदन में उल्लिखित उपलब्धियों को संभव बनाया है। साथ ही, संपादकीय समिति के प्रयासों की भी प्रशंसा करता हूँ, जिन्होंने समय पर वार्षिक प्रतिवेदन 2025 का संकलन किया।

मुझे पूर्ण विश्वास है कि यह संस्थान भविष्य में भी शीतजल मात्स्यिकी एवं जल कृषि के सतत् विकास, वैज्ञानिक नवाचार तथा हिमालयी क्षेत्र एवं उससे परे आजीविका संवर्धन में महत्वपूर्ण योगदान देता रहेगा।



(अमित पांडे)
निदेशक (कार्यवाहक)

PREFACE

The Indian Himalayan region, with its unique climatic conditions and rich aquatic biodiversity, sustains a wide array of coldwater ecosystems that are crucial for ecological balance, fisheries resources, and the livelihoods of communities in hills. Coldwater aquaculture, particularly trout farming and carp culture, continue to gain prominence through sustained research and development interventions. The elevation of ICAR-Directorate of Coldwater Fisheries Research to the ICAR-Central Institute of Coldwater Fisheries Research (ICAR-CICFR) marks a significant milestone, recognizing its expanded mandate and growing contributions to the advancement of coldwater fisheries and aquaculture in the country.



During the year 2025, ICAR-CICFR made notable progress across diverse research domains through an integrated and multidisciplinary approach. Significant advancements were achieved in fisheries resource management with the development of geospatial decision-support tools, standardized environmental assessment protocols, and enhanced the understanding of biodiversity, genetics, and emerging ecological concerns such as microplastics. In aquaculture, the Institute strengthened scientific interventions through innovations in larval rearing systems, captive breeding protocols, and optimization of culture practices for both indigenous and exotic coldwater fish species.

In the area of fish nutrition and feed innovation, the Institute developed RAS-specific feeds and standardized methodologies for precise evaluation of feed performance and nutrient utilization. Concurrently, cutting-edge research in molecular genetics and biotechnology led to the development of vaccines, validation of fish cell lines, and initiation of research on recombinant reproductive hormones, thereby enhancing scientific capabilities of the Institute. Disease surveillance and health management programmes, including antimicrobial resistance monitoring and large-scale farm-level disease assessments, provided critical inputs for sustainable coldwater aquaculture practices.

Externally funded projects further strengthened the Institute's impact by addressing key challenges such as climate resilience, genomic characterization, alternative therapeutics, livelihood-oriented aquaculture, and developing fisheries management plan for hydroelectric projects. Innovations such as aquaphage therapy, autogenous vaccines, and low-cost RAS systems demonstrated the Institute's commitment to developing sustainable and farmer-friendly technologies. In addition, significant efforts were made towards strengthening intellectual property management through patent filings, trademark registrations, and promotion of technology commercialization and awareness.

The Institute also actively engaged in extension, training, and outreach programmes, reaching a large number of farmers, stakeholders, and students through field demonstrations, advisory services, and capacity-building initiatives. These efforts have played a vital role in technology dissemination, skill development, and strengthening the linkages between research and field application.

The continued support and guidance from ICAR have been instrumental in achieving these milestones. I express my sincere gratitude to Dr. M. L. Jat, Secretary, DARE & Director General, ICAR; Dr. J. K. Jena, Deputy Director General (Fisheries Science), Dr. Subhadeep Ghosh, and Dr.



Devika Pillai, Assistant Director General, for their constant encouragement and leadership. I also acknowledge the valuable inputs of the Chairman and members of the Research Advisory Committee for guiding the Institute's research in right direction.

I place on record my deep appreciation for the dedication and hard work of all scientists, technical staff, administrative personnel, and research scholars of ICAR-CICFR. Their collective efforts have been pivotal in achieving the accomplishments documented in this annual report. I also commend the Editorial Committee for their dedicated efforts in compiling the Annual Report 2025 in time.

I am confident that the Institute will continue to contribute significantly towards sustainable coldwater fisheries and aquaculture development, scientific innovation, and livelihood enhancement in the Himalayan region and beyond.

(Amit Pande)
Director (Act.)



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कार्यकारी सारांश

हिमालयी क्षेत्र की शीतजल (Coldwater) पारिस्थितिकी प्रणालियाँ, अपनी विशिष्ट जलवायु परिस्थितियों एवं समृद्ध जलीय जैव विविधता के कारण, मत्स्य संसाधनों के संरक्षण, पारिस्थितिक संतुलन बनाए रखने तथा पर्वतीय समुदायों की आजीविका के समर्थन में महत्वपूर्ण भूमिका निभाती हैं। भारतीय कृषि अनुसंधान परिषद् (ICAR) के एक प्रमुख संस्थान के रूप में, भा.कृ.अनु.प. केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान (ICAR-CICFR) ने संसाधन मूल्यांकन, जल कृषि नवाचार, मत्स्य पोषण, जैव प्रौद्योगिकी तथा स्वास्थ्य प्रबंधन जैसे क्षेत्रों में समन्वित दृष्टिकोण अपनाते हुए जल कृषि के उन्नयन में उल्लेखनीय प्रगति की है। वर्ष के दौरान, संस्थान ने जल कृषि विस्तार हेतु भू-स्थानिक (Geospatial) उपकरण विकसित किए। प्रमुख मत्स्य प्रजातियों की आनुवंशिक एवं पारिस्थितिक समझ को सुदृढ़ किया तथा देशी एवं विदेशी मछलियों के पालन की उन्नत तकनीकों को अनुकूलित किया। आहार विकास, कृत्रिम प्रजनन, लार्वा पालन प्रणाली तथा जलवायु-सहिष्णु (Climate & resilient) जल कृषि में महत्वपूर्ण उपलब्धियाँ प्राप्त की गईं। साथ ही, आणविक जैव प्रौद्योगिकी के क्षेत्र में वैक्सीन विकास, सेल लाइन स्थापना तथा प्रजनन तकनीकों में प्रगति ने संस्थान की वैज्ञानिक क्षमता को और मजबूत किया है। व्यापक रोग निगरानी एवं एंटीमाइक्रोबियल प्रतिरोध (AMR) अध्ययन ने मत्स्य स्वास्थ्य प्रबंधन को स्थायी बनाने में सहयोग दिया। संस्थान ने जलवायु परिवर्तन, जीनोमिक अनुसंधान, वैकल्पिक उपचार तथा आजीविका आधारित जल कृषि से संबंधित कई बाह्य वित्तपोषित परियोजनाओं को भी सफलतापूर्वक क्रियान्वित किया। वर्ष 2025 के दौरान भा.कृ.अनु.प. – केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान (ICAR-CICFR) की प्रमुख अनुसंधान उपलब्धियाँ निम्नलिखित हैं:

संसाधन आकलन एवं प्रबंधन

- लद्दाख में शीतजल मत्स्य पालन के लिए एक भू-स्थानिक निर्णय-सहायता ढांचा विकसित किया गया, जिसमें स्थलाकृति, मृदा, जल, अवसंरचना एवं जलवायु संबंधी मानकों को एकीकृत कर उपयुक्त

स्थलों का चयन किया गया।

- उच्च हिमालयी क्षेत्रों में सतत मत्स्य पालन विस्तार हेतु स्थल चयन के लिए एक समेकित भू-स्थानिक डेटाबेस विकसित किया गया, जिसमें स्थलाकृति (ऊँचाई, ढाल, अभिमुखता), Sentinel- 2A उपग्रह चित्रों पर आधारित उच्च-परिशुद्धता भूमि उपयोग/आवरण (LULC) वर्गीकरण, तथा मृदा के महत्वपूर्ण मानक (बनावट, pH, जैविक कार्बन, गहराई, अपरदन) शामिल किए गए।
- हिमालयी क्षेत्रों के लिए विश्वसनीय जलविज्ञान एवं जलवायु आकलन हेतु भू-स्थानिक इंटरपोलेशन (IDW) और उपग्रह आधारित आंकड़ों का उपयोग कर वर्षा मानचित्रण प्रोटोकॉल का मानकीकरण किया गया।
- कश्मीर घाटी के प्रमुख जल निकायों में माइक्रोप्लास्टिक की उपस्थिति, स्थानिक वितरण, स्रोतों एवं प्रमुख प्रकारों का आकलन किया गया, साथ ही मछलियों के आंत्र (gut) एवं जलीय पर्यावरण में इनके प्रसार का अध्ययन कर इनके पारिस्थितिक एवं मानव स्वास्थ्य पर संभावित जोखिमों को रेखांकित किया गया।
- स्नो ट्राउट (*Schizothorax* spp.) की वर्गीकरण संबंधी अस्पष्टताओं को विस्तृत मॉर्फोमेट्रिक एवं मेरिस्टिक विश्लेषण द्वारा दूर किया गया, जिससे प्रजातियों की स्पष्ट पहचान संभव हुई और उनकी विश्वसनीयता में सुधार हुआ।
- रेनबो ट्राउट के स्टॉक्स में आनुवंशिक विविधता एवं आबादी संरचना का आकलन जीनोम-व्यापी SNP मार्करों के माध्यम से किया गया, जिससे भारतीय हैचरी आबादी में पर्याप्त आनुवंशिक विविधता तथा तात्कालिक अंतःप्रजनन (inbreeding) के जोखिम का अभाव पाया गया।

जल कृषि अनुसंधान एवं विकास

- सुनहरी महासीर (Golden Mahseer) के लार्वा के लिए एक उन्नत वीनींग (weaning) रणनीति

विकसित की गई, जिसमें प्रारंभिक अवस्था में माइक्रोएलगी आहार को शामिल करते हुए समय पर कृत्रिम (formulated) आहार में परिवर्तन किया गया। साथ ही पाचन एंजाइमों की गतिशीलता का अध्ययन कर लार्वा पोषण के वैज्ञानिक आधार को सुदृढ़ किया गया तथा वृद्धि प्रदर्शन एवं आहार अनुकूलन क्षमता में सुधार किया गया।

- सुनहरी महासीर के प्रजनकों के सुरक्षित एवं जीवित परिवहन हेतु ऑक्सीजन युक्त परिस्थितियों में नियंत्रित पैकिंग परीक्षणों के माध्यम से उपयुक्त लोडिंग बायोमास का अनुकूलन किया गया, जिससे 30 घंटे तक की लंबी परिवहन अवधि के लिए सुरक्षित सीमाएँ निर्धारित की गईं।
- पर्वतीय धाराओं (hill stream) की मछलियों के लिए FRP आधारित जलप्रवाही प्रणाली (flow-through system) के साथ एक लार्वा पालन प्रणाली का डिजाइन एवं संचालन किया गया, जिसमें निस्पंदन (filtration) की व्यवस्था के साथ RAS जैसी परिस्थितियों का अनुकरण किया गया।
- देशी सजावटी पर्वतीय धाराओं की मछलियों जैसे लोचेज (loaches) के लिए कैप्टिव प्रजनन प्रोटोकॉल का मानकीकरण किया गया, जिसमें हार्मोन प्रेरित स्पॉनिंग एवं लार्वा पालन शामिल है। सफल प्रजनन एवं बीज उत्पादन का प्रदर्शन कर सजावटी मत्स्य पालन के विविधीकरण एवं आजीविका संवर्धन को बढ़ावा दिया गया।
- भीमताल झील के ऊपरी क्षेत्र में केज कल्चर की संभावनाओं का आकलन करते हुए साइजोथोरेक्स रिचर्डसोनी के लिए 50 मछली प्रति घन मीटर (50 fish m⁻³) की स्टॉकिंग घनत्व का अनुकूलन किया गया, जिससे बेहतर वृद्धि प्रदर्शन प्राप्त हुआ। साथ ही, समय एवं स्थान आधारित लिमनोलॉजिकल मानकों तथा प्लवक उत्पादकता का मूल्यांकन कर शीतजल झील पारिस्थितिकी में केज आधारित जल कृषि की पर्यावरणीय स्थिरता स्थापित की गई।

मत्स्य पोषण एवं चारा विकास

- रेनबो ट्राउट के लिए आरएएस (Recirculating Aquaculture System) आधारित उच्च-

गुणवत्तायुक्त आहार का विकास किया गया, जिससे वृद्धि दर, फीड दक्षता, मल की स्थिरता, ठोस अपशिष्ट निष्कासन में सुधार, अमोनिया उत्सर्जन में कमी तथा जल गुणवत्ता एवं आरएएस प्रणाली की समग्र कार्यक्षमता में वृद्धि प्रदर्शित हुई।

- आरएएस प्रणाली में सटीक मल संग्रहण और विश्वसनीय आहार प्रदर्शन, पोशक तत्व पाचनशीलता तथा अपरशिष्ट उत्पादन के मूल्यांकन को सक्षम बनाने हेतु पाचनशीलता एवं मलसंग्रहण प्रणाली का मानकीकरण किया गया।
- हिमालयी क्षेत्र की एक संवेदनशील एवं आर्थिक रूप से महत्वपूर्ण प्रजाति स्नो ट्राउट (साइजोथोरेक्स रिचर्डसोनी) के लिए पोषण संबंधी हस्तक्षेप अध्ययन प्रारंभ किए गए, ताकि नियंत्रित (कैप्टिव) परिस्थितियों में लार्वा की वृद्धि और जीवित रहने की दर में सुधार किया जा सके।

आणविक आनुवंशिकी एवं जैव प्रौद्योगिकी

- प्रेरित प्रजनन (induced breeding) हेतु Ovaqua हार्मोनल फॉर्म्युलेशन की जैव-सुरक्षा का विस्तृत मूल्यांकन किया गया। उपचारित मछलियों में प्रमुख अंगों के ऊतक स्तर (histological) पर तथा बाह्य संरचना में कोई असामान्यता नहीं पाई गई, जिससे इसकी सुरक्षा और जल कृषि में प्रजनन हस्तक्षेप हेतु उपयुक्तता सिद्ध हुई।
- रेनबो ट्राउट तथा स्नो ट्राउट के स्थायी सेल लाइनों का विकास एवं प्रमाणीकरण किया गया। कल्चर एवं जीवन्तता (viability) परीक्षणों का मानकीकरण, माध्यम (media) का अनुकूलन तथा वृद्धि गतिकी (growth kinetics) का वर्णन करते हुए शीतजल प्रजातियों में प्रयोगशाला में विकसित फिश मीट के लिए एक सुदृढ़ प्लेटफॉर्म स्थापित किया गया।
- रेनबो ट्राउट के लिए एरोमोनाज सैल्मोनिसीडा के विरुद्ध एक निष्क्रिय (inactivated) वैक्सीन विकसित की गई, जिसने उच्च प्रभावशीलता (RPS ~88%), बेहतर जीवितता, विलंबित मृत्यु दर तथा सशक्त जन्मजात एवं अनुकूली प्रतिरक्षा प्रतिक्रियाएँ प्रदर्शित कीं।
- मत्स्य प्रजनन में उपयोग हेतु पुनः संयोजित गोनाडोट्रोपिन (LH एवं FSH) के विकास की प्रक्रिया सिंथेटिक जीन डिजाइन के माध्यम से प्रारंभ की गई है। इसमें एवं उप-इकाइयों को जोड़कर सिंगल-चेन जीन का निर्माण,

यूकेरियोटिक अभिव्यक्ति हेतु अनुक्रम (Sequence) का अनुकूलन, तथा आगे क्लोनिंग एवं प्रमाणीकरण जैसे चरण शामिल हैं, जो प्रजनन जैव-प्रौद्योगिकी और जल कृषि अनुसंधान को सुदृढ़ करने में सहायक होंगे।

रोग निगरानी एवं स्वास्थ्य प्रबंधन

- उत्तराखंड के 44 मत्स्य फार्मों में एएमआर (एंटीमाइक्रोबियल रेजिस्टेंस) सर्विलांस किया गया, जिसमें प्रमुख रोगजनक जीवाणु (एरोमोनास, स्टैफिलोकोकस, ई. कोलाई) की पहचान की गई तथा मछलियों और जल के नमूनों में एंटीबायोटिक प्रतिरोध के आधारभूत प्रोफाइल स्थापित किए गए, जिससे शीतजल जलकृषि में प्रभावी मत्स्य स्वास्थ्य प्रबंधन एवं एएमआर निगरानी को सुदृढ़ किया जा सके।
- एनएसपीएडी (NSPAAD) चरण-II के अंतर्गत उत्तराखंड के 86 मत्स्य फार्मों में व्यापक रोग निगरानी की गयी। आधारभूत स्वास्थ्य डेटा तैयार किया गया, आयातित ट्राउट अंडों की वायरल स्क्रीनिंग के माध्यम से जैव-सुरक्षा सुनिश्चित की गई, तथा प्रशिक्षण और डिजिटल रोग रिपोर्टिंग प्रणाली के माध्यम से मत्स्य पालकों की क्षमता को सशक्त बनाया गया।
- एआईएनपी-एफएच (AINP-FH) कार्यक्रम के अंतर्गत रेनबो ट्राउट में प्रमुख औषधीय रसायनों (केमोथेराप्यूटिक्स) की विषाक्तता सीमा (LD), फार्माकोकिनेटिक्स, जैव-सुरक्षा तथा अवशेष अवधि (withdrawal period) का आकलन किया गया, जिससे सुरक्षित एवं जिम्मेदार मछली स्वास्थ्य प्रबंधन सुनिश्चित किया जा सके।

प्रसंस्करण एवं मूल्य संवर्धन

- दूरस्थ शीतजल क्षेत्रों में रेनबो ट्राउट की बाजार क्षमता बढ़ाने और कटाई उत्पादन के पश्चात हानि को कम करने के लिए विभिन्न मूल्यवर्धित उत्पाद विकसित किए गए, जिनमें कटलेट, फिश कबाब, अचार, ग्रिल्ड फिश और फिश मोमोज शामिल हैं। ये उत्पाद शेल्फ लाइफ बढ़ाते हैं और किसानों की आय में वृद्धि करते हैं, साथ ही खराब सड़क संपर्क से जुड़ी चुनौतियों का समाधान भी करते हैं।

बाह्य वित्तपोषित परियोजनाएँ

- जलवायु-अनुकूल ट्राउट पालन के लिए आरएस-

आधारित प्रणाली, हीट हार्डनिंग तकनीक तथा जोखिम आकलन विधियाँ विकसित एवं सत्यापित की गई, जिससे तापमान में उतार-चढ़ाव और पर्यावरणीय तनाव के प्रति सहनशीलता में सुधार हुआ।

मध्य-पर्वतीय क्षेत्रों में विदेशी एवं देशी लघु कार्प प्रजातियों की पॉलीकल्चर प्रणाली का प्रदर्शन किया गया, जिससे विविधीकृत उत्पादन मॉडल स्थापित हुआ और मत्स्य उत्पादन में वृद्धि हुई।

- रेनबो ट्राउट में *लैक्टोकोकस गार्विई* के विरुद्ध एक ऑटोजेनस वैक्सीन विकसित की गई, जिसने प्रयोगशाला एवं फील्ड परिस्थितियों में उच्च प्रभावशीलता, जैव-सुरक्षा और मजबूत प्रतिरक्षा प्रतिक्रिया प्रदर्शित की।
- प्रमुख मत्स्य रोगजनकों को लक्षित करने वाले नवीन बैक्टीरियोफेज को पृथक कर उनको लक्षित किया गया, जो एंटीबायोटिक्स के पर्यावरण-अनुकूल विकल्प के रूप में एक्वाफेज थेरेपी के विकास के लिए महत्वपूर्ण हैं।
- सुनहरी महासीर (*Tor putitora*) के संपूर्ण जीनोम असेंबली एवं ट्रांसक्रिप्टोमिक विश्लेषण में महत्वपूर्ण प्रगति की गई, जिससे लिंग विभेदन एवं तापीय तनाव प्रतिक्रिया से जुड़े जीनों की पहचान संभव हुई।
- मत्स्य वायरस से नवीन सेल-पेनेट्रेटिंग पेप्टाइड्स की पहचान कर उनकी विशेषता का निर्धारण किया गया, जिनमें अंतःकोशिकीय डिलीवरी एवं जैव-प्रौद्योगिकी अनुप्रयोगों की उच्च क्षमता है।
- मत्स्य प्रोटिओम से नवीन एंटीमाइक्रोबियल पेप्टाइड्स की खोज एवं विशेषता निर्धारण हेतु इन-सिलिको पाइपलाइन का मानकीकरण किया गया, जिससे अगली पीढ़ी की औषधियों के विकास को बढ़ावा मिला।
- उच्च हिमालयी क्षेत्रों के दूरस्थ गांवों में 'हर घर ट्राउट' मॉडल के अंतर्गत बैकयार्ड ट्राउट पालन का प्रदर्शन किया गया, जिससे आजीविका एवं पोषण सुरक्षा को प्रोत्साहन मिला।
- नायर नदी में मछलियों की पारिस्थितिकी- जलविज्ञान एवं तापीय संवेदनशीलता का आकलन किया गया, जिससे आवासीय परिस्थितियों, मत्स्य विविधता एवं जलवायु संवेदनशीलता के बीच संबंध स्थापित हुआ।

- पर्वतीय क्षेत्रों में सीमित जल वाले हाइब्रिड आरएएस मॉडल विकसित एवं प्रदर्शित किए गए, जिससे उत्पादन दक्षता और किसानों द्वारा अपनाने की दर में वृद्धि हुई।
- एनएचपीसी परामर्श परियोजना के अंतर्गत सुबनसिरी जलविद्युत परियोजना के लिए हैचरी विकास एवं मत्स्य प्रबंधन में सहयोग प्रदान किया गया, जिसमें पारिस्थितिक आकलन, अवसंरचना योजना एवं एसओपी विकास शामिल हैं।
- पीएमएमएसवाई आरएएस (PMMSY-RAS) परियोजना के अंतर्गत प्रजनक भण्डार प्रबंधन एवं बीज उत्पादन हेतु अत्याधुनिक आरएएस सुविधा स्थापित की गई, जिससे विभिन्न राज्यों को ट्राउट आईड ओवा की आपूर्ति सुनिश्चित की जा सके।

आउटरीच परियोजनाएँ

- भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान, भीमताल द्वारा मणिपुर विश्वविद्यालय में स्थापित महासीर हैचरी का उद्घाटन 10 मार्च 2025 को अजय कुमार भल्ला (माननीय राज्यपाल, मणिपुर) द्वारा किया गया। यह हैचरी अब सफलतापूर्वक संचालित हो रही है और इसमें चॉकलेट एवं सुनहरी महासीर का सफल प्रजनन किया गया है।
- हिमाचल प्रदेश तथा उत्तराखण्ड के पर्वतीय राज्यों में ट्राउट मत्स्य पालन को अपनाने से जुड़े सामाजिक-आर्थिक कारकों, उत्पादकता एवं चुनौतियों का अध्ययन 90 किसानों के डेटा के आधार पर किया गया। अध्ययन में क्षेत्रीय स्तर पर उत्पादकता, लाभप्रदता और बाधाओं में महत्वपूर्ण अंतर सामने आए, जिससे विशेष रूप से उत्तराखंड में बेहतर प्रबंधन पद्धतियों और लक्षित हस्तक्षेपों की आवश्यकता पर बल दिया गया।

बौद्धिक संपदा अधिकार (IPR) एवं प्रौद्योगिकी विकास

- भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान की बौद्धिक संपदा पोर्टफोलियो को और सुदृढ़ करते हुए मत्स्य स्वास्थ्य एवं जैव-प्रौद्योगिकी नवाचारों से संबंधित तीन पेटेंट आवेदन दायर किए गए, जिनमें डायग्नोस्टिक प्रोब्स, एंटीमाइक्रोबियल पेप्टाइड्स तथा एंटीफंगल नैनो-फॉर्म्यूलेशन्स शामिल हैं।

- वर्ष के दौरान संस्थान ने संस्थागत ब्रांडिंग और प्रमुख प्रौद्योगिकियों (जैसे सीआईसीएफआर लोगो, ट्राउट फीड, महासीर फीड तथा GnRH फॉर्म्यूलेशन) के लिए चार ट्रेडमार्क आवेदन भी दायर किए।
- 2 मई 2025 को भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान, भीमताल ने अपने आईटीएमयू सेल के माध्यम से विश्व बौद्धिक संपदा दिवस के अवसर पर एक कार्यक्रम आयोजित किया, जिसका उद्देश्य वैज्ञानिकों, छात्रों और कर्मचारियों के बीच मत्स्य एवं जलकृषि में नवाचार को बढ़ावा देने में बौद्धिक संपदा अधिकारों के महत्व के प्रति जागरूकता बढ़ाना था।

महत्वपूर्ण घटनाएँ, विस्तार गतिविधियाँ, प्रशिक्षण एवं अन्य कार्यक्रम

- एमजीएमजी कार्यक्रम के अंतर्गत पाँच टीमों ने नैनीताल, अल्मोड़ा, चम्पावत, पिथौरागढ़ एवं ऊधम सिंह नगर के विभिन्न गाँवों को अपनाकर शीतजल मात्स्यिकी में आवश्यकता-आधारित वैज्ञानिक हस्तक्षेप प्रदान किए।
- भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान द्वारा किसानों के लिए फील्ड डे, जागरूकता कार्यक्रम एवं परामर्श सेवाएँ आयोजित की गईं, जिनमें रेनबो ट्राउट एवं कार्प पालन, सजावटी मत्स्य पालन तथा बेहतर प्रबंधन पद्धतियों का प्रसार एवं सामग्री वितरण किया गया।
- संस्थान ने मत्स्य रोग प्रकोपों पर फील्ड जांच कर त्वरित सलाह प्रदान की, जिससे हानि को कम करने एवं उत्पादन बढ़ाने में सहायता मिली।
- भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान ने उत्तराखंड मत्स्य विभाग को डेनमार्क से आयातित रेनबो ट्राउट आईड ओवा के क्वारंटीन, ऊष्मायन एवं स्वास्थ्य परीक्षण हेतु तकनीकी मार्गदर्शन प्रदान किया, जिससे जैव-सुरक्षा एवं हैचरी प्रबंधन में सुधार हुआ।
- भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान, भीमताल तथा इसके क्षेत्रीय केंद्र चम्पावत में 26 जनवरी 2025 को 76वां गणतंत्र दिवस मनाया गया, जिसमें सभी स्टाफ सदस्यों सहित शोध छात्रों ने भाग लिया।

- भा.कृ.अनु.प.-शीतजल मात्स्यिकी अनुसंधान निदेशालय, भीमताल को उन्नत कर भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान बनाया गया। इस महत्वपूर्ण उपलब्धि का उत्सव 21 फरवरी 2025 को बड़े उत्साह के साथ मनाया गया। इस अवसर पर डॉ० हिमांशु पाठक, सचिव (डेयर) एवं महानिदेशक, आईसीएआर, मुख्य अतिथि के रूप में उपस्थित रहे। साथ ही उप-महानिदेशक (डीडीजी) एवं सहायक महानिदेशक (एडीजी) (मत्स्य विज्ञान) भी कार्यक्रम में सम्मिलित हुए। यह उपलब्धि संस्थान के शीतजल मत्स्य अनुसंधान एवं विकास में महत्वपूर्ण वैज्ञानिक योगदान की औपचारिक मान्यता को दर्शाती है।



- 19-21 फरवरी 2025 को 'जियो-स्पेशियल टूल्स द्वारा शीतजल संसाधन मानचित्रण' पर तीन दिवसीय प्रशिक्षण आयोजित किया गया।
- 27 फरवरी से 1 मार्च 2025 को चम्पावत में 'रेनबो ट्राउट के प्रजनन, बीज उत्पादन, हैचरी, आहार एवं रोग प्रबंधन' पर प्रशिक्षण कार्यक्रम आयोजित किया गया।
- 7 मार्च 2025 को अंतरराष्ट्रीय महिला दिवस मनाया गया।
- 23-24 मार्च 2025 को चमोली जिले के पीपलकोटी में स्नो ट्राउट रैंचिंग कार्यक्रम आयोजित किया गया।
- 3-9 अप्रैल 2025 के दौरान 'शीतजल मत्स्य अनुसंधान में अनुप्रयुक्त तकनीक' पर पाँच दिवसीय प्रशिक्षण आयोजित किया गया।
- "पोषण अभियान जन आंदोलन" के समर्थन में 7वां पोषण पखवाड़ा 8 से 22 अप्रैल 2025 तक मनाया गया। इस राष्ट्रीय अभियान के अंतर्गत भीमताल एवं चंपावत

में जागरूकता एवं जन-संपर्क से संबंधित विभिन्न गतिविधियों का आयोजन किया गया।

- भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान की 38वीं अनुसंधान सलाहकार समिति (RAC) की बैठक 05-06 मई 2025 को डॉ. ए.जी. पोन्नैय्या, पूर्व निदेशक, आईसीएआर-सीआईबीए एवं आईसीएआर-एनबीएफजीआर की अध्यक्षता में आयोजित की गई।
- 'कार्प मछलियों के प्रजनन एवं बीज उत्पादन तथा मछली एवं मत्स्य उत्पादों के मूल्य संवर्धन' विषय पर पाँच दिवसीय व्यावहारिक प्रशिक्षण कार्यक्रम 22 से 26 मई 2025 के दौरान भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान, चम्पावत में आयोजित किया गया।
- भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान, भीमताल तथा इसके प्रायोगिक क्षेत्र केंद्र, चम्पावत ने 21 जून 2025 को 'एक पृथ्वी, एक स्वास्थ्य के लिए योग' थीम के साथ 11वाँ अंतरराष्ट्रीय योग दिवस मनाया।
- 21 जून 2025 को मत्स्य पालन विभाग, भारत सरकार के सचिव डॉ. अभिलक्ष लिखी ने भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान, भीमताल का दौरा कर संस्थान की गतिविधियों एवं प्रगति की समीक्षा की।
- संस्थान ने 29 मई से 12 जून 2025 तक उत्तराखंड में 'विकसित कृषि संकल्प अभियान' का क्रियान्वयन किया, जिसमें 226 गाँवों को सम्मिलित करते हुए 6,000 से अधिक किसानों तक चार वैज्ञानिक एवं तकनीकी टीमों के माध्यम से पहुँच बनाई गई तथा जमीनी स्तर की समस्याओं एवं चुनौतियों की पहचान की गई।
- भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान ने 10 जुलाई 2025 को राष्ट्रीय मत्स्य किसान दिवस मनाया, जिसमें पर्वतीय मत्स्य पालन पर तकनीकी सत्र आयोजित किए गए, शीतजल मत्स्य पालन तकनीकों का प्रसार किया गया तथा एससी/एसटी किसानों को सामग्री वितरण के माध्यम से सहयोग प्रदान किया गया।
- भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान

संस्थान की 21वीं आई.आर.सी. बैठक 21 जुलाई 2025 को निदेशक डॉ. अमित पांडे की अध्यक्षता में आयोजित हुई।

- भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान, भीमताल एवं इसके प्रायोगिक क्षेत्र केंद्र, चम्पावत ने 15 अगस्त 2025 को 79वाँ स्वतंत्रता दिवस मनाया।
- 20 अगस्त 2025 को भीमताल में संस्थान की 24वीं प्रबंधन समिति (IMC) की बैठक निदेशक डॉ. अमित पांडे की अध्यक्षता में आयोजित की गई।
- भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान ने 1 से 15 सितम्बर 2025 तक हिंदी पखवाड़ा मनाया।
- भा.कृ.अनु.परि.-केन्द्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान, भीमताल ने 24 सितम्बर 2025 को अपना 38वाँ स्थापना दिवस मनाया।
- 16 से 18 सितम्बर 2025 के दौरान भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान, भीमताल में 'गोल्डन महासीर के बीज उत्पादन एवं हैचरी प्रबंधन' पर तीन दिवसीय प्रशिक्षण कार्यक्रम आयोजित किया गया।
- 11 अक्टूबर 2025 को भा.कृ.अनु.प.-केन्द्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान, भीमताल एवं इसके प्रायोगिक केंद्र, चम्पावत द्वारा प्रधानमंत्री धन-धान्य कृषि योजना (PM-DDKY) एवं पल्स मिशन के शुभारंभ के अवसर पर कार्यक्रम आयोजित किया गया।
- 16 सितम्बर से 1 अक्टूबर 2025 तक 'स्वच्छता ही सेवा' राष्ट्रीय अभियान के अंतर्गत भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान द्वारा व्यापक कार्यक्रम आयोजित किया गया।
- 31 अक्टूबर 2025 को सरदार बल्लभभाई पटेल की जयंती के उपलक्ष्य में राष्ट्रीय एकता दिवस मनाया गया।

- 'वंदे मातरम' के 150 वर्ष पूर्ण होने के उपलक्ष्य में 7 नवम्बर 2025 को संस्थान के सभागार में सामूहिक गायन कार्यक्रम आयोजित किया गया।
- 19 नवम्बर 2025 को भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान, भीमताल में एक दिवसीय किसान गोष्ठी आयोजित की गई, जिसमें किसानों ने प्रधानमंत्री किसान सम्मान निधि की 21वीं किस्त जारी होने तथा कोयंबटूर, तमिलनाडु से दक्षिण भारत प्राकृतिक मत्स्य पालन सम्मेलन 2025 के उद्घाटन का लाइव प्रसारण भी देखा।
- 17 से 21 नवम्बर 2025 तक भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान, भीमताल में 'रीसर्कुलेंटिंग एक्वाकल्चर सिस्टम (RAS)' पर पाँच दिवसीय प्रशिक्षण कार्यक्रम आयोजित किया गया।
- 17 से 21 नवम्बर 2025 के दौरान चम्पावत स्थित प्रायोगिक मत्स्य फार्म में सीआईएफई, मुंबई के एमएफएससी छात्रों के लिए 'शीतजल मत्स्य पालन' पर पाँच दिवसीय फील्ड प्रशिक्षण आयोजित किया गया।
- 18 से 24 नवम्बर 2025 तक 'एक्ट नाउरू प्रोटेक्ट अवर प्रेजेंट, सिक्थोर अवर फ्यूचर' थीम के अंतर्गत विश्व एंटी माइक्रोबिअल रजिस्ट्रेंस (एएमआर) जागरूकता सप्ताह मनाया गया।
- 26 नवम्बर 2025 को संविधान दिवस मनाया गया, जिसमें सभी कर्मचारियों ने शपथ ली।
- जनजातीय गौरव वर्ष पखवाड़ा 2025 के अंतर्गत 1 से 15 नवम्बर 2025 तक उत्तराखंड एवं मेघालय के जनजातीय क्षेत्रों में जागरूकता कार्यक्रम आयोजित किए गए।
- 16 से 31 दिसम्बर 2025 तक भा.कृ.अनु.प.-केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान द्वारा स्वच्छता पखवाड़ा आयोजित किया गया।

1. Executive Summary

The coldwater ecosystems of the Himalayan region, endowed with unique climatic conditions and rich aquatic biodiversity, play a vital role in sustaining fisheries resources, ecological balance, and livelihood support to hill communities. As a premier institute under ICAR, ICAR-CICFR has made significant strides in advancing coldwater fisheries and aquaculture through an integrated approach encompassing resource assessment, aquaculture innovation, fish nutrition, biotechnology, and health management. During the year, the institute developed geospatial decision-support tools for aquaculture expansion, strengthened genetic and ecological understanding of key species, and optimized culture practices for indigenous and exotic fishes. Notable progress was achieved in feed development, captive breeding, larval rearing systems, and climate-resilient aquaculture. Concurrently, advances in molecular biotechnology, including vaccine development, cell line establishment, and reproductive interventions, have strengthened scientific capabilities of the institute. Comprehensive disease surveillance and antimicrobial resistance studies further supported sustainable fish health management. The institute also successfully implemented several externally funded projects addressing climate resilience, genomic research, alternative therapeutics, and livelihood-oriented aquaculture. The key research achievements of ICAR-CICFR during the year 2025 are summarized below:

Resource assessment and management

- Developed a geospatial decision-support framework for coldwater aquaculture in Ladakh by integrating topographical, soil, water, infrastructural, and climatic parameters for site suitability assessment.
- Developed an integrated geospatial database combining topographical features (elevation, slope, aspect), standardized

high-accuracy LULC classification using Sentinel-2A imagery, and critical soil parameters (texture, pH, organic carbon, depth, erosion) to delineate and evaluate suitable sites for sustainable aquaculture expansion in high-altitude regions.

- Standardized rainfall mapping protocols using geospatial interpolation (IDW) and satellite-derived datasets, enabling reliable hydrological and climate assessments for Himalayan regions.
- Assessed the occurrence, spatial distribution, sources, and dominant morphotypes of microplastics in major water bodies of the Kashmir valley, including their prevalence in fish gut and aquatic environments, highlighting associated ecological and human health risks.
- Taxonomic ambiguities of snow trout (*Schizothorax* spp.) have been resolved through detailed morphometric and meristic analyses, enabling clear species delineation and improving the reliability of snow trout species identification.
- Assessed genetic diversity and population structure of rainbow trout stocks using genome-wide SNP markers, revealing adequate genetic variability and absence of immediate inbreeding risks in Indian hatchery populations.

Aquaculture oriented research and development

- Developed an optimized weaning strategy for golden mahseer larvae by integrating early microalgal feeding with a timely transition to formulated diets, while elucidating associated digestive enzyme dynamics to strengthen the scientific basis of larval nutrition and improve growth performance and feed adaptability.
- Optimized loading biomass for safe live transportation of golden mahseer brooders through controlled packing trials under oxygenated conditions, establishing

suitable biomass limits over extended transport durations (up to 30 hours).

- Designed and operationalized a dedicated larval rearing system for hill stream fishes using FRP-based flow-through systems with filtration, simulating RAS conditions.
- Standardized captive breeding protocols for indigenous ornamental hill stream fishes like loaches, including hormone-induced spawning and larval rearing, and demonstrated successful breeding and seed production, supporting diversification and livelihood-oriented ornamental fish culture.
- Assessed the potential of cage culture in upland Bhimtal Lake by optimizing stocking density (50 fish m⁻³) for enhanced growth performance of *Schizothorax richardsonii*, while simultaneously evaluating spatiotemporal limnological parameters and plankton productivity to establish the environmental sustainability of cage-based aquaculture in coldwater lake ecosystems.

Fish nutrition and feed development

- Developed RAS-specific high-energy feeds for rainbow trout, demonstrating improved growth, feed efficiency, faecal stability, solid removal, reduced ammonia excretion, and overall enhancement of water quality and system efficiency in RAS systems.
- Standardized an indigenous digestibility and faecal collection system, enabling precise faecal recovery and reliable evaluation of feed performance, nutrient digestibility, and waste output under RAS conditions.
- Initiated nutritional intervention studies for snow trout (*Schizothorax richardsonii*), a vulnerable and economically important Himalayan species, to improve larval growth and survival under captive conditions.

Molecular genetics and biotechnology

- Assessed the biosafety of Ovaqua

hormonal formulation for induced breeding through detailed evaluation of treated fish, confirming the absence of histological alterations in key organs and any external morphological abnormalities, thereby establishing its safety and suitability for reproductive interventions in aquaculture.

- Developed and validated stable cell lines of rainbow trout and snow trout; standardized culture and viability assays, optimized media, and characterized growth kinetics to establish a platform for lab-grown fish meat in coldwater species.
- Developed an inactivated vaccine against *Aeromonas salmonicida* for rainbow trout, demonstrating high efficacy (RPS ~88%), enhanced survival with delayed mortality, and strong innate and adaptive immune responses.
- The development of recombinant gonadotropins (LH and FSH) for applications in fish reproduction has been initiated through synthetic gene design. Synthetic single-chain genes are being constructed by linking the α - and β -subunits, followed by sequence optimization for eukaryotic expression, with subsequent steps involving cloning and validation to support advancements in reproductive biotechnology and aquaculture research.

Disease surveillance and health management

- Conducted AMR surveillance across 44 fish farms in Uttarakhand, identified key bacterial pathogens (*Aeromonas*, *Staphylococcus*, *E. coli*) and established baseline antibiotic resistance profiles in fish and water isolates for informed fish health management and AMR monitoring strategies in coldwater aquaculture.
- Under NSPAAD Phase-II, conducted large-scale disease surveillance across 86 farms in Uttarakhand, generated baseline health datasets, ensured biosecurity through viral screening of imported trout

ova, and strengthened farmer capacity through training and digital disease reporting systems.

- Under AINP-FH programme, toxicity thresholds (LD₅₀), pharmacokinetics, biosafety, and withdrawal periods of key chemotherapeutics in rainbow trout were assessed for safe and responsible fish health management.

Processing and value addition

- To improve marketability and minimise post-harvest losses of rainbow trout in remote coldwater regions, a range of value-added products were developed, including cutlets, fish kababs, pickles, grilled fish, and fish momos. These products extend shelf life and increase economic returns to farmers, addressing challenges associated with poor road connectivity.

Externally funded projects

- Developed and validated climate-resilient trout farming in RAS-based system, heat hardening approaches, and risk assessment methods, to improve tolerance to temperature fluctuations and environmental stressors.
- Demonstrated polyculture of exotic and indigenous minor carps in mid-hill regions to establish a viable model for diversified production and improved fish yield in hill aquaculture systems.
- Developed an autogenous vaccine against *Lactococcus garvieae* in rainbow trout, demonstrating high efficacy, biosafety, and strong immune responses under laboratory and field conditions.
- Isolated and characterized novel bacteriophages targeting major fish pathogens for the development of aquaphage therapy - a promising eco-friendly alternative to antibiotics.
- Made a significant progress in whole genome assembly and transcriptomic analysis of golden mahseer (*Tor putitora*) to identify candidate genes linked to sex differentiation and thermal stress response.

- Identified and characterized a repertoire of novel cell-penetrating peptides from fish viruses, with significant potential for intracellular delivery and biotechnological applications
- Standardized an in-silico pipeline for discovery and characterization of novel antimicrobial peptides from fish proteome, enabling targeted development of next-generation therapeutics.
- Demonstrated backyard trout farming ('Har Ghar Trout' model) in high-altitude vibrant villages, promoting livelihood and nutritional security.
- Conducted ecohydrological and thermal sensitivity assessments of fish in Nayar river, linking habitat conditions with fish diversity and climate vulnerability.
- Developed and demonstrated low-cost hybrid RAS models for trout farming in water-limited hill regions, enhancing production efficiency and farmer adoption.
- Under NHPC consultancy project, supported hatchery development and fisheries management for Subansiri hydroelectric project through ecological assessments, infrastructure planning, and SOP development.
- Under PMMSY RAS Project, established a state-of-the-art multi-loop RAS facility for broodstock management and seed production to cater trout eyed ova to multiple states.

Outreach projects

- The mahseer hatchery established by ICAR-CICFR, Bhimtal at Manipur University, Imphal, was inaugurated on 10 March 2025 by the Hon'ble Governor of Manipur, Shri Ajay Kumar Bhalla, and has since become operational, achieving successful breeding of chocolate and golden mahseer.
- Studied the socio-economic factors, productivity, and challenges affecting trout farming adoption in the Himalayan states of Himachal Pradesh and Uttarakhand, based

on data from 90 farmers. The study highlights significant regional differences in productivity, profitability, and constraints, emphasizing the need for improved management practices and targeted interventions, especially in Uttarakhand.

IPR and technology development

- Further strengthened intellectual property portfolio of ICAR-CICFR through filing of three patent applications on fish health and biotechnology innovations, including diagnostic probes, antimicrobial peptides, and antifungal nanoformulations.
- During the year, the institute filed four trademark applications for institutional branding and flagship technologies, including CICFR logo and key aquaculture products (trout feed, mahseer feed, and GnRH formulation).
- On 2 May 2025, ICAR-CICFR, Bhimtal marked the World Intellectual Property Day by organizing a programme through its ITMU Cell to raise awareness among scientists, students, and staff about the importance of intellectual property rights in promoting innovation in fisheries and aquaculture.

Important events, extension activities, trainings and other programmes

- Under MGMG programme, five teams adopted multiple villages across Nainital, Almora, Champawat, Pithoragarh, and Udham Singh Nagar, delivering need-based scientific interventions in coldwater fisheries.
- ICAR-CICFR carried out farmer-centric field days, awareness programmes and advisories on rainbow trout and carp culture, ornamental fish rearing, and best management practices for the benefit of farmers through technology dissemination and input distribution.
- The institute undertook field investigations on fish disease outbreaks with real-time advisory support to mitigate losses and

improve farm performance.

- ICAR-CICFR provided technical guidance to the Department of Fisheries, Govt. of Uttarakhand on quarantine, incubation, and health assessment of imported (from Denmark) rainbow trout eyed ova to ensure biosecurity, improved hatchery practices, and minimization of mortality risks.
- ICAR-CICFR, Bhimtal and its field centre at Champawat celebrated the 76th Republic Day on 26th January 2025, wherein all the staff members, including research students, participated.
- ICAR-Directorate of Coldwater Fisheries Research, Bhimtal was elevated to ICAR-Central Institute of Coldwater Fisheries Research and this momentous occasion was celebrated with great enthusiasm on 21st February 2025. The event was graced by Dr. Himanshu Pathak, Secretary DARE & DG, ICAR, along with DDG and ADG (Fisheries Science), marking a major milestone that recognizes the institute's scientific contributions in coldwater fisheries research and development.
- A three-day training programme on 'Coldwater resource mapping using Geo-Spatial tools' was conducted at ICAR-CICFR, Bhimtal during 19-21 February 2025.
- A three-day hands-on training programme on 'Breeding, seed, hatchery, feed, and



disease management of rainbow trout' was organised at ICAR-CICFR, Experimental Fish Farm, Champawat, from 27th February

to 1st March 2025.

- ICAR-CICFR celebrated the International Women's Day on 7th March 2025 under the theme 'Accelerate Action'.
- A snow trout ranching programme was conducted at Pipalkoti, Chamoli district, under the joint aegis of ICAR-CICFR, Bhimtal, VPHEP-THDC, and the Department of Fisheries, Uttarakhand on 23rd and 24th March 2025.
- A five-day training on 'Applied techniques in coldwater fisheries research' was conducted during 3rd - 9th April 2025 at ICAR-CICFR, Bhimtal.
- The 7th Poshan Pakhwada was observed from 8th - 22nd April 2025 in support of the "Poshan Abhiyaan Jan Andolan". As part of the national campaign, a series of awareness and outreach activities were organized at Bhimtal and Champawat.
- The 38th RAC meeting of ICAR-CICFR was held on 05th - 06th May 2025 under the Chairmanship of Dr. A.G. Ponniah, Former Director, ICAR-CIBA & ICAR-NBFR.
- A five-day hands-on training programme on 'Breeding and seed production of carp and value addition of fish and fishery products' was conducted at ICAR-CICFR, Experimental Fish Farm, Champawat, during 22nd - 26th May 2025.
- ICAR-CICFR, Bhimtal and its Experimental Field Centre, Champawat, observed the 11th International Yoga Day on 21st June 2025 with the theme 'Yoga for One Earth, One Health.'
- Dr. Abhilaksh Likhi, IAS, Secretary, Department of Fisheries, Government of India, visited ICAR-Central Institute of Coldwater Fisheries Research, Bhimtal on 21st June 2025 to review the institute's activities and progress.
- The institute implemented the 'Viksit Krishi Sankalp Abhiyan' in Uttarakhand from 29th May to 12th June 2025, covering 226 villages and reaching over 6,000 farmers through four dedicated teams of

scientists and technical staff and identified field-level issues and challenges.

- ICAR-CICFR celebrated National Fish Farmers Day on 10th July 2025 by organizing technical sessions on hill aquaculture, disseminating coldwater fish farming technologies, and supporting SC/ST farmers through input distribution.
- The 21st IRC meeting of ICAR-CICFR was held on 21st July 2025 under the Chairmanship of Dr. Amit Pande, Director, ICAR-CICFR.
- ICAR-CICFR, Bhimtal and its Experimental Field Centre, Champawat celebrated 79th Independence Day on 15th August 2025.
- Institute organised 24th Institute Management Committee (IMC) meeting on 20th August 2025 at Bhimtal under the chairmanship of Dr. Amit Pande, Director, ICAR-CICFR, Bhimtal.
- ICAR-CICFR observed Hindi Pakhwada (Hindi Fortnight) during 1-15th September 2025.
- ICAR-CICFR, Bhimtal celebrated its 38th Foundation Day on 24th September 2025.
- A three-day training programme on 'Seed production and hatchery management of golden mahseer' was organised at ICAR-CICFR, Bhimtal during 16th - 18th September 2025.
- ICAR-CICFR, Bhimtal, along with its Experimental Field Centre at Champawat, organized a programme on 11th October, 2025 to mark the launch of the Pradhan Mantri Dhan-Dhanya Krishi Yojna (PM-DDKY) and Pulse Mission.
- ICAR-CICFR, Bhimtal along with its Experimental Fish Farm at Champawat, conducted an extensive programme under the National Sanitation Campaign 'Swachhta Hi Seva' from 16th September to 1st October 2025.
- ICAR-CICFR observed Rashtriya Ekta Diwas (National Unity Day) on 31st October 2025 to mark the birth anniversary of

Sardar Vallabhbhai Patel.

- To commemorate the completion of 150 years of Vande Mataram, a collective singing of “Vande Mataram” was held on 7th November 2025 at the Institute Auditorium.
- The ICAR-CICFR, Bhimtal, conducted a one-day Kisan Goshti on 19th November 2025, during which participating farmers also watched the live telecast of the 21st instalment release of the PM Kisan Samman Nidhi and the inauguration of the South India Natural Fish Farming Summit 2025 from Coimbatore, Tamil Nadu.
- The ICAR-Central Institute of Coldwater Fisheries Research organised a five-day training programme on 'Recirculating aquaculture systems (RAS) for intensive fish farming' from 17th - 21st November 2025 at Bhimtal.
- A five days field training on 'Coldwater Fisheries' was organised for M.F.Sc students of CIFE, Mumbai during 17th - 21st November 2025 at Experimental Fish Farm, Champawat.
- ICAR-CICFR organized World AMR awareness week during 18 - 24th November 2025 on the theme Act Now: protect our Present, Secure our Future.
- The institute celebrated Constitution Day on 26th November 2025 with a pledge administered by all the staff members.
- As part of the Janjatiya Gaurav Varsh Pakhwada 2025 celebrations, the ICAR-CICFR conducted several awareness programmes in tribal areas of Uttarakhand and Meghalaya from 1 - 15th November 2025.
- ICAR-CICFR organized Swachhta Pakhwada during 16- 31st December 2025.

2. Introduction

2.1. Brief History

Coldwater fisheries in the Indian sub-continent was initiated by the British administrator turned naturalist by introducing two main types of trout, viz. brown trout (*Salmo trutta fario*) and rainbow trout (*Oncorhynchus mykiss*) around the beginning of the last century primarily to meet their needs for sport fishing or recreational angling. These introductions in India are the formal beginning of coldwater fisheries development in the country. The research on coldwater fisheries commenced with the establishment of Coldwater Fisheries Research Centre of CIFRI in the year 1963 at Harwan, Jammu & Kashmir as a scheme under 3rd Five-year Plan. Initially the centre assisted in providing the research inputs related to departmental trout hatcheries and other trout related problems to the State of Himachal Pradesh and Jammu & Kashmir. The activities of the centre increased rapidly and it carried out significant amount of investigation on coldwater fishery resources of the country. Thus, it was realized that coldwater fisheries as an important sector have potential in generating rural income and providing food security to the economically underprivileged population residing in Indian uplands. To utilize the available resources and opportunities in the coldwater fisheries, the involvement of Indian Council of Agricultural Research in this sector started during late sixties and subsequently culminated in the creation of **National Research Center on Coldwater Fisheries (NRCCWF)** as an independent Research Center on 24th September 1987 during the 7th Five Year Plan. This is the only national facility in the country to take up the research investigation on capture and culture aspects on coldwater with a focus on exotic and indigenous fish species. Since its inception, the NRCCWF in spite of constraints in terms of manpower and infrastructure has made significant contribution for proper appraisal of coldwater fishery resources and developed suitable technologies to propagate important coldwater fish species in hills. Thus, keeping in view the ever-expanding activities of NRCCWF, and the greater potential of coldwater fisheries in different Himalayan states, in a significant decision during

the 11th Five Year plan it was upgraded to **Directorate of Coldwater Fisheries Research (DCFR)**. The basic objective was to develop location, situation and system specific technologies by utilizing and augmenting resources in all the Himalayan states from Jammu and Kashmir to Arunachal Pradesh. In a landmark development for coldwater fisheries research in India, the ICAR-Directorate of Coldwater Fisheries Research (DCFR), Bhimtal, was further elevated and rechristened as the **ICAR-Central Institute of Coldwater Fisheries Research (ICAR-CICFR)** on 18th February 2025, making a significant milestone in strengthening national research capacity in the coldwater sector.

At present, the Institute is ISO certified (ISO 9001:2015) nodal research centre focussed on endemic as well as exotic coldwater fishes. In the last 36 years, the institute has been working untiringly to address issues and challenges of coldwater fisheries through use of modern techniques and biotechnological tools. The institute has developed different need-based technologies and popularized various models of fish breeding and culture in Himalayan region. In recent years, development of efficient and cost-effective trout feed, disease surveillance and health management, molecular characterization, development of breeding and seed production protocols for food and ornamental species as well as conservation and consultancy services are a few areas among a long list of activities undertaken by the institute. The institute has also contributed in human resource development and skill development programme for creating trained manpower for the overall development of the sector. The ICAR-CICFR is on its glorious path of virtually actualizing its vision by imparting boon of quality research in sustainable coldwater fisheries production, management and conservation.

2.2 Location

The headquarters of ICAR-CICFR is located at Bhimtal (29°19'52.647"N 79°33'18.083"E), at an altitude of 1470 m asl in the district of Nainital of Uttarakhand state. The nearest airport is at Pantnagar which is about 55 km

from Bhimtal. The closest railway station is Kathgodam, around 22 km from Bhimtal and about 280 km from Delhi. Bhimtal can also be reached from Delhi via Haldwani by bus. ICAR-CICFR has an experimental fish farm centre at Chirapani in Champawat district (29°17'55.537"N 80°6'8.915"E) of Uttarakhand, which is about 150 km from Bhimtal.

2.3 Vision

Coldwater fisheries and aquaculture to be an important economic activity in upland region for livelihood security and ecotourism

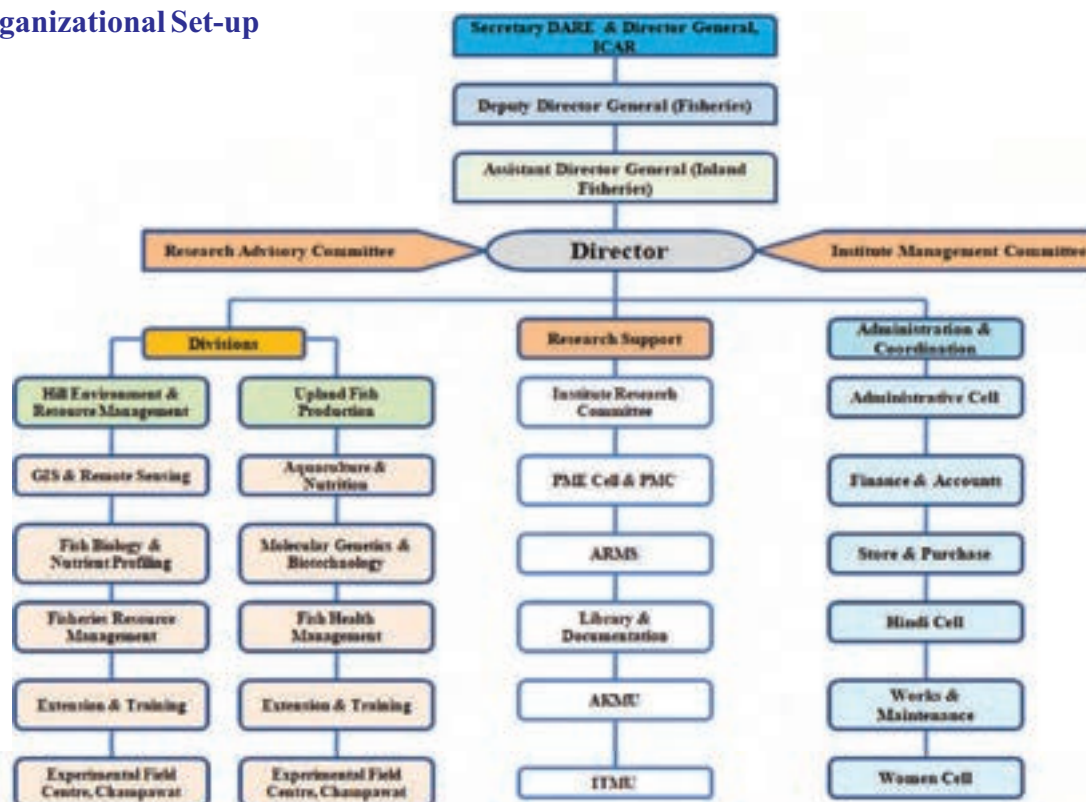
2.4 Mission

To become a Centre of excellence for assessing and managing Coldwater fishery resources, development technologies and models of hill aquaculture and formulating strategies for holistic growth of the sector

2.5 Mandate

- To conduct basic, strategic and applied research in coldwater fisheries and aquaculture
- To act as repository of hill fisheries resources
- Human resource development through training, education and extension

2.6 Organizational Set-up





2.8 Infrastructure

ICAR-CICFR Building Complex

The main office complex of ICAR-CICFR is located at Bhimtal. The facilities available at main complex are different laboratories, library, AKMU cell, wet laboratories, flow-through raceways, recirculatory aquaculture system, hatchery, museum and well maintained aquarium open for public, guest house, committee rooms and

auditorium. A functional mahseer seed production unit is also available at a different site in Bhimtal. The institute has an Experimental Field Centre at Mudiyani, Champawat, Uttarakhand. The field centre has trout hatchery, cemented nursery and grow-out raceways with water recirculation system, ponds, tanks for conducting experiments, laboratories, check dam, reservoir, meeting hall, guest house and staff quarters.



Main office building of ICAR-CICFR, Bhimtal



Museum at ICAR-CICFR, Bhimtal



Rainbow trout RAS facility at CICFR, Bhimtal



Guest House of ICAR-CICFR, Bhimtal



Experimental fish farm & Field Centre of ICAR-CICFR at Champawat

Laboratory facilities

The institute has well equipped laboratories to support research on geo-informatics, environmental fish biology, nutritional physiology, molecular genetics and biotechnology, fish biochemistry, cell culture, diagnostic bacteriology and fish mycology and parasitology. There is also

wet laboratory facilities available in this institute that are well maintained and used for conducting research experiments in coldwater fishes. A feed mill installed in the main campus of the institute is functional to meet the basic requirement of fish feed in the experimental farm.



Laboratory facilities at ICAR-CICFR, Bhimtal

2.9 Support services

Prioritisation, Monitoring and Evaluation Cell

Prioritization, Monitoring and Evaluation cell of the institute monitors the implementation and progress of research projects. The PME cell is responsible for maintaining the records of project reports through RPP system and for dealing with all the associated technical matters. The cell also keeps a record of publications, deputation and participation of scientists in seminars, symposia, workshop and conferences, training programmes attended as well as conducted. This cell also organizes the annual meeting of Institute Research Committee (IRC) and Research Advisory Committee (RAC) to evaluate the progress made in each research project and approve the work programme for the following year. New research proposals are also approved by the IRC after thorough evaluation of the objectives, technical programme, practical utility, manpower and financial involvement.

Agriculture Knowledge Management Unit

Agricultural Knowledge Management Unit (AKMU) of this institute provides the facilities for scanning and printing and internet access (BSNL) to all scientists and other staff members. It also serves as network administrator and monitors the

LAN connectivity of around 50 computers at this institute. In AKMU cell, desktop computer and internet facilities are also available for research scholars and students working under various project/programmes. Internet facilities at the Experimental Fish Farm & Field Centre, Champawat is provided through BSNL. Electronic mail and messaging solutions (mail server) are also maintained at this institute for secure communication via webmail.

The website of the institute (<http://www.cicfr.res.in>) has been modified as per Guidelines for Indian Government Website (GIGW) and certified for Standardization Test Quality Certification (STQC). The website is also being regularly updated as per the ICAR guidelines, under the AGROWEB project. The site presents information about the institute's manpower, mandate, research projects, major achievements, technology generated and consultancy services. Further, the conduct of training programmes, seminars, symposia, recruitments and tender notices are being notified in the website. The Institute's website is also linked to the website of Indian Council of Agricultural Research (<http://www.icar.org>).



AKMU unit of ICAR-CICFR, Bhimtal

Library and Documentation Unit

The Institute has a library and documentation unit which acts as a repository of literature and information. It is accessible to all the scientists, staff members, research scholars, students and other individuals from neighbouring institutes interested in scientific literature on coldwater fisheries and allied subjects. All scientific books have been catalogued with barcoding. As part of the One Nation One Subscription (ONOS) initiative, the library offers users access to a broad range of e-resources through the ONOS platform. The library maintains active reprography services by producing departmental publications and

supplying required photocopies to the scientists and research scholars. An inventory of e-journals comprising more than 35,000 soft copies of important fisheries research articles have been developed. The documentation section is entrusted with the responsibility of publishing scientific bulletins, brochures, pamphlets, annual report and newsletters. Publications like annual reports, technical bulletins and special publications published from time to time are mailed to about 250 organizations, institutions, fishery agencies for exchange and sharing of knowledge with other research organizations.



Library and Documentation unit at ICAR-CICFR, Bhimtal



Institute Technology Management Unit

The Institute Technology Management Unit has been constituted under the chairmanship of Director, for dealing with patents and other intellectual property rights developed at the institute. It is also responsible for safe transfer of technologies and for providing information about

ICAR guidelines on IPR issues. Training and guidance are provided for concerned scientists with respect to IPR issues. The ITMU cell observes World Intellectual Property Day on 26th April every year by organizing a special workshop to create awareness of intellectual property rights.

2.10 Staff strength (as on 31.12.2025)

Category	Sanctioned	Filled	Vacant
Director (RMP)	01	-	01
Scientific	30	18	12
Technical	14	06	08
Administrative	18	10	08
Supporting	11	05	06
Total	74	39	35

2.11 Financial statement for the year 2024-25 and 2025-26 (up to 31st Dec. 2025)

(Rs. in lakh)

S. No.	Head	Expenditure 2024-25	Expenditure 2025-26 (up to 31 st Dec. 25)
CAPITAL			
1.	Works	3.40799	
A.	Land		
B.	Office Building	3.40799	
C.	Residential Building		
D.	Minor works		
2.	Equipments	50.25805	16.78899
3.	Information Technology	23.85442	11.65064
4.	Library Books & Journals	4.19246	
5.	Vehicle & Vessels	9.33812	
6.	Livestock		
7.	Furniture & Fixtures	11.94644	6.52664
8.	Others	-	
	Total Capital	102.99748	34.96627
Grants in Aid- Salaries (Revenue)			
	Establishment Expenses		
	A. Salaries	864.25975	692.84990
	B. Arrear of Scientific staff	-	
	Total	864.25975	723.91356
Grants in Aid- General (Revenue)			
1.	Pension & other Retirement Benefit	122.32949	52.46186
2.	Travelling Allowance		
	Domestic TA/Transfer TA	14.88297	13.60345
	Foreign TA	0	0
3.	Research & Operation Expenses		
	A. Research Expenses	52.46036	33.25573
	B. Operational Expenses	87.71501	59.89888
	Total- Research & Operation Expenses	140.17537	93.15461

4.	Administrative Expenses		
A.	Infrastructure	118.79838	92.79092
B.	Communication	0.57410	0.35909
C.	Repair & Maintenance		
i)	Equipments, Vehicle & Others	1.82992	5.17337
ii)	Office Building	66.65438	3.484
iii)	Residential Building	-	-
iv)	Minor Works	0.80645	0.16482
D.	Other (excluding TA) (instt.)	86.12308	70.61714
	Total Administrative Expenses	274.78631	172.58934
5.	Miscellaneous Expenses		
A.	HRD within India	0.26000	3.85451
	HRD (Abroad)	-	-
B.	Other Items (Fellowship)	-	-
C.	Publicity & Exhibition	7.60000	3.50000
D.	Guest House Maint.	1.76197	0.37124
E.	Other Miscellaneous	1.52961	1.384
	Total Misc. Expenses	11.15158	9.10975
	NEH (Capital)	59.98560	17.39391
	NEH (Revenue)	99.99935	97.35846
	Total NEH	159.98495	114.75237
	TSP (Capital)	10.00000	0
	TSP (Revenue)	29.99998	7.46610
	Total TSP	39.99998	7.46610
	SCSP (Capital)	0	0
	SCSP (Revenue)	84.98245	62.47736
	Total SCSP	84.98245	62.47736
	Grand Total (Capital + Revenue-Salaries + Revenue-General)	1815.55033	1253.43101



3. Research Achievements

A. Institutional projects

3.1 Resource Assessment and Management

Project: CF-6	Ecosystem assessment and mapping of aquatic resources in Indian Himalayan regions
Sub project 8:	Decision support framework for coldwater aquaculture in Ladakh, India using geospatial tools
Period:	April 2023 – March 2026
Personnel:	P.A. Ganie (PI), Kishor Kunal, Garima
Funding Support:	Institutional, ICAR-CICFR

Coldwater aquaculture has strong potential to improve nutrition and livelihood opportunities in high-altitude regions such as Kargil and Leh, owing to the availability of clean water resources and favourable climatic conditions. This study assesses site suitability for coldwater fish farming by analyzing key topographical factors, soil parameters, and infrastructure factors. The integration of these parameters with water availability, water quality, and meteorological data provides a comprehensive framework to support planning and the sustainable expansion of coldwater aquaculture in the region.

Database of topographical features of the Leh region

A spatial database of major topographical features was developed for the Leh region to support coldwater aquaculture planning. Elevation (DEM) data were reclassified into altitude zones to identify suitable elevation ranges (Fig. 1). GIS-based slope and aspect analyses were carried out to assess terrain steepness and slope orientation, which influence site feasibility, sunlight exposure and water retention (Fig. 2 & 3). The processed datasets were integrated with a classified LULC map to identify land cover patterns and potential areas suitable for aquaculture development (Fig. 4).

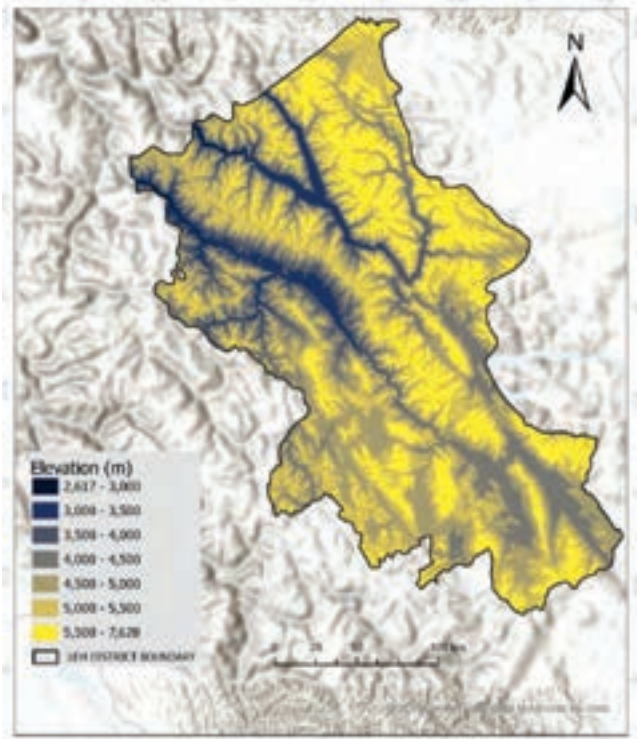


Fig. 1: Spatial distribution of elevation classes of the study region

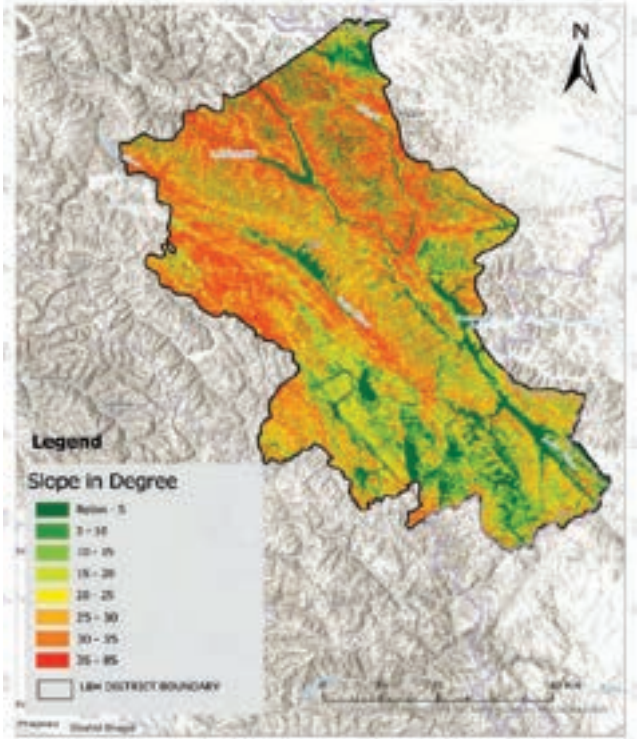


Fig. 2: Spatial distribution of slope classes of the study region

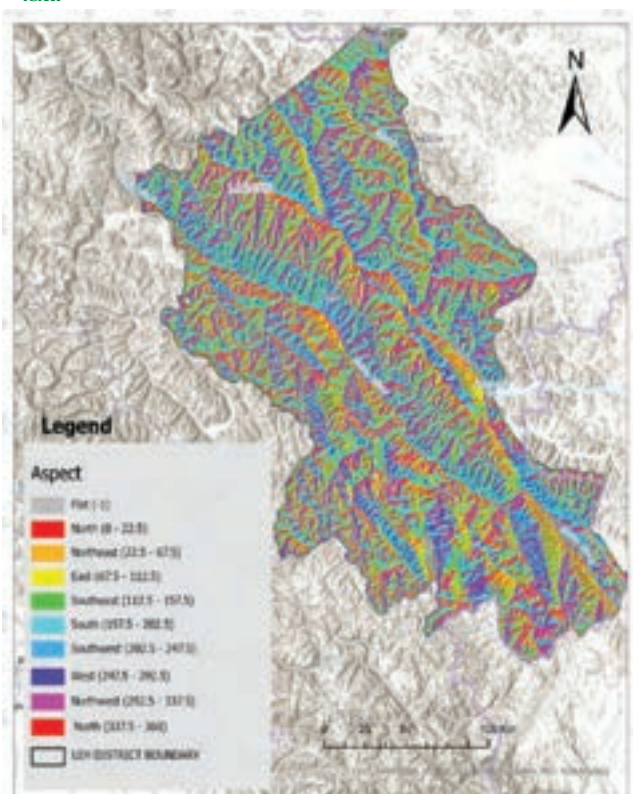


Fig. 3: Spatial distribution of aspect classes of the study region

Standardized methodology for land use-land cover classification

The methodology for land use-land cover (LULC) classification in District Leh, Union Territory of Ladakh, was developed through a structured and iterative process. It involved delineating the district boundary and defining classification objectives based on the region's physical characteristics. The process included utilizing pre-processed Sentinel-2A multispectral imagery and preparing training samples for major land cover classes, including snow/glacier, barren land, water bodies, built-up areas, vegetation, and agricultural land, using field knowledge and Google Earth imagery. A supervised classification algorithm was then applied to classify the imagery into LULC categories, followed by post-classification processing such as filtering, reclassification, and spatial refinement. Accuracy assessment was conducted using independent validation samples and a confusion matrix to calculate overall accuracy and Kappa statistics. The final LULC map for District Leh thus developed can be used for further spatial analysis and planning applications (Fig. 4)

Database of infrastructural features of the Leh region

Infrastructure is a key factor in selecting suitable

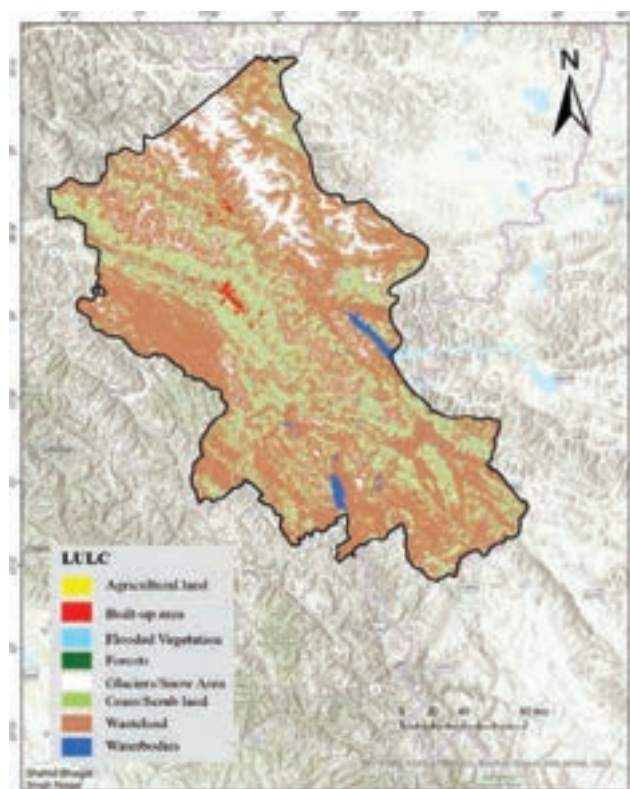


Fig. 4: Spatial distribution of LULC classes of the study region

sites for coldwater aquaculture, as access to roads, markets, farms and government institutions affects the feasibility and sustainability of operations. Major infrastructural features were mapped and integrated into a geospatial database to support informed decision-making for aquaculture site selection in the Leh region (Fig. 5).

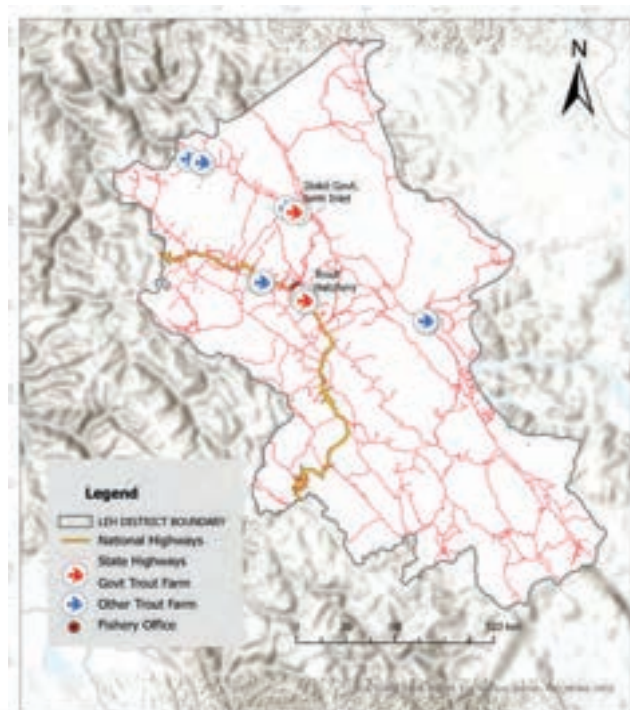
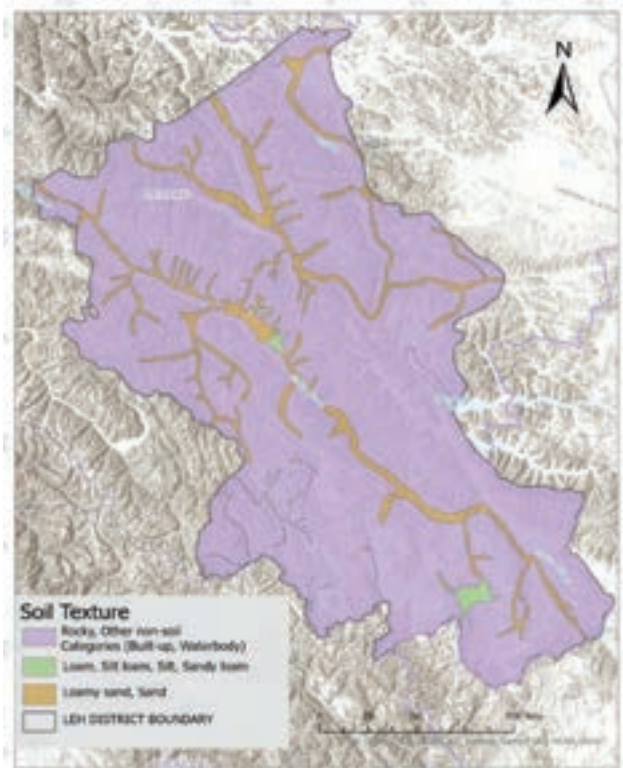
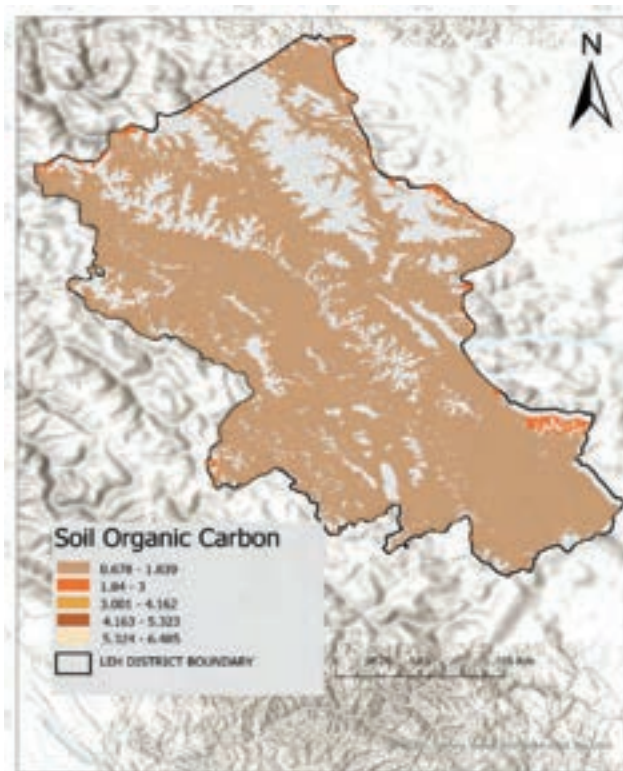


Fig. 5: Infrastructural facilities of the study region

A comprehensive database of important soil parameters relevant to coldwater aquaculture was developed for the Leh region. Five key soil factors, namely soil texture, pH, organic carbon content,

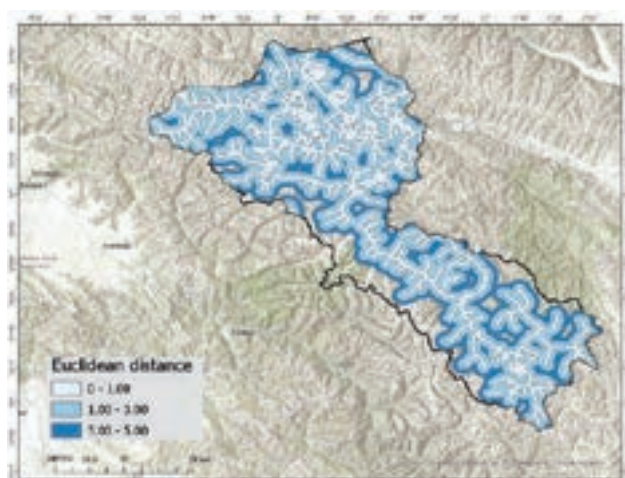


soil depth and erosion, were identified, digitized and converted into thematic shapefiles. These spatial layers support assessment of soil suitability for aquaculture planning and site selection (Fig. 6 & 7).

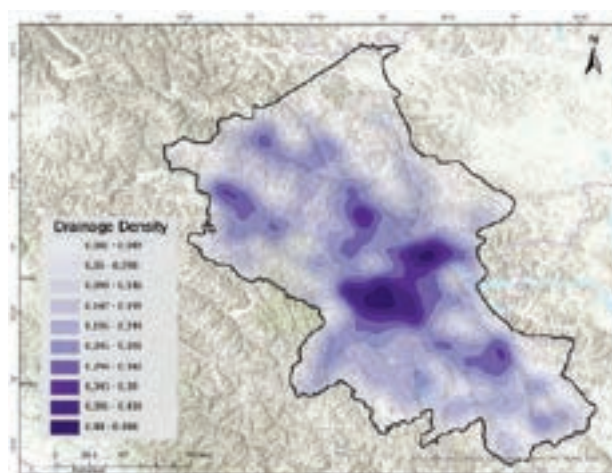


Database of water availability parameters of Ladakh

A spatial database of key water availability parameters was developed for the Ladakh region, and corresponding thematic layers were generated. These included layers for distance to perennial



water sources, distance to springs, and drainage density. The generated layers facilitated the identification of areas with reliable water resources, thereby supporting suitable site selection for coldwater aquaculture planning (Fig. 8 & 9).



ICAR-Central Institute of Coldwater Fisheries Research, Bhimtal

Database of meteorological parameters of Ladakh

A spatial database of important meteorological parameters was developed for Ladakh to support

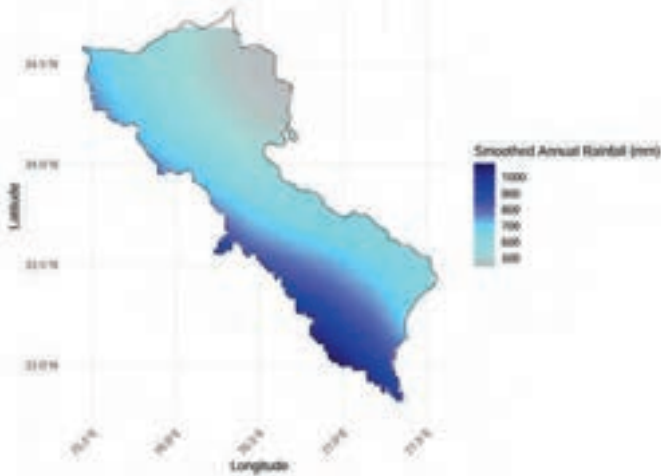


Fig. 10: Spatial distribution of annual rainfall in the Kargil region

Methodology standardization for developing rainfall distribution maps

The methodology for preparing spatial distribution rainfall maps was standardized for the districts of Leh and Kargil. The process began with the procurement of rainfall data from NASA-POWER (<https://power.larc.nasa.gov/data-access-viewer/>), selecting the parameter "Precipitation corrected monthly average" to obtain datasets for the year 2024. The average monthly rainfall values for 2024 were extracted for both districts and compiled as georeferenced data points for spatial analysis. An

coldwater aquaculture planning. Key variables such as temperature and rainfall were compiled and processed into thematic layers. These datasets help in assessing climatic suitability for aquaculture site selection (Fig. 10 & 11).

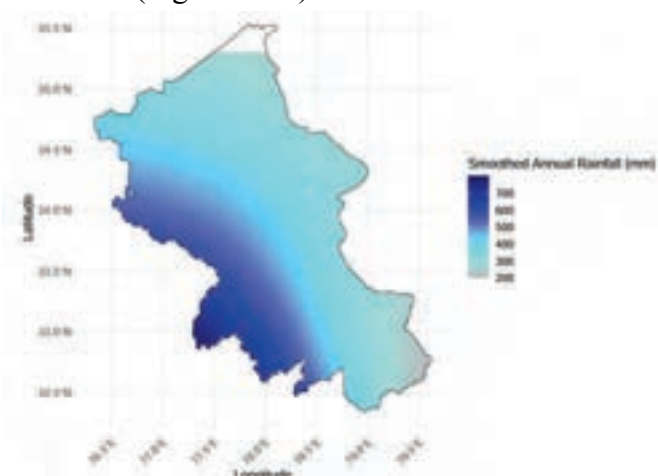


Fig. 11: Spatial distribution of annual rainfall in the Leh region

interpolation technique, namely Inverse Distance Weighting (IDW), was applied to generate continuous rainfall surfaces, which were then processed to produce high-resolution spatial distribution maps. The resulting maps were validated using available ground-station data and cross-checked for consistency, ensuring an accurate representation of spatial rainfall patterns. This standardized methodology provides a reliable framework for rainfall mapping and can be used for hydrological analysis, climate studies, and regional planning in the Union Territory of Ladakh (Fig. 10 and 11).

Project: CF-6	Ecosystem assessment and mapping of aquatic resources in Indian Himalayan regions
Sub project 9:	Assessment of microplastics in selected water bodies of Kashmir valley
Period:	April 2023 – March 2026
Personnel:	Kishor Kunal (PI), P.A. Ganie, Garima, R.A.H. Bhat (till July 2025)
Funding Support:	Institutional, ICAR-CICFR

Microplastics are small plastic particles less than 5 mm in size, ubiquitous in the environment and found in water, food, and air. They result from the breakdown of larger plastics (secondary) or are manufactured for products (primary), posing risks to aquatic life and human health. Microplastics are hazardous chemicals to marine and freshwater

ecosystems; therefore, it is becoming a severe concern for ecology. Consuming fish with high microplastic levels poses significant health risks to humans. Furthermore, tourism activities are the primary source of the plastic waste that eventually degrades into microplastics. Both field and laboratory studies suggest that fishes are very

susceptible to microplastics ingestion and compared with marine species, freshwater fishes have been less studied.

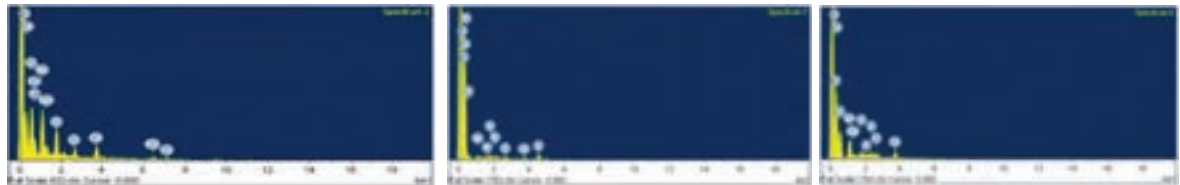
Sampling stations were established across several key locations, including the Upper and Middle Jhelum Rivers, Dal Lake, Anchar Lake, Manasbal Lake, and Wular Lake. Water sampling was done using bucket and sample was filtered through plankton net of 200µm and collected in 500ml bottle. Firstly, water quality parameters were measured to characterize the physical and chemical characteristics of water. The water was kept for digestion using 30% H₂O₂ for oxidation of organic material. Density separation is done using NaI (4.4M). Plastic is considered of lower density and it floats in the solution of NaI. After that vacuum filtration was done through 0.45µm pore size nitrocellulose filter paper. Filter papers were kept separately in watch glass and dried at room temperature. The filter paper was observed under microscope (Carl Zeiss, stemi 508). Categorization of microplastic is done based on size, shape and color. Different water quality parameters (water temperature, pH, dissolved oxygen, and TDS) were measured. Average water temperature was Anchar lake (12.02°C), Dal lake (13.98°C) Jhelum river (12.05°C), Manasbal lake (14.88°C) and Wular lake (15.75°C). pH for different locations were Anchar lake (7.00), Dal lake (7.48) Jhelum river (6.85), Manasbal lake (7.93) and Wular lake (8.01). Dissolved oxygen for different locations were Anchar lake (6.2ppm), Dal lake (5.6ppm) Jhelum river (5.8ppm), Manasbal lake (6.2ppm) and Wular

lake (5.8ppm), while TDS for different location were Anchar lake (200ppm), Dal lake (83ppm) Jhelum river (134ppm), Manasbal lake (223ppm) and Wular lake (102ppm). Litter composition was also analyzed at different location which was mainly categorized under (plastic metal, glass rubber, clothes and others). Among which plastic contributed maximum while glass was minimum by number. Among the plastic different components were classified as (net pieces, food wrappers, plastic bags, beverage bottles, straws and others). At all the lakes food wrappers were the major contributor. It was up to 51% at Manasbal lake and 32% Wular lake. Microplastic were also classified based on size and colors. Different size categories were <50µm, 51-100 µm, 101-200 µm, 201-500 µm, and >500 µm. All the size range were observed at all the stations. Based on color, microplastic were majorly classified as translucent, red, brown, blue, black, orange and colours other than these were kept under category “others”. The contribution of translucent were dominant over other color which ranged from (19-44%) followed by orange color ranged from (15-31%). Based on morphotype microplastics were classified into fibers, fragments, pellets, beads and others. In Jhelum and Wular lake fibers were maximum (47% and 45% respectively). While at Anchar, Dal and Manasbal lake fragments were maximum (32%, 37% and 40% respectively). Beads were less in number at all the stations.

Microplastic was also analyzed in the gut of fishes collected from different lakes and classified in a similar manner.



SEM images of different types of microplastics obtained



FTIR analysis of different types of microplastics obtained

Project: CF-8	Revisiting the taxonomy of snow trout (<i>Schizothorax</i> sp.) from
Sub project 3:	Indian Himalayan waters
Period:	April 2023 – March 2026
Personnel:	Garima (PI), K. Kunal, P.A. Ganie
Funding Support:	Institutional, ICAR-CICFR

Snow trout is an important group in coldwater capture fisheries and contribute more than 70% of capture fisheries. Ambiguity among the species is high because their characters are very similar. Samples have been primarily collected from the Western and Central Himalayas. After collection of samples the fishes were identified based on morphological characters which mainly included, presence or absence of papilla and labial fold, presence of interrupted or uninterrupted labial fold, comparative length of rostral and maxillary barbels, length of barbels with relation to eye diameter. Based on mouth pattern different authors have identified the fishes of snow trout under different genus like *Schizothorax*, *Schizothoraichthys*, *Schizopyge* and *Schizopygopsis* but in present study species of above genera have been kept under *Schizothorax*. Till now total 8 species have been identified (*Schizothorax richardsonii*, *S. plagiostomus*, *S. esocinus*, *S. niger*, *S. planifrons*, *S. progastus*, *S. nasus*, *S. molesworthi* and *S. labiatus*) based on morphological characteristics. Morphometric and merstic measurements for the 9

species have been completed. The major characters which are used for identification were comparative length of rostral and maxillary barbels, length of barbels in comparison with eye diameter, Presence of papilla and labial folds, position of dorsal fin with respect to pelvic fin and shape of snout. For morphometric different measurements which were taken include: total length, standard length, depth of body, head length, post orbital length of head, diameter of eye, snout length, interorbital space, length of barbels, length of dorsal spine, width of head pre dorsal length, pre anal length, pre pectoral length, pre pelvic length and length of caudal peduncle. Meristic characters are countable structures that are fixed early in development and remain constant throughout their lives. Different authors have reported different fin formula for the same species. Among various species the difference in meristic characters is negligible. These do not serve as reliable tools for the identification of different species of *Schizothorax*.

Project: CF-8	Evaluation of genetic diversity, inbreeding effects and environmental
Sub project 4:	landscape influences in rainbow trout populations in India
Period:	April 2024 – March 2027
Personnel:	Ananya Khatei (PI), Pramod Kumar Pandey (till March 2025), S. Ali, P.A. Ganie
Funding Support:	Institutional, ICAR-CICFR

Field sampling at Munnar

A field sampling survey was conducted at Munnar, located at an approximate altitude of 1,800 m above sea level, to collect biological and environmental samples for analysis. Fin tissue samples were collected from rainbow trout maintained in local hatchery facilities, and a total of 15 specimens were sampled for subsequent laboratory investigations. In addition, water samples were also collected from the sampling locations to assess environmental parameters and support further analytical studies related to fish health and habitat conditions.





Sampling at Munnar

Genetic diversity analysis

Genetic diversity analysis was carried out on two geographically distinct populations of rainbow trout collected from multiple hatcheries located in Kashmir and Uttarakhand. Genome-wide SNP markers were used to evaluate patterns of genetic variation and population structure across the sampled stocks. After stringent quality filtering, a high-confidence set of genetic markers was retained for downstream analysis, ensuring reliable assessment of diversity parameters.

Both populations exhibited moderate to comparable levels of nucleotide diversity across

the genome, indicating maintenance of substantial genetic variation within hatchery stocks. In both regions, observed heterozygosity exceeded expected heterozygosity, resulting in negative inbreeding coefficients, which suggests heterozygote excess and deviation from Hardy–Weinberg equilibrium. These findings collectively indicate that the hatchery populations retain appreciable genetic variability with no immediate signals of inbreeding depression, although continued genetic monitoring is recommended to ensure long-term stock sustainability and management effectiveness.

3.2 Aquaculture Oriented Research and Development

Project: AQ-16	Captive management of golden mahseer in perspective to aquaculture and conservation
Sub project 8:	Development of protocols for live transportation of mahseer brooders
Period:	April 2025 – March 2028
Personnel:	M.S. Akhtar (PI), Ciji A, R.S. Patiyl
Funding Support:	Institutional, ICAR-CICFR

Mahseer brooders are typically collected from rivers and lakes that are located far from hatchery facilities, making transportation an unavoidable but critical step in conservation aquaculture. Safe transport of these brooders

remains a major challenge because mahseer are highly sensitive to handling and environmental changes. Long-distance movement often leads to stress, mortality, and reduced breeding performance, which weakens stocking and

ranching programmes. At present, hatcheries and fisheries departments lack standardized, science-based transport protocols tailored to mahseer species. Developing a reliable and validated transport method will improve survival and maintain reproductive quality, ensuring a consistent supply of healthy seed for conservation and restocking efforts. Efficient movement of broodstock between natural habitats and hatcheries will also support genetic management, reduce repeated dependence on wild capture, and strengthen organized breeding programmes. This project therefore aims to address a key operational gap between broodstock transportation and successful hatchery operation. To establish an optimal loading density for live transport, an initial experiment was designed to standardize the biomass

of golden mahseer brooders/adults under controlled packing conditions. Three biomass levels were tested in oxygen-filled polybags, each maintained at a constant oxygen to water ratio, with treatments conducted in triplicate over a 30-hour simulated transport period. Water quality parameters, including dissolved oxygen, pH, carbon dioxide, alkalinity, and total ammonia, were monitored to assess changes in the transport medium. In parallel, blood plasma samples were collected to evaluate physiological stress responses. Sampling was performed at two defined intervals, 18 hours and 30 hours, representing mid and extended transport durations. At these same time points, gill ventilation rates were recorded for all biomass groups as a non-invasive indicator of respiratory effort and stress. Data analysis is underway.



Golden mahseer brooders in polybags for loading biomass optimization

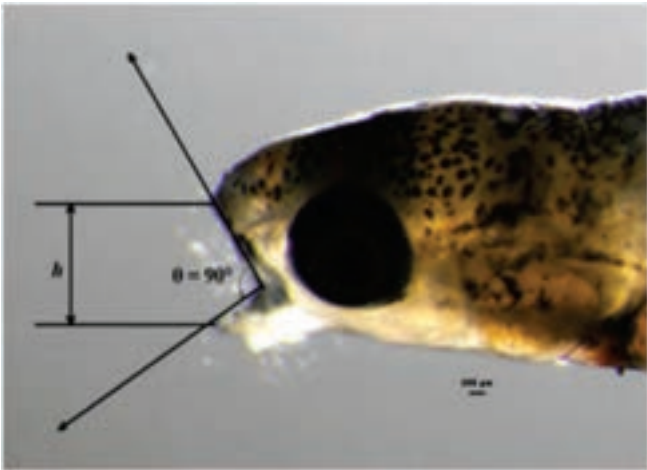
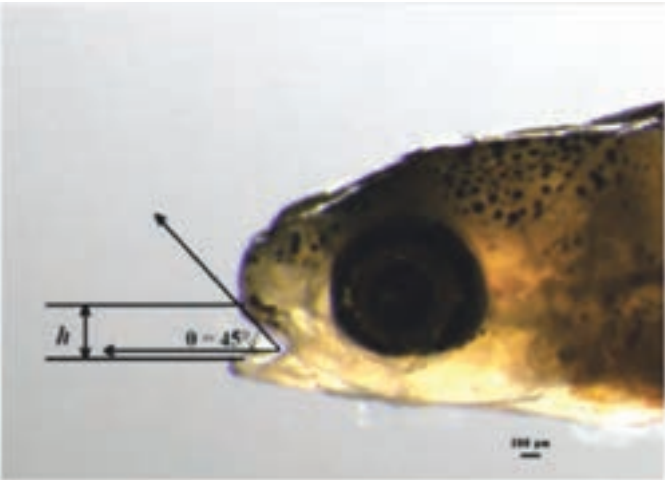
Project: AQ-16	Captive management of golden mahseer in perspective to aquaculture and conservation
Sub project 7:	Development of a weaning strategy for golden mahseer, <i>Tor putitora</i>
Period:	April 2023 – March 2026
Personnel:	Ciji A (PI), M.S. Akhtar, Rajesh M, B.S. Kamalam (till May 2025)
Funding Support:	Institutional, ICAR-CICFR

The effects of different weaning strategies on the performance and digestive enzyme activities of golden mahseer were studied. Initially, a preliminary trial with mahseer larvae (10 days

post-hatch; dph) was conducted using live feeds (*Chlorella*, *Artemia*, *Panagrellus*), goat liver (GL), and a formulated larval diet (200–400 µm), fed exclusively or under co-feeding regimes for six

weeks. Based on this trial, appropriate weaning strategies were selected for a further 42-day experiment comprising six feeding regimes, spread over three phases. During the first five days (phase 1), larvae (10 dph) were fed either *Chlorella* or GL and then switched to three feeding regimes (phase 2; next 7 days), viz., exclusively on larval feed, *Artemia*, and co-feeding. During the next 30 days (phase 3), all groups were switched to larval feed. At the end of the experiment, growth and survival did not vary significantly; however, larvae initially fed GL showed higher size heterogeneity. Although larval fitness in terms of thermal tolerance was not varied, the survival activity index (SAI) was significantly higher in both the

abruptly weaned and co-fed groups and the gradual transition to the formulated diet enhanced SAI. Digestive enzyme profiles indicated modulating enzyme dynamics with weaning transition. At the end of phase 1, the activities of all studied digestive enzymes did not vary significantly across the treatments. While in later phases, weaning strategies modulated various digestive enzymes differently. These results suggest an initial period of *Chlorella* feeding followed by abrupt weaning to larval feed potentiates uniform growth and digestive functions. These results provide a practical feeding protocol to improve the larval rearing efficiency of golden mahseer.



Mouth size measurement of mahseer larvae at 45° and 90° angle

Project: NPOFBC	Network project on Ornamental fish breeding and culture (NPOFBC): ICAR - CICFR component: Development of breeding protocol and larval rearing technique of the selected indigenous hill stream ornamental loaches, suckers and hill trout
Period:	April 2018 – March 2026
Personnel:	Ananya K (PI)
Funding Support:	ICAR-CMFRI & ICAR-CICFR

Development of a larval rearing system

A larval rearing system specifically designed for the breeding and larval rearing of hill stream fishes was developed. FRP tanks were fabricated, comprising six round tanks, six rectangular tanks, and six small circular tanks. A

flow-through system, similar to a Recirculating Aquaculture System (RAS), was established and equipped with appropriate filtration units. Currently, broodstock are being conditioned in these tanks to prepare them for the upcoming breeding season.



Larval rearing system

Breeding of ornamental fishes

Brooders of Almora loach were maintained in glass aquaria ($2 \times 2 \times 1.5$ ft) equipped with a gravel-bed biofilter and a powerhead pump (80 L hr^{-1}). Partial water exchange was carried out at 10-day intervals. Fish were fed a formulated artificial diet containing 40% protein and 12% lipid throughout the year, and supplementary feeding with *Tubifex* worms was provided for two months prior to the breeding season (June–September) to enhance gonadal maturation. Key variables examined during breeding trials included the nature of the spawning substrate, broodstock sex ratio, and hormone application protocols. A commercially available synthetic hormone,

Ovatide™, was used for induced spawning. A diluted dose of 0.2 ml kg^{-1} body weight was administered intramuscularly near the caudal region after anesthetizing the fish using clove oil. Post-injection, brooders were pre-conditioned in formalin- and salt-treated water. To prevent egg predation, brooders were removed from the breeding setup immediately after spawning. During egg incubation, care was taken to maintain clean water conditions, minimize fungal infections by avoiding excessive aeration, and provide suitable substrates. Feeding was restricted before and after spawning to reduce organic load, and antifungal treatments were applied to brood fish to prevent water contamination. Successful spawning

was achieved, and eggs hatched well under captive conditions. The newly hatched larvae, which appeared whitish and transparent, remained near the bottom for approximately 5–8 days, occasionally rising to the surface in a characteristic spiral swimming motion.

In addition to loach breeding, successful breeding of goldfish was also conducted, resulting in the production of approximately 3,000–4,000 larvae.



Checking the readiness of fish for breeding



Project: AQ-22	Culture system diversification
Sub project 3:	Assessing the potential of cage farming for the production of quality seed of economically important indigenous and exotic fish species in Bhimtal lake
Period:	April 2023 – March 2026
Personnel:	S. Chandra (PI), P.A. Ganie, R.A.H. Bhat (till July 2025)
Funding Support:	Institutional, ICAR-CICFR

Background

Cage culture has emerged as a viable aquaculture system for augmenting fish production in India through optimal utilization of lentic inland waters, including reservoirs and natural lakes. Uttarakhand possesses approximately more than 21,500 ha of such water resources with considerable potential for cage-based aquaculture. At the national level, approximately 50,000 floating cages are currently in operation, achieving production levels of 30–50 kg m⁻³. Bhimtal Lake (29°21' N; 79°24' E), situated at 1,346 m above mean sea level and 22 km from Nainital in Uttarakhand state, is a C-shaped freshwater lake with a surface area of 47.8 ha, a catchment area of 10.77 km², and a maximum depth of 18 m. As the largest lake in the Nainital district, it represents an important site for evaluating sustainable aquaculture interventions in upland ecosystems. In the present study, 32 rectangular cages (5 × 4 m and 2 × 2 m) were installed in Bhimtal Lake to assess the growth performance of the indigenous snow trout (*Schizothorax* spp.) under cage culture conditions. The spatiotemporal effect of cage farming on Bhimtal Lake has also been studied. The study also aimed to establish a demonstration unit to promote environmentally sustainable and economically viable cage farming practices using native coldwater fish species.

Growth Performance of *Schizothorax richardsonii*

The growth performance of *Schizothorax richardsonii* was assessed over a two-year rearing period in triplicate under two stocking densities, 50 fish/m³ and 75 fish/m³ in an upland Bhimtal Lake. Initial measurements of length (163 mm ± 7.01 mm), weight (37.9 g ± 4.75 g), and overall biomass of *Schizothorax richardsonii* were recorded prior to their stocking in the experimental cages. After

six months of rearing, the average weight and length were 49.00 ± 13.21 g and 186.17 ± 12.17 mm in G1, and 45.17 ± 9.30 g and 184.50 ± 9.46 mm in G2, indicating no significant difference between the groups. After 12 months, significant growth over time (p < 0.001) indicated that rearing duration, not stocking density, influenced weight gain. Net weight gain ranged from 32.85 g to 37.22 g.

After 24 months of rearing, fish stocked at 50 fish/m³ attained a significantly higher mean body weight (147.06 ± 35.15 g) and total length (253.81 ± 19.46 mm) compared to those stocked at 75 fish/m³ (124.75 ± 29.55 g and 239.31 ± 15.64 mm, respectively). The t-test results confirmed that both weight and length differences between the two stocking densities were statistically significant (p < 0.05), demonstrating a pronounced density-dependent effect on long-term growth performance. One-way ANOVA conducted within each stocking density across rearing periods (6 months, 1 year, and 2 years) revealed a significant increase (p < 0.05) in both body weight and total length with advancing culture duration. Post-hoc comparison indicated that growth increments between successive rearing intervals were significantly higher during the second year compared to the first year, particularly under the 50 fish/m³ stocking density. During the culture period, water quality parameters were under normal range and water temperature varied between 11.0°C (Feb) to 26.2°C (June).

Further analysis of net growth during the second year showed that fish reared at 50 fish/m³ exhibited significantly higher net weight gain (71.94 g) and length increment (51.31 mm) compared to fish stocked at 75 fish/m³ (54.00 g and 37.44 mm, respectively) (p < 0.05). These results clearly indicate that reduced stocking density

enhanced growth efficiency during the later stages of rearing. The statistical analyses using t-test and ANOVA demonstrate that a stocking density of 50

fish/m³ is significantly more favourable for optimizing growth performance of *S. richardsonii*, particularly over prolonged rearing periods.

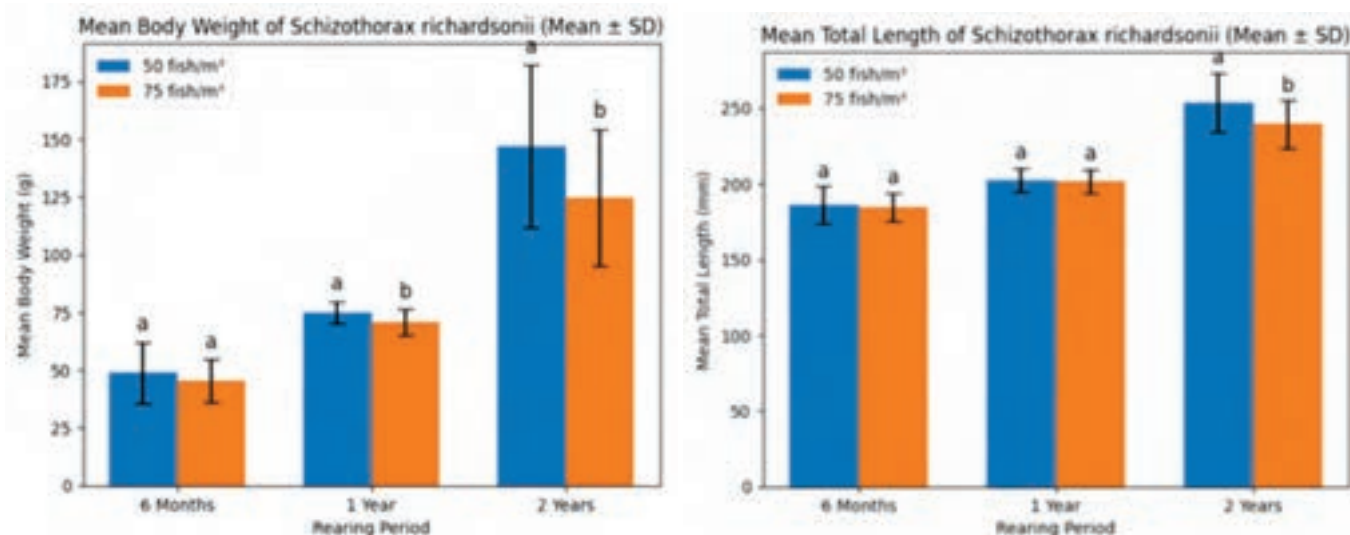
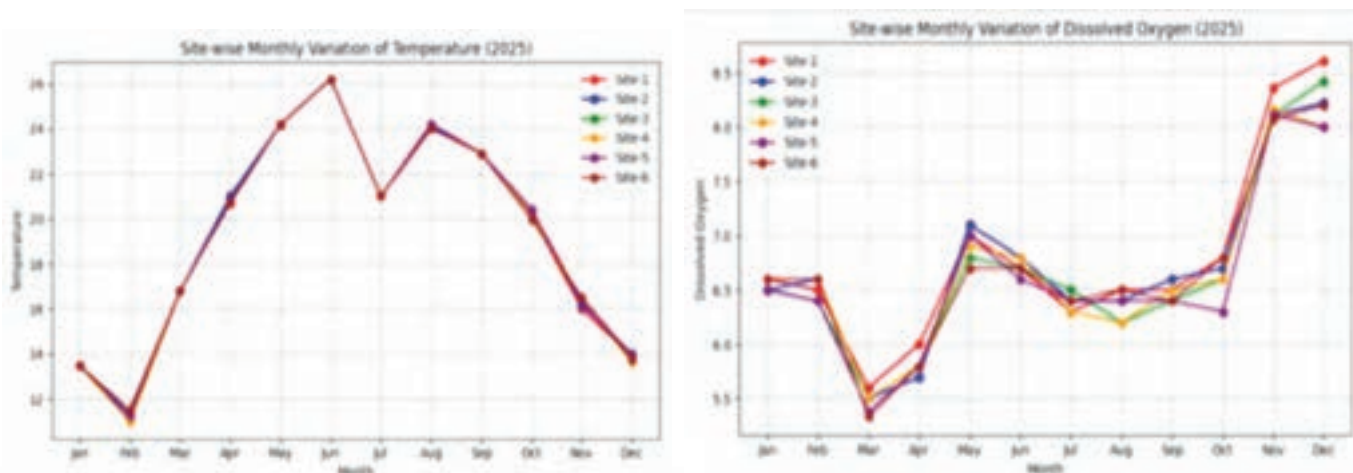


Fig.: Growth performance of *Schizothorax richardsonii* (Trial -1) in mid hill cage

Spatiotemporal variations in the limno-biological indices of Bhimtal Lake

To assess spatiotemporal variations in limno-biological indices of Bhimtal Lake during cage farming operations in second year of rearing, six sampling sites were selected over an approximately 1 km stretch of the lake, including the cage culture site. Seasonal water quality and plankton data were collected and analysed. Key physicochemical parameters such as temperature, Dissolved Oxygen (DO), pH, Total Dissolved Solids (TDS), phosphate, ammonium, nitrate, hardness, alkalinity and ORP were monitored monthly at all sampling stations. The water temperature from January to December ranged between 11.0°C to 26.2°C. All sites exhibited similar seasonal patterns, with dissolved

oxygen showing winter minima (January–February), summer maxima (May–June), a pronounced decline during March–July, and recovery in the post-monsoon and winter months (November–December), indicating minimal site-wise variability and effective water mixing. Nitrate concentrations displayed a sharp summer peak in May across all sites, followed by a rapid decline during the monsoon and post-monsoon period, with minor site-specific elevations at Sites 5 and 6 suggesting localized nutrient inputs. Plankton samples were collected monthly from the same locations, and both qualitative and quantitative assessments of total plankton density across sites were carried out. Preliminary results are presented graphically below:



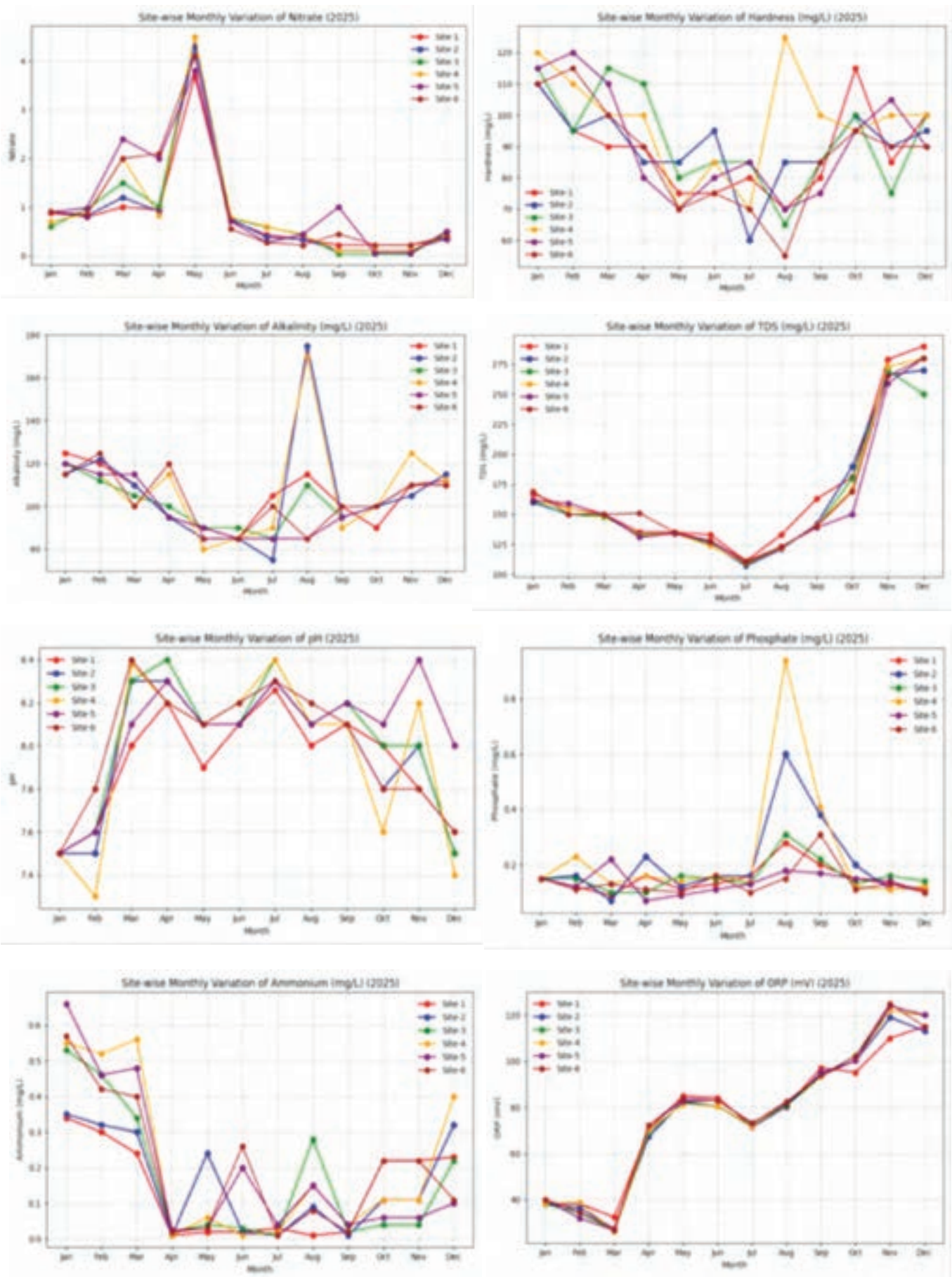


Fig.: Monthly variation in water quality parameters

Annual plankton abundance in Bhimtal lake

Plankton abundance in Bhimtal lake shows a clear seasonal pattern with a gradual increase from winter to early summer, a distinct peak during June–July, followed by a progressive decline towards winter. In winter (Jan–Feb), plankton density remains relatively low, reflecting lower temperature and reduced primary productivity while in pre-monsoon to early monsoon (Mar–Jun), a sharp increase is observed, driven mainly by diatoms and chlorophyceae, supported by rising temperature, nutrient availability, and light conditions. The peak period was June to July and maximum total abundance occurs during

June–July, coinciding with enhanced productivity; cyanobacteria and zooplankton groups also increase during this phase. Abundance remains high but begins to decline gradually in post monsoon. A steady reduction in plankton density is evident, reaching the annual minimum in December, likely due to declining temperature and productivity. Overall, the annual cycle reflects a summer-dominated productivity regime, typical of freshwater ecosystems, with diatoms and green algae forming the major contributors, followed by seasonal responses of cyanobacteria and zooplankton.

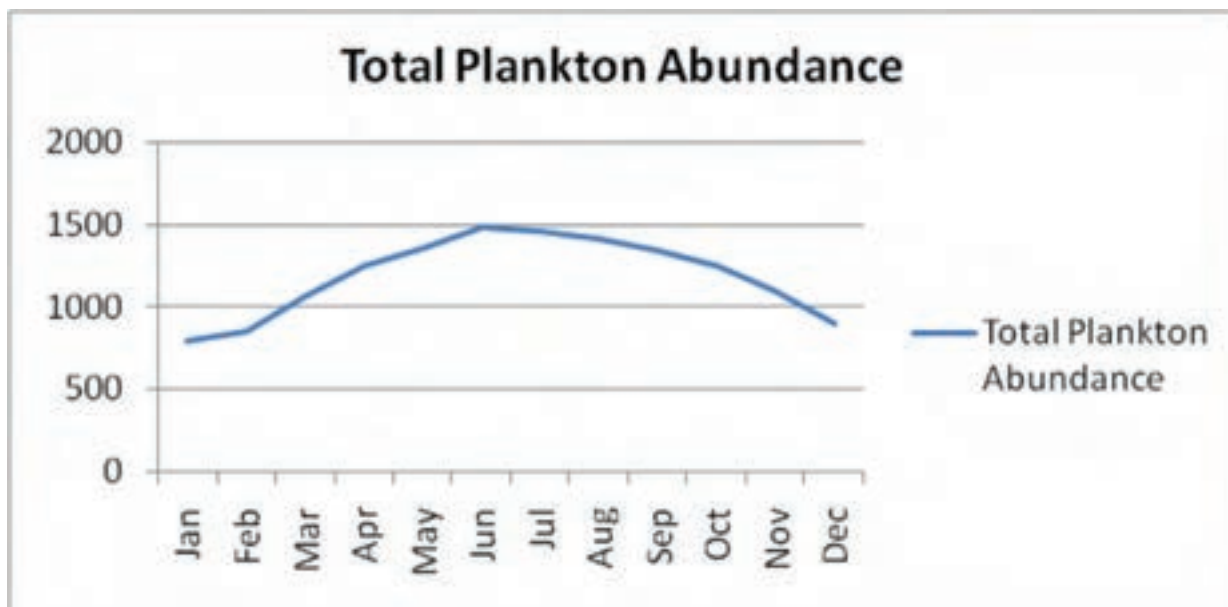


Fig.: Monthly plankton abundance

3.3 Fish Nutrition and Feed Development

Project: AQ-21	Coldwater fish nutrition and feed development
Sub project 5:	Development and validation of RAS specific rainbow trout feeds
Period:	April 2024 – March 2027
Personnel:	Rajesh M (PI from Aug. 2025 onwards), B.S. Kamalam (PI till May 2025), R.S. Patiyl
Funding Support:	Institutional, ICAR CICFR

Seven RAS-specific low-protein, high-energy experimental diets were formulated and prepared using different commercial binders, additives, and their combinations. Feeding trials were subsequently conducted in rainbow trout using replicated experimental units to evaluate growth performance and feed utilisation. Sequential large-

scale trials were then carried out in 7 m³ RAS tanks to assess the impact of feed and faecal quality on water quality. In addition, the experimental diets were subjected to faecal recovery tests using indigenously developed digestibility and faecal collection units. The results indicated that the inclusion of binders and additives significantly



influenced growth performance and feed utilisation in rainbow trout. Furthermore, the type of binder and its combinations markedly affected solid removal efficiency and ammonia excretion rates. These findings are significant, as improved faecal stability reduces fine solid generation, thereby decreasing the load on microscreen filters. Lower fine solids also reduce oxygen demand in the RAS, enhance biological nitrification, and minimize off-

flavour and odour issues. Reduced ammonia excretion additionally allows for the design of biofilters with smaller footprints and lowers nitrate accumulation, ultimately improving water reuse efficiency. Moreover, the production of more intact solids facilitates easier collection and potential repurposing. The figures below illustrate the solid removal efficiency and ammonia excretion rates of three different feed types in rainbow trout.

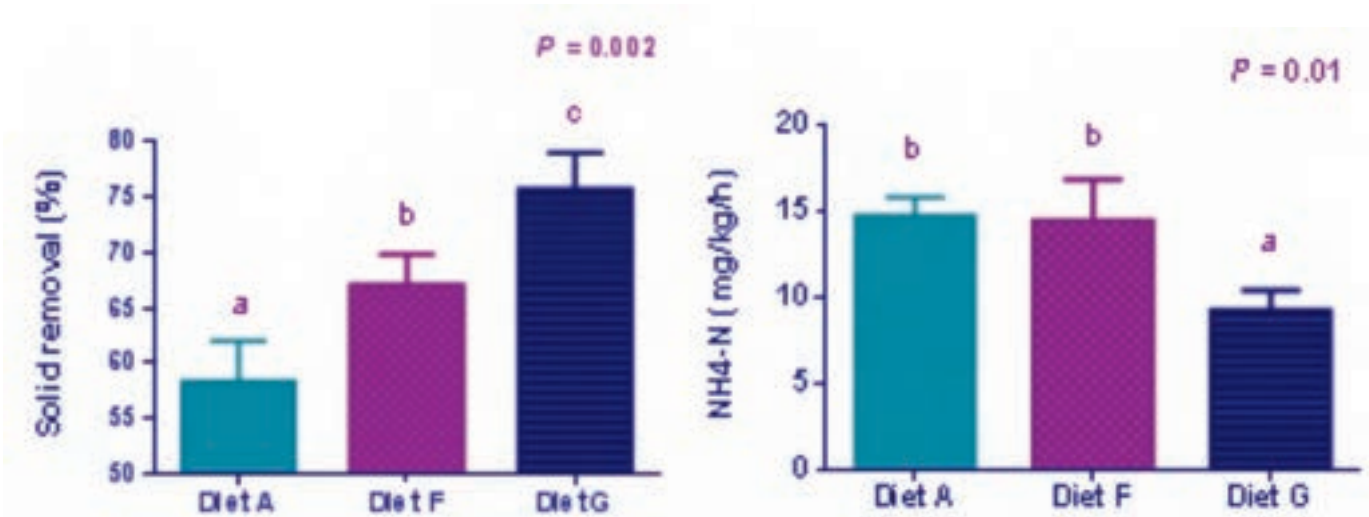


Fig.: Solid removal efficiency and ammonia excretion rates of three types of feeds in rainbow trout

Project: AQ-21	Coldwater fish nutrition and feed development
Sub project 6:	Improving the growth and survival of snow trout larvae through nutritional intervention in captive conditions
Period:	April 2025 – March 2028
Personnel:	Pankaj Kumar (PI), Rajesh M. , K. Kunal
Funding Support:	Institutional, ICAR - CICFR

Schizothorax richardsonii (Gray, 1832) is a 'threatened' species despite being present in all types of habitats (lower reaches and upper reaches of rivers, streams, ponds, and lakes) in the Himalaya. Snow trout is an economically important, indigenous food fish inhabiting streams and rivers of the Himalayan and sub-Himalayan regions. In the central Himalayas, *S. richardsonii*, locally known as “Asela,” constitutes a major capture fishery in the Uttarakhand region. Subsequently, rampant anthropogenic activities in the Himalayan rivers, including incessant hydropower development, infrastructure development, overfishing, exotic species introduction, and habitat degradation, are among

the primary factors responsible for the decline in numbers of the snow trout, and the species is now categorized under the vulnerable category. Since this is the most preferred food fish in the hill region, this species has aquaculture prospects and potential to be a candidate species for species diversification hill aquaculture due to its nutritional value, taste, and consumer preference. On the other side, the declining wild population needs propagation in the natural coldwater bodies of the Indian Himalaya. Breeding and seed production of this species are challenging in the hills, necessitating a scientific approach for captive maturation and spawning. To bring it into culture conditions, need for proper feed requirement studies and formulation of a

balanced diet for all the stages, making it a major researchable task. Asela is a sport fish and could support a sport fishery in the mid-hill region. Once the feed problem is solved, the stocking of seeds for the regular ranching program into streams and rivers can be made. To follow up on this, a collection of snow trout fish from the Gandaki

stream and the Gaudi-Gandaki River in the Champawat region has been carried out. Subsequently, snow trout stocks are maintained in the nursery raceway at ICAR-CICFR, EFF, for acclimatization and for further study to evaluate the growth performance and breeding behaviours in captive conditions.



Maintaining snow trout brooders for captive breeding

3.4 Molecular Genetics and Biotechnology

Project: AQ-18	Design and production of GnRH analog as an inducing agent for spawning in fish
Sub project 10:	
Period:	April 2022 – March 2026
Personnel:	K.V. Chanu (PI), D. Thakuria
Funding Support:	Institutional, ICAR-CICFR

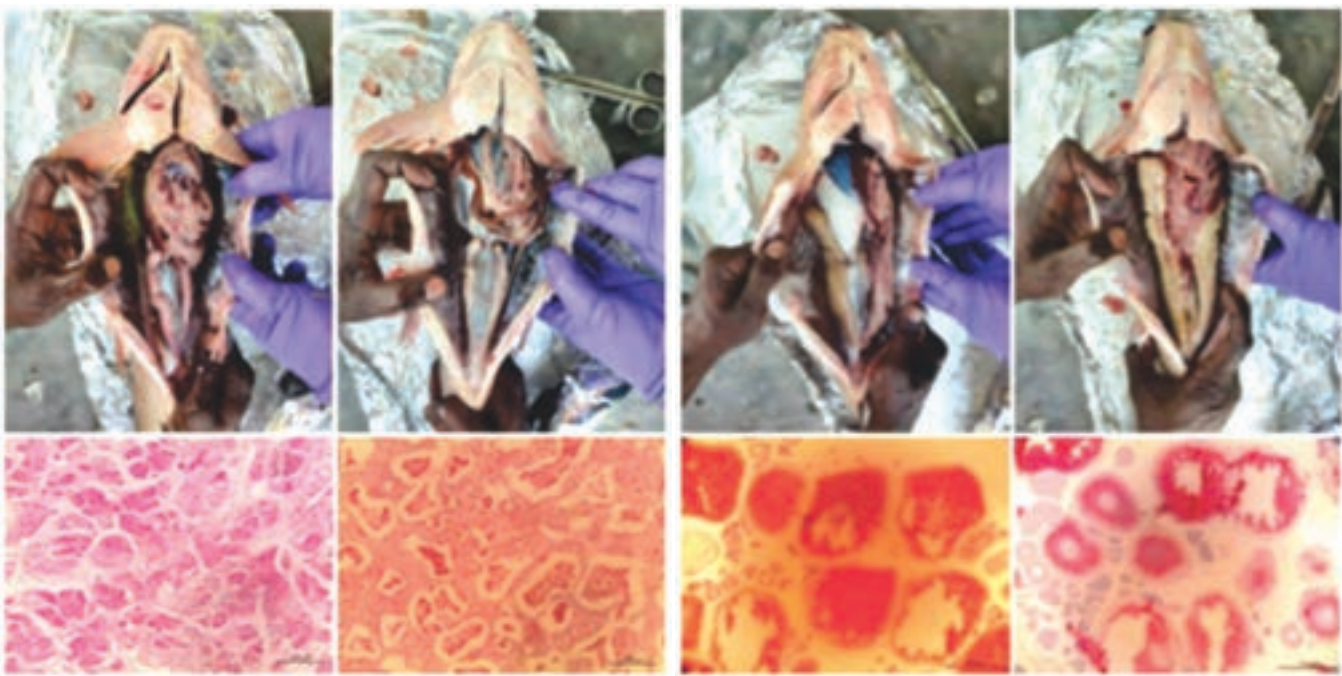
Assessment of the safety of Ovaqua, a hormonal formulation for induced breeding in fish

The evaluation of safety of Ovaqua in fish was carried out in rohu by comparing control and hormone-treated groups through gross organ

examination and histological analysis. To assess biosafety, brain, kidney, liver, and male and female gonadal tissues were collected from control (untreated) and "Ovaqua" treated fish and processed for histological examination. The

treated fish showed no abnormalities in external morphology. Upon dissection, no gross pathological changes and deformities were observed in the treated fish. In histological examination, no degenerative changes or cellular disintegration were observed in "Ovaqua" treated

male gonads. Similarly, normal ovarian histoarchitecture and orderly oocyte maturation in "Ovaqua" treated female gonad was observed, which indicates that the hormonal formulation did not induce any unwanted histological damage thereby supporting the safety of the hormone.



Gross and histological comparison between control and treated male (left) and female gonad (right)

Project: AQ-18	Development of lab grown meat from coldwater fish
Sub project 11:	
Period:	April 2024 – March 2027
Personnel:	Amit Pande (PI), K.V. Chanu
Funding Support:	Institutional, ICAR-CICFR

Karyotyping of cell lines

Karyotype analysis was performed for the Rainbow trout liver (RBTL) and *Schizothorax richarsonii* muscle (SRM) cell lines to confirm their identity and cytogenetic stability. Metaphase chromosome spreads were prepared and examined under a microscope to determine the chromosome number and structural integrity. The analysis revealed that the RBT liver cell line exhibited a modal chromosome number of 2n=62, consistent with the reported diploid chromosome number of *Oncorhynchus mykiss*. Similarly, the SRM cell line showed a modal chromosome number of 2n=96, confirming it to be the *Schizothorax richarsonii* cell line.

Evaluation of cell viability in experimental culture media (CW)

An experiment was conducted on the RBTL cell line to evaluate cell viability under different concentrations of experimental culture media (CW), including 0% CW, 2% CW, 4% CW, 6% CW, 8% CW, and 10% CW, along with 5% FCS and 10% FCS as comparative controls. Cell viability was assessed using MTT and resazurin assays to determine metabolic activity and cell survival at varying media concentrations. The study demonstrates that RBTL cell viability in experimental CW media is concentration-dependent. Lower to moderate CW concentrations supported cell survival and metabolic activity, while higher concentrations resulted in reduced viability.



Fig.: Resazurin and MTT assay

Doubling time calculation

The population doubling time was calculated for RBTL, RBTH and SRM cell lines to assess their proliferation rates and growth characteristics. The doubling time for RBTL and RBTH was 2.52 days, while for SRM was 4.42 days. The results indicate that RBTL and RBTH cells exhibited comparatively faster growth rates, whereas the SRM cell line showed a slower proliferation rate.

Assessment of optimal cell growth with respect to different concentrations of Pluronic on cell suspension medium (MEM Joklik Medium) in both FCS and CW-based culture systems

The growth of RBTL cells was evaluated under two different experimental conditions over a period of seven days. In the first condition, cells were cultured in media containing varying

concentrations of Pluronic supplemented with FCS. In the second condition, cells were cultured in media containing varying concentrations of Pluronic supplemented with CW media. Cell growth was monitored to assess the effect of different Pluronic concentrations in both FCS and CW-based culture systems.

In the first condition, where the cells were cultured in media containing varying concentrations of Pluronic supplemented with FCS, steady growth was observed only at 0.05% concentration of Pluronic. In the second condition, where the cells were cultured in media containing varying concentrations of Pluronic supplemented with CW media, at 0.1% concentration of Pluronic, cells demonstrated maximum growth on day 1 and maintained their viability till seven days.

Project: AQ-18	Development of vaccine against <i>Aeromonas salmonicida</i> infection for rainbow trout, <i>Oncorhynchus mykiss</i> in India
Sub project 12:	
Period:	April 2024 – March 2027
Personnel:	N. Shahi (PI), Amit Pande, S.K. Mallik
Funding Support:	Institutional, ICAR-CICFR

An intraperitoneal (IP) inactivated vaccine was developed using various strains of *Aeromonas salmonicida* collected from multiple fish farms in Northern India. For the vaccine trial, advance fingerlings of rainbow trout (mean body weight 12.5 ± 0.75 g) received a primary vaccination, followed by a booster. The biosafety of the vaccine was confirmed through both *in-vitro* and *in-vivo* methods. No cytotoxic effects were observed during *in-vitro* testing using the epithelioma

papulosum cyprini (EPC) cell line. Similarly, *in-vivo* biosafety was validated through histological analysis of tissues collected during the challenge, which was conducted 10 days post booster dose. No abnormalities were observed in any of the experimental groups across either trial.

The vaccine demonstrated high efficacy in the relative percentage survival (RPS) study, where the *Aeromonas* vaccinated and challenged (AVC) group achieved a significant survival rate of 90.0%



compared to the 13.3% observed in the *Aeromonas* non-vaccinated and challenged (ANVC) group. This resulted in an RPS of 88.46%, while also successfully delaying the onset of mortality until day 5 and reaching a stable survival plateau by day 8. The serum lysozyme activity and bactericidal activity both showed a significant initial divergence between the two groups. In the A VC group, lysozyme activity peaked sharply at day 1, followed by a gradual decline, while bactericidal activity reached its lowest point at day 1 before showing a steady, progressive recovery toward day 14. In contrast, the ANVC group exhibited relatively inconsistent fluctuations, with lysozyme activity remaining negligible and bactericidal

activity is elevated later at day 4 before declining. Immunogenic gene expression analysis revealed that the AVC group elicited a robust and rapid immune response of pro-inflammatory markers (*IL-8*, *TNF- α 1*, *IFN- γ*) at day 1 and established immunological memory through significant *IgM secretory* expression as early as day 7. In contrast, the A NVC group's response was delayed and typical of a primary infection for all four immune genes, with markers such as *IL-8* and *IFN- γ* showing massive, inconsistent spikes at day 1 and day 7 respectively. A rapid and sustained defence was achieved via the vaccine, replacing the vulnerable and erratic immune response observed in the non-vaccinated group.

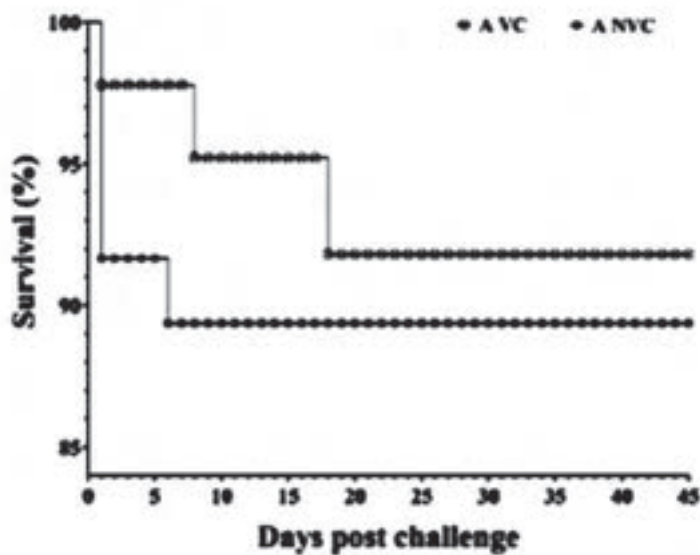


Fig.: Relative percentage survival graph of the IP vaccine trial after giving challenge to the juvenile rainbow trout

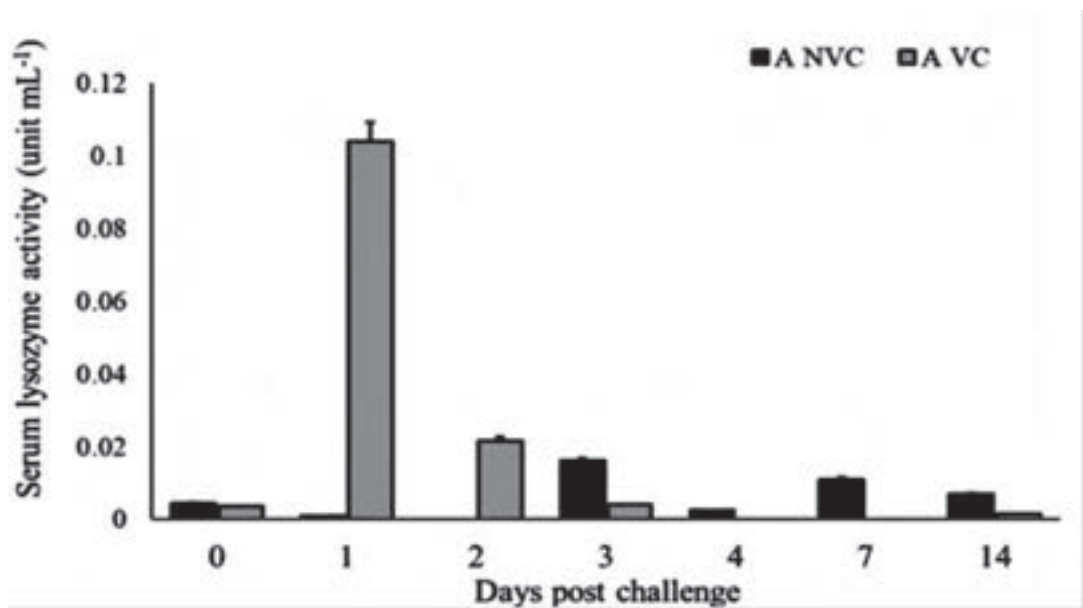


Fig.: Serum lysozyme activity graph of the IP vaccine trial after giving challenge to the juvenile rainbow trout

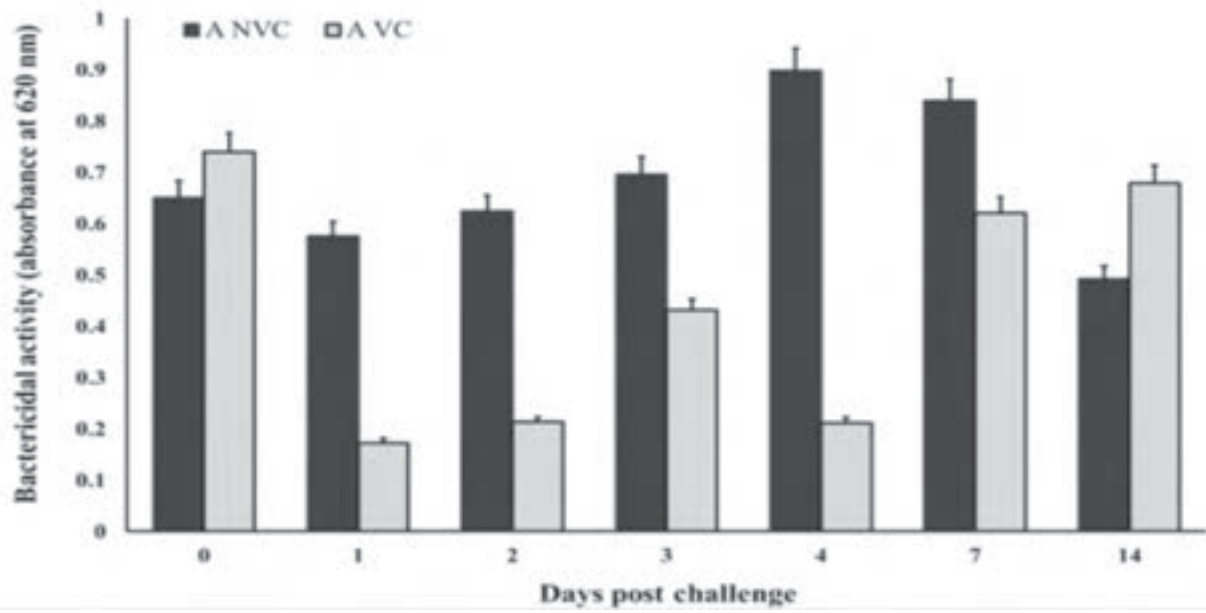


Fig. : Bactericidal activity graph of the IP vaccine trial after giving challenge to the juvenile rainbow trout

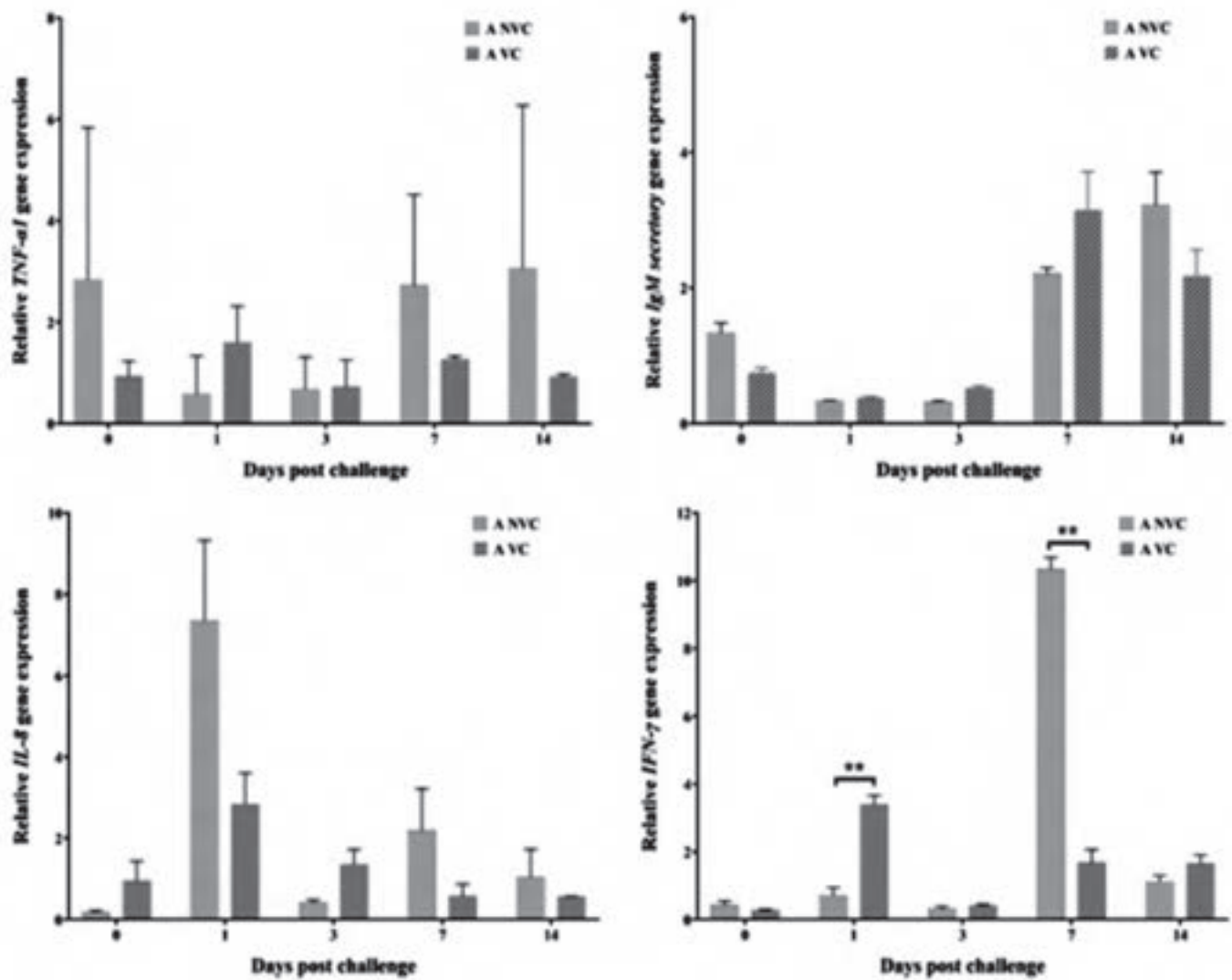


Fig.: Immunogenic gene expression of IL-8, IgM secretory, INF- γ and TNF- α genes for spleen



Project: AQ-18	Production of fish recombinant gonadotropin hormone for use in
Sub project 13:	aquaculture
Period:	April 2024 – March 2027
Personnel:	D. Thakuria (PI), Amit Pande, K.V. Chanu
Funding Support:	Institutional, ICAR-CICFR

Construction of single chain synthetic genes encoding Luteinizing Hormone (LH) and follicle stimulating hormone (FSH)

Construction of synthetic genes encoding luteinizing hormone (LH) and follicle stimulating hormone (FSH) from fish is an important step for advancing reproductive biotechnology and aquaculture research. LH and FSH are pituitary glycoprotein hormones that regulate gametogenesis, steroidogenesis, and final maturation in teleosts. Both hormones are heterodimers composed of a common α -subunit and a hormone-specific β -subunit (LH β or FSH β), where the β -subunit confers biological specificity. The first step in synthetic gene construction (synthetic single-chain gene having both subunits) involved retrieval of the nucleotide or amino acid sequences of both subunits from cDNA. Single-chain analogs were

constructed by genetically linking the α - and β -subunits with a flexible peptide linker, improving stability and simplifying expression. For efficient heterologous expression, the FSH and LH gene sequences were optimized in silico by codon optimization according to the eukaryotic host expression system. Codon usage bias, GC content, mRNA secondary structure and restriction enzyme sites etc. were considered during optimization. Signal peptide sequences was added to facilitate secretion of the recombinant hormone. The synthesis of synthetic single-chain LH and FSH genes for expression in a eukaryotic host is currently underway. Once synthesized, the full-length single chain synthetic genes will then be cloned into suitable expression vector under strong promoter. The constructs will be verified by restriction digestion and DNA sequencing.

3.5 Disease Surveillance and Health Management

Project: AMR	Network programme on antimicrobial resistance (AMR) in fisheries and livestock under INFAAR
Period:	April 2021-March 2026
Personnel:	S.K. Mallik (PI), N. Shahi, R.A.H. Bhat (till July 2025)
Funding Support:	Nodal Agency - ICAR-NBFGR (ICAR-FAO Network Programme on AMR)

During the current year, a total of two districts in Uttarakhand; Rudraprayag and Tehri Garhwal were covered, encompassing 44 farms overall for AMR sample collection. Of these, 30 farms were located in Rudraprayag and 14 farms in Tehri Garhwal. Bacterial isolates obtained from fish tissue samples (gill and intestine) across both districts included 25 isolates of *Aeromonas* spp. (20 from Rudraprayag and 5 from Tehri Garhwal), 27 isolates of *Staphylococcus* spp. (21 from Rudraprayag and 6 from Tehri Garhwal), and 5 isolates of *Escherichia coli* (4 from Rudraprayag and 1 from Tehri Garhwal). Water samples collected from the two districts yielded 25 isolates of *Aeromonas* spp. (16 from Rudraprayag and 9

from Tehri Garhwal), 6 isolates of *Staphylococcus* (all from Rudraprayag), and 1 isolate of *Escherichia coli* (from Rudraprayag). Antimicrobial resistance analysis revealed that *Aeromonas* spp. showed maximum resistance to Cefoxitin (92%) in both fish and water isolates, *Staphylococcus* spp. exhibited maximum resistance to Oxacillin (100%) in both sample types, and *Escherichia coli* demonstrated maximum resistance to Aztreonam (100%) in both fish and water isolates. In future AMR surveillance, the antibiotic resistance profile of target bacterial isolates from fish farms in Kangra district of Himachal Pradesh and Dibrugarh in Arunachal Pradesh will be studied comprehensively.

Project: FP-01	Processing and value addition of Rainbow trout
Period:	April 2024-March 2027
Personnel:	Garima (PI), K. Kunal, Renu Jethi, B.S. Kamalam (till May 2025)
Funding Support:	Institutional, ICAR-CICFR

"Rainbow trout is a highly valued fish species in the coldwater aquaculture sector, fetching premium prices in both local and international markets. However, farmers frequently face mass mortalities in ponds due to environmental stressors such as water shortages, oxygen depletion, and floods. Additionally, the remote locations of these farms, coupled with the highly perishable nature of fresh fish due to its high water content, present significant logistical challenges for sales and distribution. To mitigate these issues, the preparation of value-

added products offers a viable solution. Value addition not only extends the shelf life of the fish-enabling safe transport over longer distances-but also helps farmers secure better prices and increase their overall profitability. Various mince-based products suitable for local markets have been developed from rainbow trout, incorporating ingredients like potatoes and eggs to improve bulk and binding. These products include fish cutlets, kebabs, pickles, patties, grilled fish, kofta, cheese balls, fingers, balls, momos, soup, and nuggets."



Different value-added products prepared from rainbow trout



3.6 Externally Funded Projects

Project:	NSPAAD National surveillance programme for aquatic animal disease - Surveillance of coldwater fish diseases in Himachal Pradesh and Uttarakhand (NFDB funded multi-institutional project)
Period:	April 2022-March 2026
Personnel:	Amit Pande (PI), S.K. Mallik, R.A.H. Bhat (till July 2025)
Funding Support:	Nodal Agency - ICAR-NBFGR

Active surveillance under NSPAAD phase II

Under NSPAAD Phase II, implemented under the Pradhan Mantri Matsya Sampada Yojana (PMMSY), ICAR–CICFR carried out active surveillance in 86 fish farms across Uttarakhand. Active surveillance was conducted across both plains and hill/high-altitude regions to ensure uniform and representative data collection. A total of 86 baseline data sets were recorded, comprising 21 from Pithoragarh, 13 from Udham Singh Nagar, 25 from Haridwar, 7 from Dehradun, 15 from Rudraprayag, and 5 from Tehri districts. During the course of active surveillance, three mortality cases were observed in Udham Singh Nagar. Samples collected from these cases were screened for OIE-listed viral, bacterial, and fungal pathogens, all of which yielded negative results. Additionally, one

case of mass mortality was reported through the *Report Fish Disease* application monitored under NSPAAD. Samples from this incident were collected and processed, with further laboratory analysis undertaken by ICAR-NBFGR, Lucknow. Through regular farm visits, the team carried out health checks, recorded disease occurrences, and interacted directly with farmers to understand their day-to-day management practices. These interactions made it easier to identify common risk factors related to water quality, stocking density, and farm management. Insights gained from the surveillance allowed the institute to provide timely, need-based advisories, strengthen disease preparedness, and build greater awareness among farmers about preventive healthcare and sustainable aquaculture practices.



(a) Fish farm in Kanalichina, Pithoragarh. (b) Fish showing petechial haemorrhage along with bloated abdomen. (c) Trout raceways in Rudra Prayag. (d) Hands on inspection of dead fish in Dehradun. (e) Massive mortality of snakehead fish in a farm at Dehradun district. (f) Massive culture of Pangas spp. in Udham Singh Nagar.

Awareness and training programmes conducted under NSPAAD phase II

Awareness and training programmes were systematically conducted in selected regions with substantial farmer participation. ICAR–CICFR conducted awareness programmes in three villages namely Nathuwakhan and Bichkhali in Ramgarh block of Nainital district and Harinagar village in Bhimtal block of Nainital district to enhance community-level knowledge on coldwater fish diseases and sustainable aquaculture, and also conducted one Training Programme at Manan village in Hawalbagh block of Almora District where farmers were trained to identify common

diseases, recognize early symptoms, and understand the role of environmental stressors through practical demonstrations. The NSPAAD project at ICAR–CICFR emphasized hands-on demonstration of the “Report Fish Disease” mobile application during surveillance activities. Farmers were practically trained on app usage and the importance of submitting structured disease information rather than verbal complaints. This intervention significantly improved digital disease reporting practices and strengthened national surveillance efforts. 72 farmers were demonstrated the use of RFD application and were registered in the application during active surveillance during the year 2025.



a



b



c



d

Awareness Programme were performed in (a) Fish health and basic management awareness for farmers and school children at a local school in Harinagar village, Nainital. (b) Awareness programme and live demonstration of the Report Fish Disease application for farmers in and around Nathuwakhan village. (c) Hands-on training in Manan village, Hawalbagh block, Almora district, where farmers were trained in fish disease identification, immediate medication, and basic health care practices; group photograph captured during the Programme. (d) Lecture on usage and reporting procedures of the "Report Fish Disease" application



Virus screening of imported rainbow trout eyed ova

In accordance with national biosecurity regulations and OIE guidelines, ICAR-CICFR conducted virological screening of samples received from K2 Aquaculture, which imports rainbow trout eyed ova from Denmark. As mandated for all imported aquatic organisms, the samples were screened for OIE-listed viral pathogens to ensure biosecurity and disease-free status. Screening primarily targeted major WOA-listed viral pathogens of

concern in salmonids, including Viral Haemorrhagic Septicaemia Virus (VHSV), Infectious Haematopoietic Necrosis Virus (IHNV), Epizootic Haematopoietic Necrosis Virus (EHNV), Infectious Salmon Anaemia Virus (ISAV), and Infectious Pancreatic Necrosis Virus (IPNV). During the year 2025, a total of seven batches of samples were screened successfully against WOA-listed pathogens by ICAR-CICFR, and notably, none of the screened samples tested positive for any WOA-listed viral pathogen.

Project:	AINP All India Network Project on Fish Health- AINP-FH
Period:	April 2021-March 2026
Personnel:	S.K. Mallik (PI), N. Shahi, R.A.H. Bhat (till July 2025)
Funding Support:	Nodal Agency-ICAR-CIBA

Determination of LD50 of potassium permanganate (KMnO₄), formalin, iodophor and benzalkonium chloride (BKC) in fingerling Rainbow trout, Oncorhynchus mykiss

Potassium permanganate (KMnO₄)

KMnO₄ concentrations tested were 1, 1.2, 1.3, 1.4, 1.5, 2, 3, 4, 5, 10, 50, and 100 ppm. Fish showed no mortality at 1–1.4 ppm during the 96-hour exposure. At 1.5 ppm, 100% mortality occurred within 26 hours. With increasing concentration, mortality occurred faster: about 27 h at 2 ppm, 19 h at 3 ppm, 7 h at 4 ppm, 5 h at 5 ppm, 2 h at 10 ppm, 52 min at 50 ppm, and 31 min at 100 ppm, indicating a clear dose-dependent increase in toxicity.

Iodophor

Iodophor concentrations 0.1, 0.2, 0.3, 0.4, 0.5, 1, 2, 3, 4, 5, 6, 7 and 10 ppm were tested in rainbow trout fingerlings. Fish survived at 0.1 ppm. At 0.2 ppm, about 50% mortality occurred at 43 h 39 min, while the remaining fish survived until the end of the experiment. Higher concentrations caused rapid mortality, with 0.3 ppm causing complete mortality within 1 h 9 min, followed by progressively faster deaths at increasing doses (50 min at 0.4 ppm, 43 min at 0.5 ppm, 9 min at 1 ppm, 6–9 min at 2–3 ppm, 4 min at 4 ppm, 3 min at 5–6 ppm, 2 min at 7 ppm, and <1 min at 10 ppm). These results indicate a strong dose-dependent acute toxicity of iodophor in rainbow trout.

Pharmacokinetics of feed administered Sulfadimethoxine+Ormetoprim

A pharmacokinetic study was conducted in rainbow trout juveniles following a single oral dose of 50 mg kg⁻¹ body weight, with samples collected from plasma, gill, liver, kidney, muscle, and intestine over 0–128 hours to evaluate ADME behavior of sulfadimethoxine (SDM) and ormetoprim. SDM showed rapid absorption with T_{max} ranging from 2–48 h (fastest in muscle at 2 h and slowest in plasma at 48 h). The highest peak concentration (C_{max}) was observed in the intestine (8450 µg kg⁻¹), followed by muscle (7308 µg kg⁻¹) and gill (6330 µg kg⁻¹). Distribution data indicated major accumulation in intestine and liver, with high exposure values (AUC_{0-∞} about 400769–475689 µg kg⁻¹ h). The liver showed the longest half-life (62.6 h) and a slow elimination rate constant (0.011 h⁻¹), suggesting slower metabolism, while kidney elimination half-life was about 25 h, indicating gradual excretion and overall higher tissue persistence. In contrast, ormetoprim showed T_{max} between 6–64 h (fastest in gill, slowest in kidney) with highest concentrations in kidney (2530 µg kg⁻¹) and liver (1450 µg kg⁻¹). It exhibited a larger apparent distribution volume (V_z/F up to 2.16 in plasma) and highest exposure in kidney (AUC_{0-∞} 213501 µg kg⁻¹·h). Liver half-life was around 29.5 h, indicating moderate metabolism, whereas a prolonged plasma half-life (179 h) suggested slower systemic processing.

Excretion appeared primarily renal, with slower intestinal elimination (half-life 98 h). SDM showed higher tissue accumulation and slower elimination, whereas ormetoprim demonstrated wider distribution but comparatively faster clearance.

Biosafety of Sulfadimethoxine+Ormetoprim in Rainbow trout

The biosafety study of sulfadimethoxine–ormetoprim in rainbow trout fingerlings was conducted at 50, 150, 250, and 500 mg/kg body weight (1×, 3×, 5×, 10× doses) for 15 days, with muscle samples collected on the 5th, 10th, 15th, and 25th day during and after dosing. Residues of sulfadimethoxine increased with dose and treatment duration, reaching the highest level (9020 µg kg⁻¹) at the 10× dose on day 15, followed by a sharp decline by day 25, indicating post-treatment elimination even at higher doses. Ormetoprim showed comparatively lower accumulation, with the maximum level (1100 µg kg⁻¹) observed at the highest dose on day 5, and a marked decline by day 25, suggesting relatively faster clearance. Residues of both drugs increased

proportionally with dose and exposure duration but decreased significantly.

Withdrawal of Sulfadimethoxine+Ormetoprim in Rainbow trout

The withdrawal study was conducted in juvenile Rainbow trout administered sulfadimethoxine–ormetoprim at a dose of 50 mg kg⁻¹ body weight for 5 days, with residues monitored in muscle, liver, kidney, gill, intestine, and plasma for 45 days post-feeding against the MRL of 100 µg kg⁻¹. For sulfadimethoxine, residues remained below the MRL in all organs except the intestine, where a transient level of 116 µg kg⁻¹ was observed on day 3, followed by depletion below the safety limit thereafter, indicating effective elimination. In contrast, ormetoprim residues in liver, gill, intestine, muscle, and plasma stayed below the MRL throughout the study; however, kidney showed markedly higher accumulation, reaching 7290 µg kg⁻¹ on day 6 and persisting at 361 µg kg⁻¹ even on the last sampling day, suggesting slower depletion and renal retention.

Project: NICRA	Development of climate resilient Rainbow trout and innovative trout farming strategies to mitigate climatic stressors
Period:	April 2021-March 2026
Personnel:	R.S. Patiyl (PI from April 2025 onwards), Rajesh M, P.A. Ganie, P.K. Pandey (PI till March 2025), B.S. Kamalam (till May 2025)
Funding Support:	Nodal Agency-ICAR-CRIDA

Recirculating aquaculture system for climate resilient aquaculture

Under the project, a recirculating aquaculture system (RAS) was developed and evaluated for climate-resilient aquaculture. Over the past five years, key production parameters were systematically assessed, and a complete rainbow trout production cycle, from stocking to market sale, was successfully evaluated. Critical variables, including water temperature, stocking density, species strain, and feed type, were tested to optimize production performance and system efficiency. In the last year, to further enhance fish welfare and increase production capacity, a 10 TR chiller facility and nanobubble generator units were installed in the RAS. During 2025, the RAS facility generated a revenue of INR 3,26,732

through the sale of approximately 545 kg of fresh rainbow trout, along with an additional INR 1,30,000 from training programmes. The facility also serves as a demonstration and training unit for farmers, entrepreneurs, students, and other stakeholders through exposure visits and hands-on training programmes. In addition, ongoing work is focused on evaluating the potential reuse of RAS sludge as an organic fertilizer to promote resource recycling and sustainability. Further, technology developed under the project “Recirculating Aquaculture-Based Hatchery and Nursery Technology for Rainbow Trout” (ICAR Technology Certification No. ICAR-FS-ICAR-Technology-2025-044), received the technology certification is recognized among the top five technologies of Fisheries SMD-2025.



Oxygen nanobubble generator



Receiving ICAR technology certification: RAS-based Hatchery and nursery technology

Heat hardening for thermal stress resilience in rainbow trout

We explored heat hardening in rainbow trout by briefly exposing the fish to a mild, non-lethal increase in temperature to improve their tolerance to later thermal stress. The trials were carried out using an in-house developed “Thermal Ramping and Regulating Quadruplex Aquarium.” After the heat-hardening treatment, the fish were returned to normal rearing conditions, and their critical thermal maximum (CTmax) was measured and

compared with fish maintained continuously at the standard temperature (16°C). The results showed that the heat-hardened group exhibited an improvement of about 1.5°C in acute thermal tolerance compared to the control group. From an aquaculture perspective, heat hardening can be a practical management tool to enhance thermal resilience, minimise stress-related mortality during sudden temperature fluctuations, and support better growth and survival, particularly in systems where temperature regulation is

challenging. This approach is especially useful in recirculating aquaculture systems (RAS) and raceway farms in hilly regions, where seasonal temperature variation and climate change can expose rainbow trout to acute thermal stress. The

observed improvement in tolerance is likely associated with physiological and cellular protective responses, which are currently being further investigated.

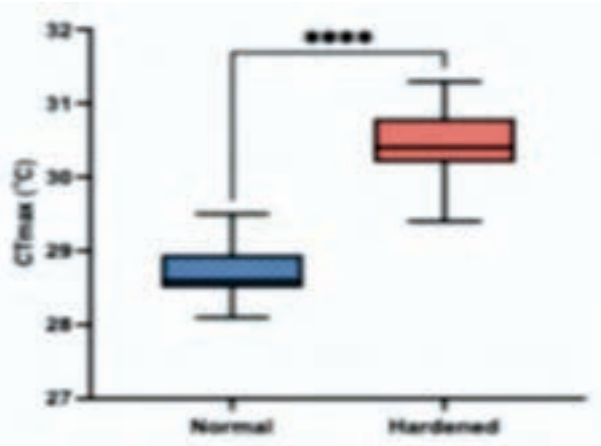
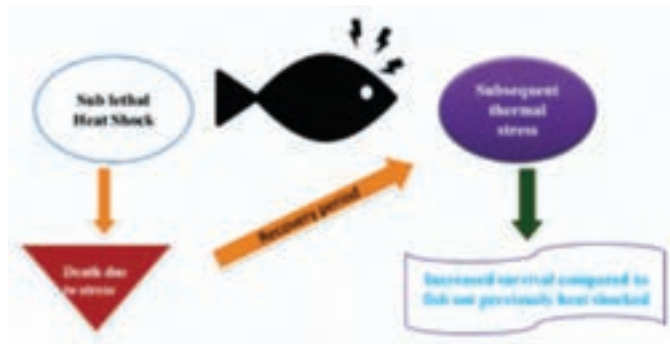
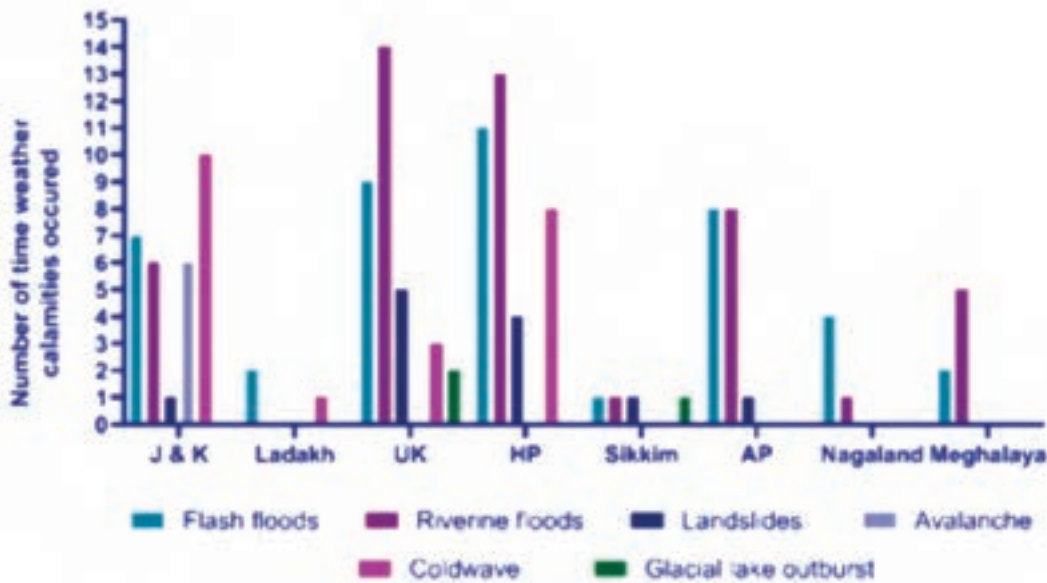


Fig.: Concept of heat hardening to enhance thermal tolerance and critical thermal maximum of rainbow trout between normal and heat hardened group

Risk assessment in coldwater states

A preliminary risk assessment mapping was conducted across major trout-farming states in India using international disaster databases (IDD), which was further validated through ground-truthing. The analysis identified key environmental hazards and mapped their frequency of occurrence over the past 25 years (2000-2024). Major risks affecting cold-water aquaculture include flash floods, riverine floods, landslides, avalanches, cold waves, and glacial lake outburst floods, all of which can cause severe damage to fish stocks as well as farming infrastructure. Among these, floods

emerged as the most significant risk, with a higher frequency of occurrence in Himachal Pradesh and Uttarakhand, where several incidents have resulted in substantial damage to trout farming infrastructure and production systems. These findings highlight the vulnerability of raceway- and flow-through-based trout farming in mountainous regions to climate- and disaster-related events. In response, the project is currently exploring suitable adaptation and mitigation strategies to reduce potential losses and enhance the resilience of trout farming systems against these environmental threats.



State-wise frequency of occurrence of major environmental hazards in the Himalayan states over the past 25 years

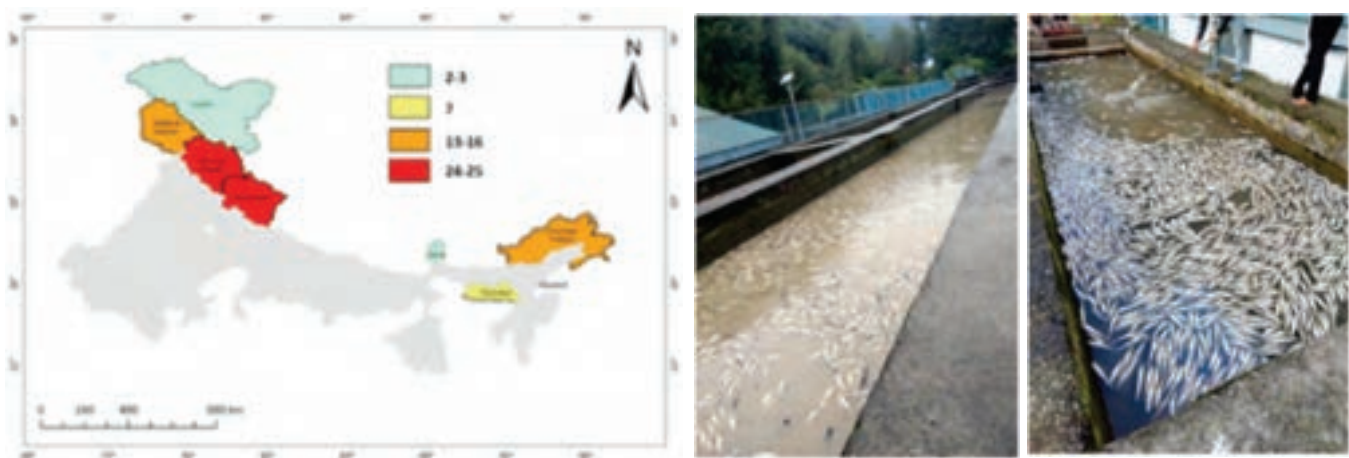


Fig.: Spatial mapping of flooding events in major coldwater states of India over the past 25 years

Impact of mild siltation on rainbow trout

Siltation caused by soil erosion and surface runoff is a major environmental stressor in raceway-based rainbow trout farming, particularly during the monsoon season, often resulting in fish mortality and economic losses. This study evaluated the short-term physiological responses of juvenile rainbow trout (*Oncorhynchus mykiss*, ~20 g) exposed to suspended silt under controlled laboratory conditions. Fish were assigned to control (no silt) and silt-exposed (2 g/L, <100 µm stream-collected silt) groups and maintained in 50 L aerated tanks at 17 ± 1 °C for 24 hours, with continuous aeration to keep silt in suspension. Water quality parameters (turbidity, dissolved oxygen, pH, temperature, and total ammonia nitrogen) were monitored throughout the exposure period. Thermal tolerance assays showed that silt

exposure increased CTmax by ~1°C and decreased CTmin by 0.7°C, while incipient lethal oxygen concentration (ILO_C), haemoglobin, and haematocrit levels remained unchanged. However, histological analysis of gill tissues revealed significant structural damage in silt-exposed fish, including lamellar disorganisation, epithelial lifting, hypertrophy, necrosis, and lamellar fusion, indicating inflammatory stress. Biochemical analyses demonstrated reduced liver SOD and GST activities and a decline in total antioxidant capacity in liver and/or gill tissues, suggesting weakened antioxidant defences. TBARS levels remained unchanged, indicating limited lipid peroxidation during short-term exposure. Overall, the findings show that even brief silt exposure can impair gill integrity and antioxidant balance in rainbow trout.

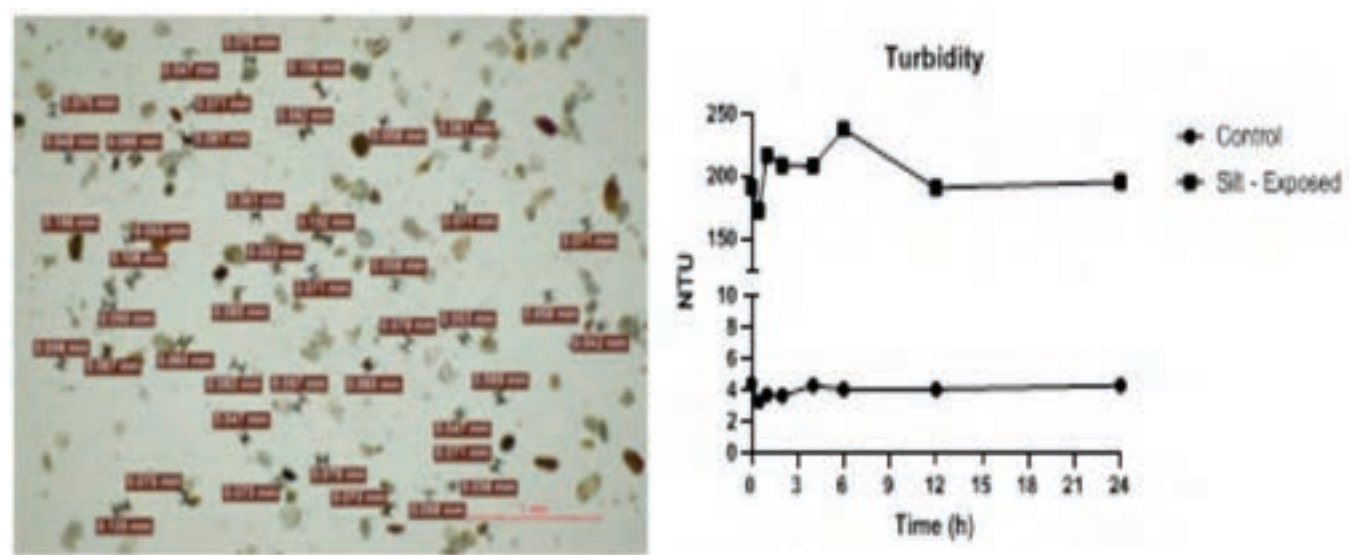


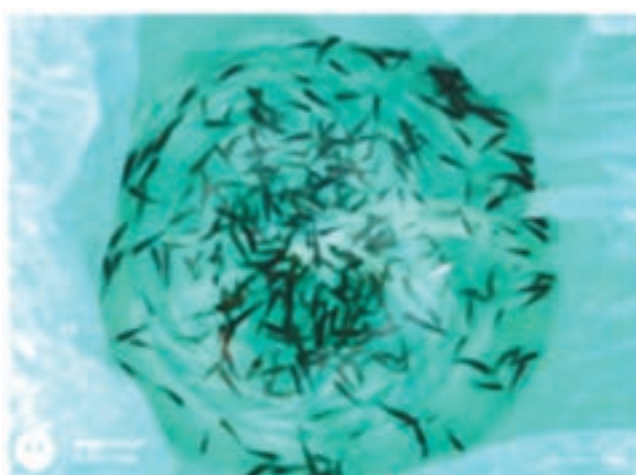
Fig.: Particle size distribution of silt and turbidity levels during simulated experiment on siltation

Project: DBT-10	Translating the native fish germplasm for socio-economic benefits through aquaculture and fisheries in Himalayan region
Period:	May 2022 - March 2026
Personnel:	Shahnawaz Ali (PI), R.S. Patiyal
Funding Support:	Dept. of Biotechnology, GOI, New Delhi

Indigenous fish-based aquaculture practices in mid hill region

Fish is considered as the cheapest source of animal protein thus play a significant role in the nutritional security of the hill dwelling population. Therefore, field trials of polyculture of exotic and minor carps in different combination was conducted at different locations in mid hills of Kumaun region, Uttarakhand. Culture in low density poly ethylene (LDPE) film lined ponds was adopted for polyculture of exotic carps (*Hypophthalmichthys molitrix*, *Ctenopharyngodon idella*, *Cyprinus*

carpio) and algae eater, eurythermal minor carp (*Labeo dyocheilus* and *Bangana dero*). Fingerlings of all species with weight range of 20-30 g were stocked @3.0 and 4.0 no./m³ (30% minor carp of the total stocked fish). Fish were harvested after 12 months of the stocking and observed for the growth and yield. Size of the minor carp at the harvesting was observed as 456± 13g for *L. dyocheilus* and 496± 12g for *B. dero*. Maximum yield was observed as 42 kg/ 100 m³. Preliminary analysis of data revealed that polyculture of exotic carp and minor carp in mid hills is useful for diversified produce.



Seeds of minor carp produced and supplied to farmers for stocking in the polylined pond

Project: DBT-11	Development of autogenous vaccine against <i>Lactococcus garvieae</i> in farmed Rainbow trout: An alternative to antibiotics
Period:	September 2023 – August 2026
Personnel:	N. Shahi (PI), S.K. Mallik, S. Chandra
Funding Support:	Dept. of Biotechnology, GOI, New Delhi

An intraperitoneal (IP) inactivated vaccine was developed for *Lactococcus garvieae*. For the vaccine trial, advance fingerlings of rainbow trout (12.5 ± 0.75 g) received a primary vaccination, followed by a booster dose 15 days later. The biosafety of the vaccine was confirmed through both *in-vitro* and *in-vivo* methods. No cytotoxic effects were observed during *in-vitro* testing using

the epithelioma papulosum cyprini (EPC) cell line. Similarly, *in-vivo* biosafety of vaccine was validated through histological analysis of tissues collected during the challenge.

The *L. garvieae* vaccine demonstrated high efficacy in the relative percentage survival (RPS) study, where the *Lactococcus* vaccinated and challenged (LVC) group achieved a significant



survival rate of 93.5% compared to the 85.5% observed in the *Lactococcus* non-vaccinated and challenged (LNVC) group. This resulted in RPS of 55.18%. The serum lysozyme assay and bactericidal activity both showed steady, progressive increases in the vaccinated and challenged group, peaking at day 14. In contrast, the non-vaccinated and challenged group showed inconsistent and negligible fluctuations during the day 0, 1, 2, and 3. Furthermore, immunogenic gene expression analysis revealed that the vaccinated and challenged group elicited a robust and rapid

immune response of pro-inflammatory markers (*IL-8*, *TNF- α 1*, *IFN- γ*) at day 1 and established immunological memory through significant *IgM secretory* expression as early as day 0 and 3. In contrast, the non-vaccinated and challenged group response was delayed and typical of a primary infection for all four immune genes, with key markers only peaking at day 14. A rapid and sustained defence was achieved via the intraperitoneal vaccine, replacing a vulnerable and erratic immune response.

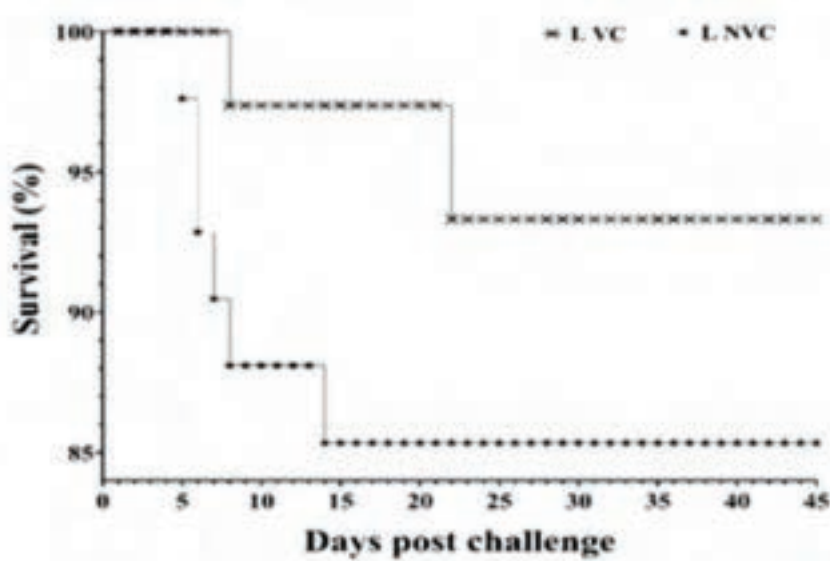


Fig.: Relative percentage survival graph of the IP vaccine trial. LVC is Vaccinated and challenged. LNVC is non-vaccinated and challenged group.

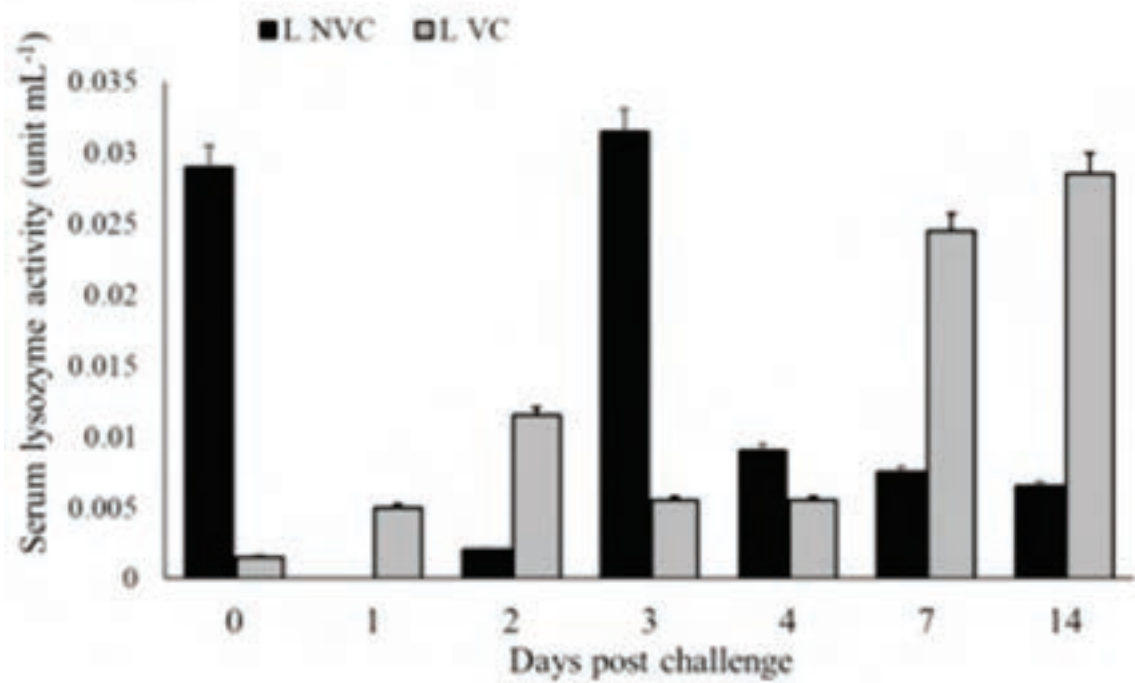


Fig.: Serum lysozyme activity graph of the IP vaccine trial after giving challenge to the juvenile rainbow trout.

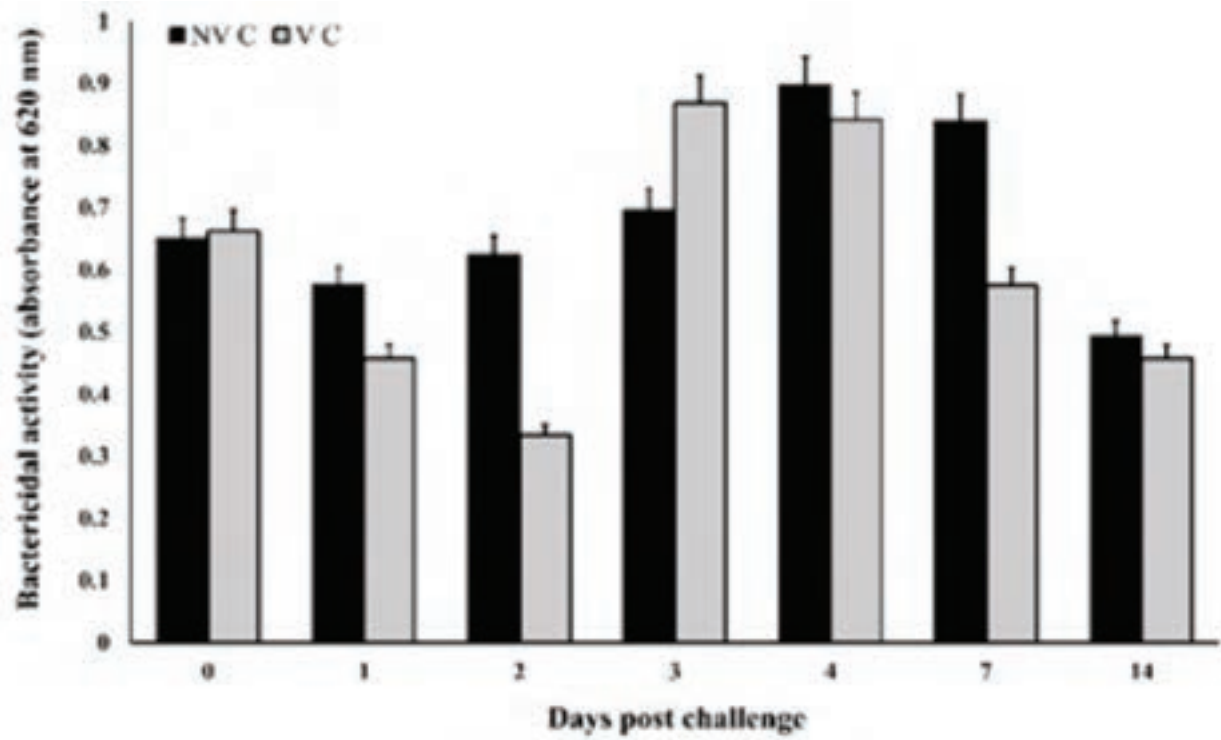


Fig.: Bactericidal activity graph of the IP vaccine trial after giving challenge to the juvenile rainbow trout.

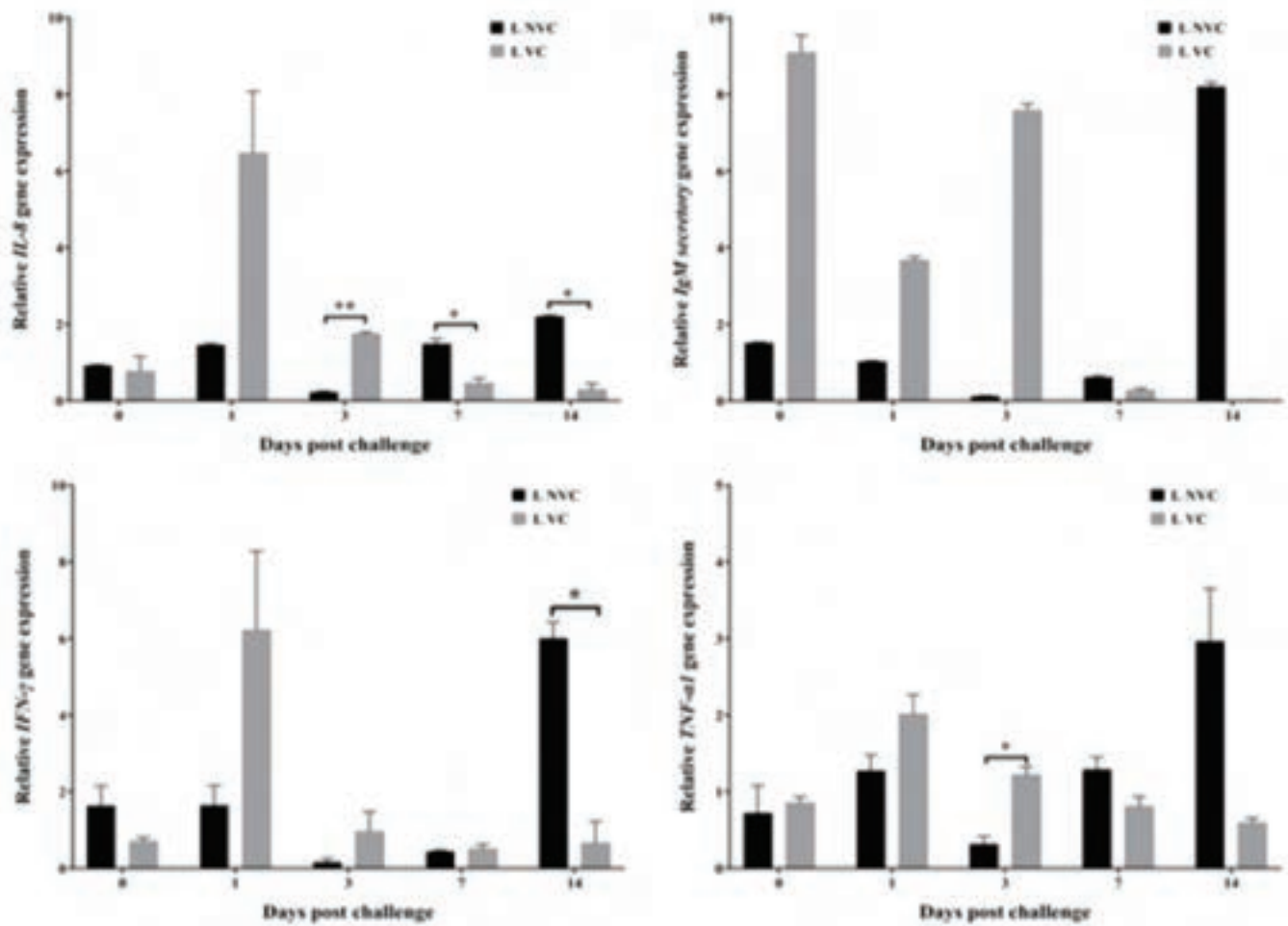


Fig.: Immunogenic gene expression of IL-8, IgM secretory, INF-γ and TNF-α1 in spleen



Field trial of bacterial vaccine was performed at EFF, ICAR-CICFR, Champawat. The trial was to evaluate the efficacy of vaccine under field condition and also to assess the duration of protection, in case of immersion vaccine of *L. garvieae*. Field trial of *L. garvieae* vaccine was performed at Harnwal trout farm of Ramgarh, District Nainital, Uttarakhand, India. In both field trial the vaccine was given to the fingerlings through immersion method. Primary dose was given on May 2025 and June 2025 at both places respectively. Booster dose was given to the fish 30

days post of primary dose on respective day in both places. Sampling was also done for the biosafety of the vaccine in the field trial of ICAR-CICFR, experimental fish farm, Champawat, and were constantly checked for any sort of physical symptoms of the disease. Confidentiality Disclosure Agreement was signed in between CICFR, Bhimtal and IIL, Telangana for *L. garvieae* vaccine development. The signing of MoA is under progress. The developed vaccine was also screened for mycoplasma contamination and it was found to be free from it.



Immersion vaccination of fish group named as treatment group with IIV and control group given immersion of phosphate buffer saline (PBS).

Project: DBT-12	Development of aquaphage therapy as an alternative to antibiotics for bacterial infections in rainbow trout farms of Indian Himalayan region (IHR)
Period:	October 2023 - September 2026
Personnel:	S. Chandra (PI from Aug. 2025 onwards), R.A.H. Bhat (PI till July 2025)
Funding Support:	Dept. of Biotechnology, GOI, New Delhi

The project was undertaken to address the growing problem of bacterial diseases in fish farming. The overuse of antibiotics can harm the environment, fish health, and human consumers. Therefore, this project aims to reduce dependence on antibiotics by using bacteriophages as a safe, targeted, and eco-friendly alternative for controlling bacterial infections in aquaculture. So far, a total of 11 bacteriophages targeting fish pathogens *Lactococcus*

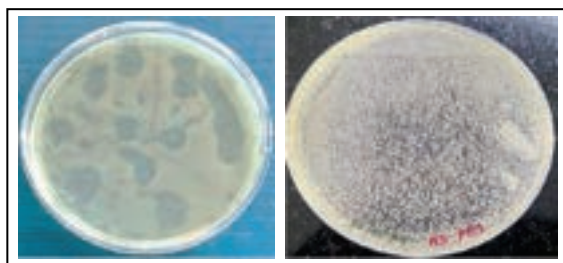
garvieae and *Aeromonas* spp. have been isolated from 30 water samples collected from different sources of coldwater region (Fish farms, rivers, sewage, factory discharge, dairy and poultry). A major challenge faced during the first year was the long-term preservation of phages, leading to the loss of some of the isolates. However, these phages were genomically characterized and identified as novel. Learning from this experience, the work

was restarted with improved protocols leading to the isolation of new bacteriophages. The newly isolated phages have also been genomically characterized. Additionally, four of the isolates

have also been morphologically characterized using transmission electron microscopy while rest are under process.



Fig.: Genome analysis methodology



A). Collected water samples were tested for presence of lytic phages using Spot Assay. The zone of clearance indicate the presence of lytic phages.

B). Webbed pattern method was performed to increase the phage titre.

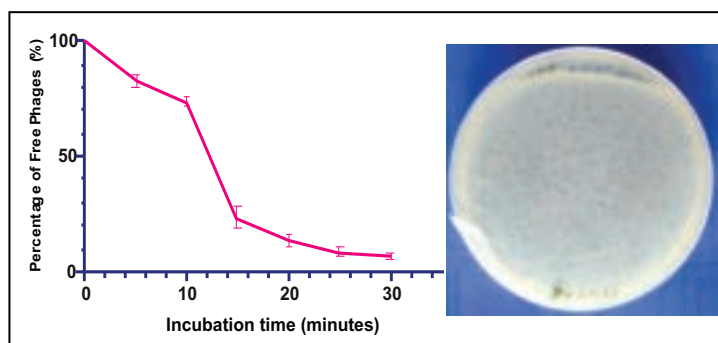


Fig.: Phage characterization
(Adsorption rate and burst size)

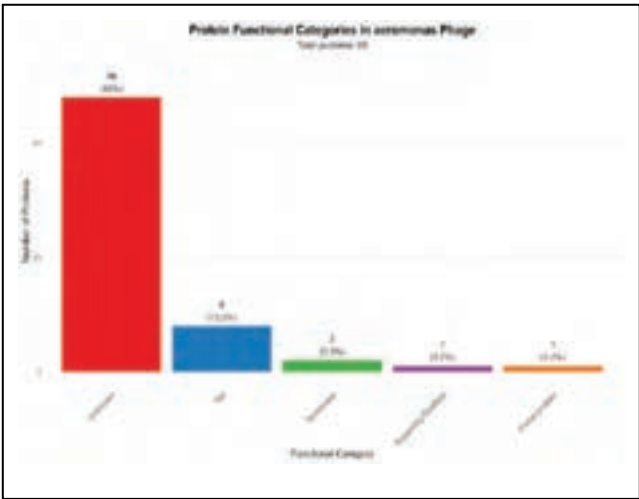
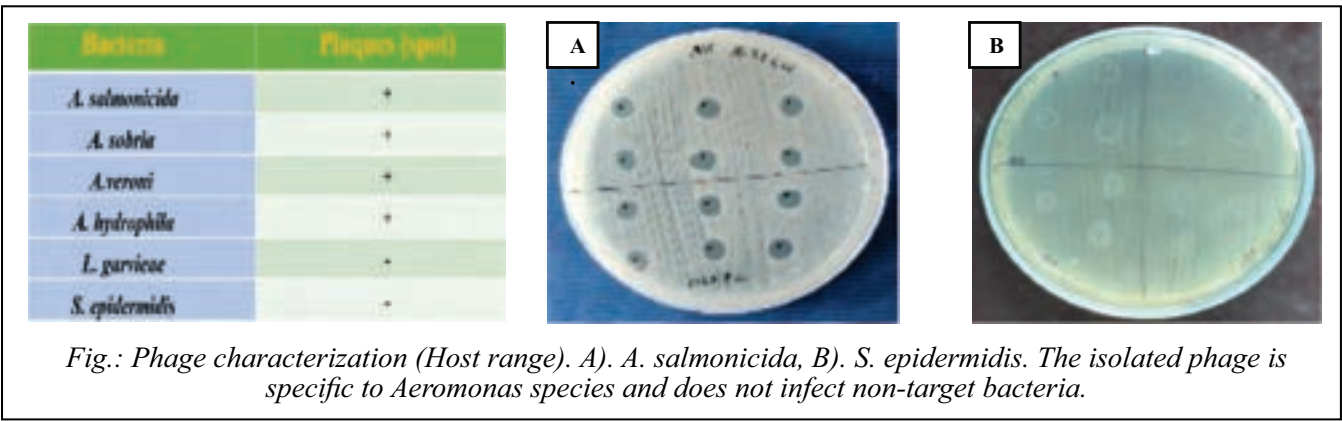


Fig.: Protein functional categories in *Aeromonas* phage

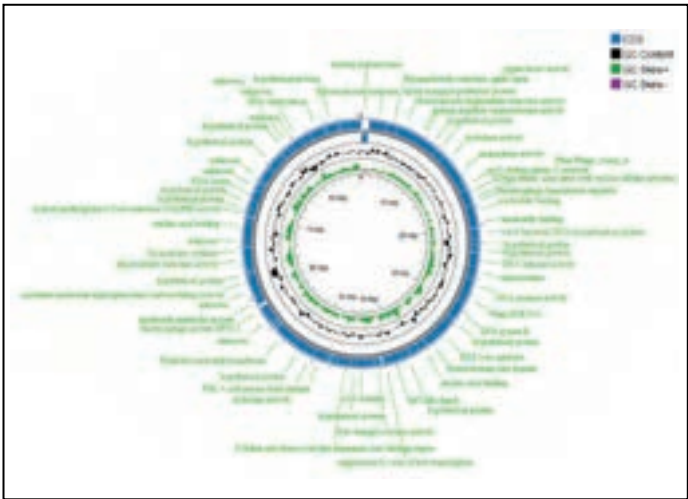
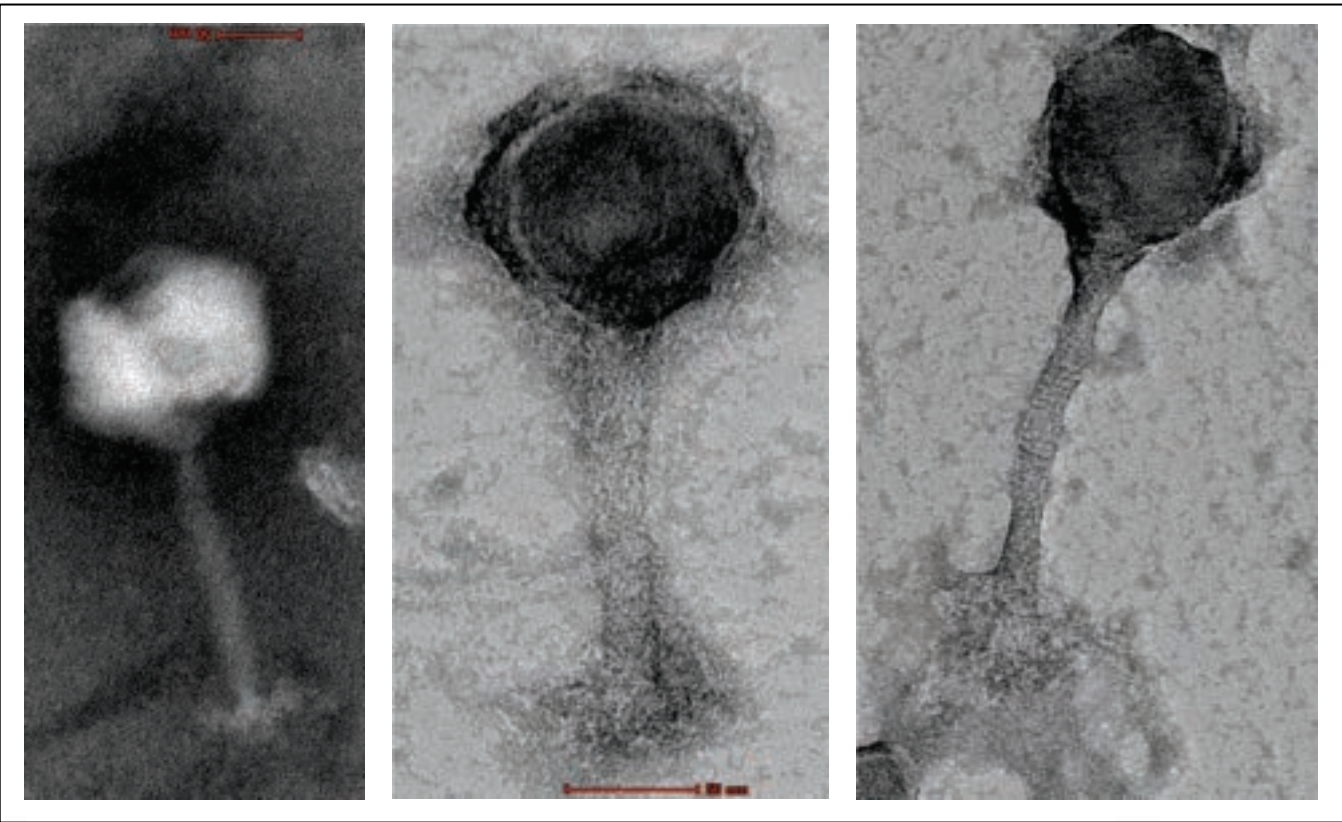
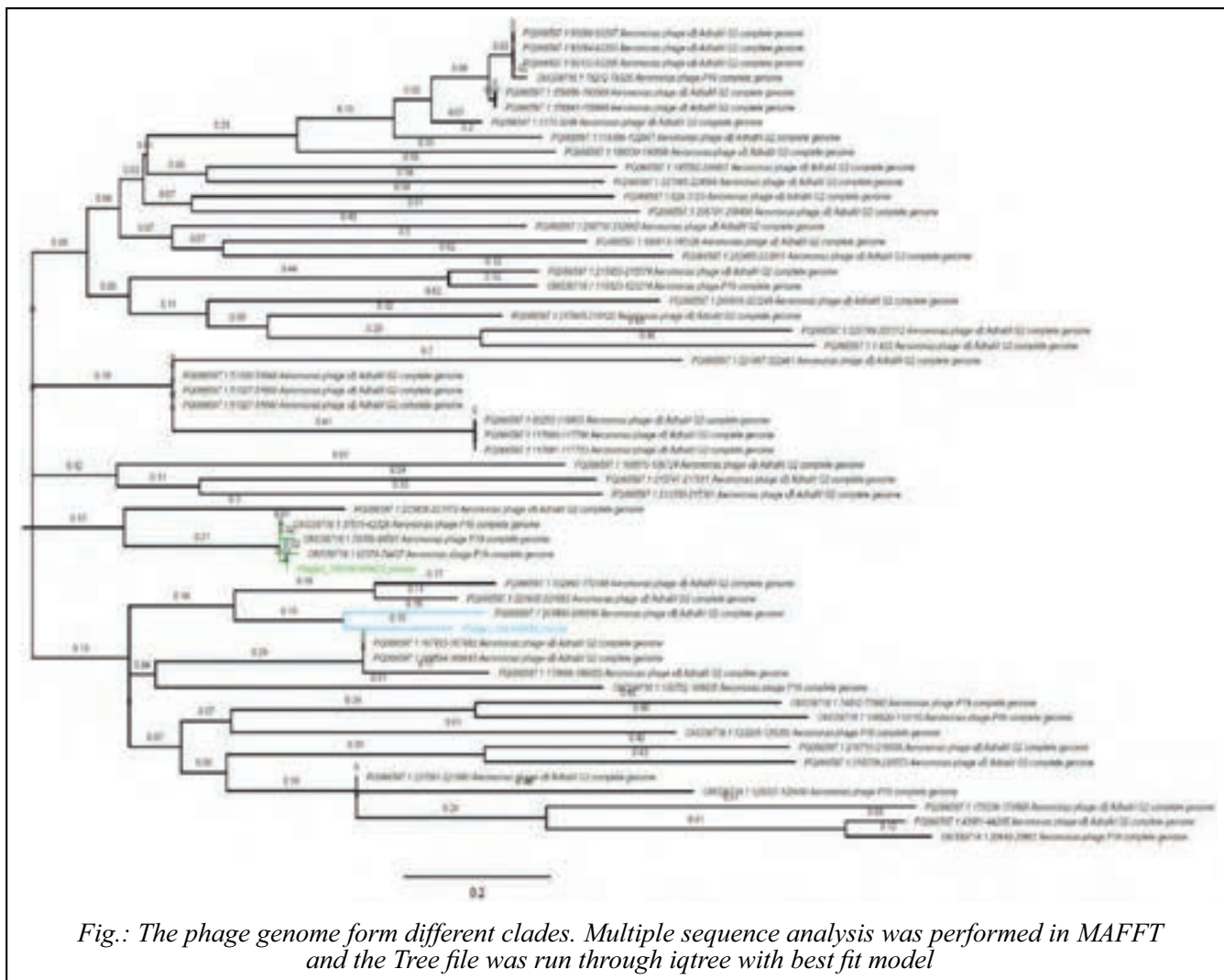


Fig.: Circular plots of the isolated phages



Transmission electron micrographs of bacteriophages



Project: DBT-13	Genome assembly, comparative genomics and transcriptomics of the endangered Himalayan golden mahseer (<i>Tor putitora</i>) to identify the genomic basis of sex differentiation and economically important traits for the development of aquaculture and conservation under climate change
Period:	July 2024 - June 2027
Personnel:	Shahnawaz Ali (PI), Kh. Victoria Chanu (from Oct. 2025 onwards)
Funding Support:	Dept. of Biotechnology, GOI, New Delhi

The rapid development of NGS technology and genome based bioinformatics methods led to the accumulation of studies and discoveries on aquatic organisms which has application in the areas of molecular taxonomy, genome evolution, molecular breeding, drug development, and DNA barcoding. Furthermore, they can be applied to characterize, utilize and conserve wild aquatic genetic resources. However, genomic resources, particularly sequencing and assembly of reference genome in aquaculture species are still limited. In

the present study, in collaboration with CSIR-CCMB, Hyderabad, we aimed to develop Whole Genome Assembly of *Tor putitora* and genome wide SNP discovery and identification and mining of important traits related genes for golden mahseer (*Tor putitora*). In addition, the project also deals with the study on the effect of temperature as an environmental stress on sex differentiation in this species. Genes related to heat shock and sex differentiation has been examined during the ontogenic developmental stages under different

thermal stress. Histological examination of gonads was done to study any structural changes towards sexual differentiation under thermal stress.

Preliminary findings indicate that molecular sex differentiation starts earlier than histological changes.

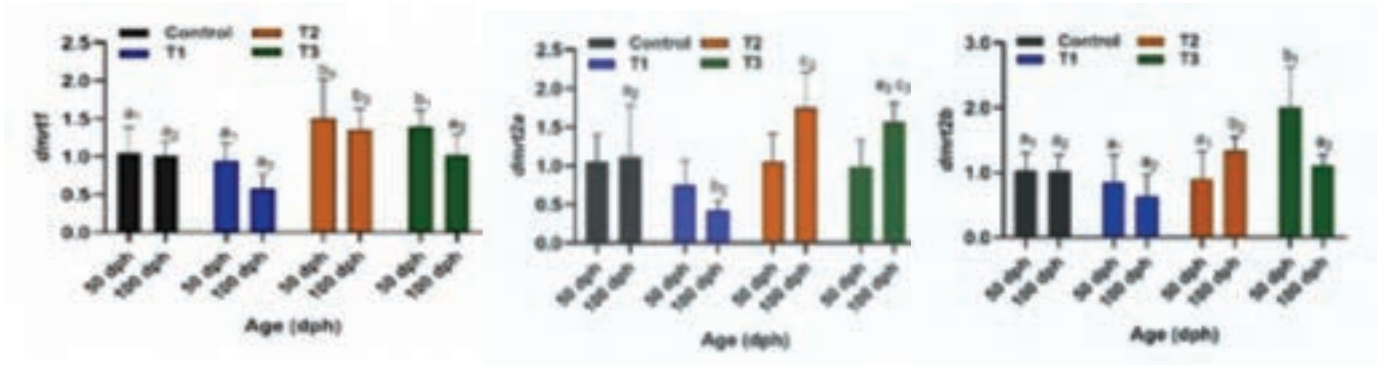
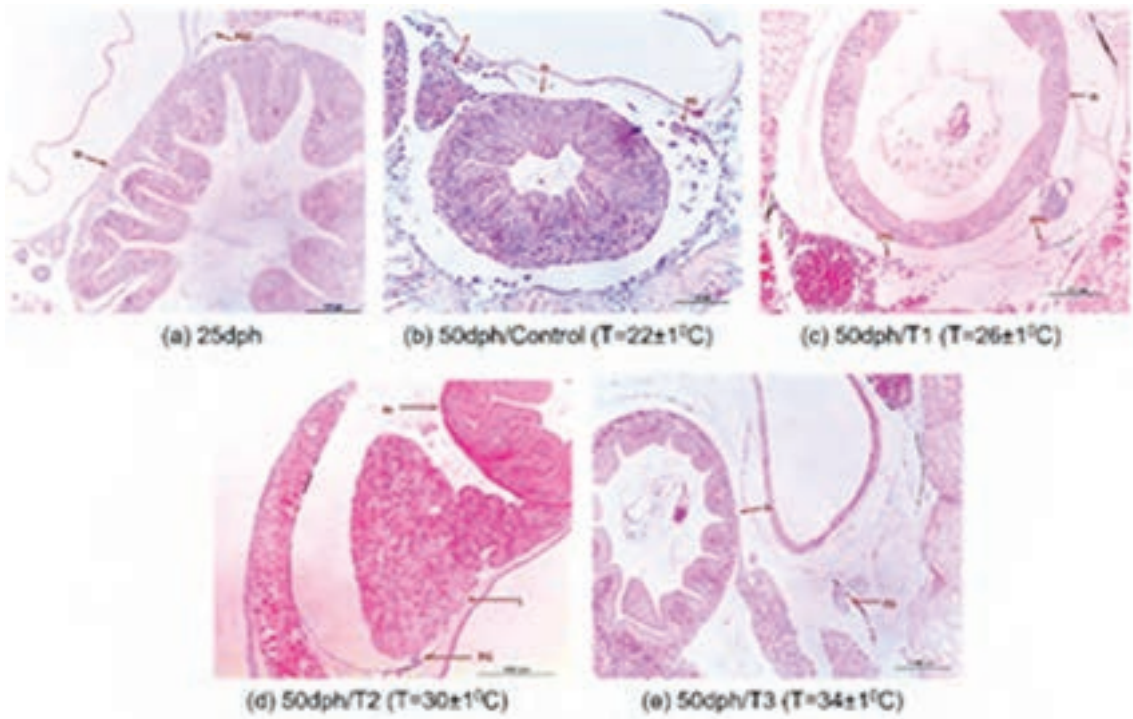


Fig.: Expression profile *dmrt1*, *dmrt2a* and *dmrt2b* genes during ontogenic developmental stages of golden mahseer exposed to different temperatures



Histological pictograph of gonadal development of *Tor putitora*. (PGC: Primordial germ cell; PG: Primary gonad; In: Intestine; P: Pancreas; L: Liver).

Project: DBT-14	Computational prediction and characterization of novel cell penetrating peptides from fish virus protein
Period:	October 2024 - October 2027
Personnel:	D. Thakuria (PI), Kh. Victoria Chanu, Amit Pande
Funding Support:	Dept. of Biotechnology, GOI, New Delhi

Identification of novel cell penetrating peptides (CPPs) from fish virus protein for intracellular delivery of biomolecules
A total of 249 novel cell-penetrating peptides (CPPs) have been identified from various proteins

of fish viruses, such as Infectious pancreatic necrosis virus, Infectious hematopoietic necrosis virus, Redspotted grouper nervous necrosis virus, Infectious Salmon anaemia virus, Tilapia lake virus, Epizootic hematopoietic necrosis virus,

European catfish virus, Lymphocystis disease virus, Cyprinid herpesvirus 3, White spot syndrome virus, Spring viremia of carp virus, Viral hemorrhagic septicemia virus, Paralichthys olivaceus birnavirus, Tilapia parvo virus, Anguillid herpesvirus, and Cyprinid herpesvirus 2. These CPPs were predicted utilizing the various online tools. Subsequently, the uptake efficiency of each peptide was also assessed. Out of these 249 CPPs, 105 CPPs showed high uptake. Furthermore, various physicochemical properties of the peptides were analyzed, including net charge, isoelectric point (pI), molecular weight

(MW), amphipathicity, water solubility, hydrophobicity, hydrophobicity ratio, and the presence of polar, non-polar, uncharged, and charged residues. A critical parameter for identifying an effective CPP is the prediction of membrane-binding capability and cellular localization. Therefore, the Boman index for each peptide was calculated. Moreover, the cellular localization of each CPP was assessed to ascertain the probability of their localization. Most of the predicted CPPs displayed localization inside the cell. The secondary structure prediction analyses were also performed to evaluate the helicity of the predicted CPPs.

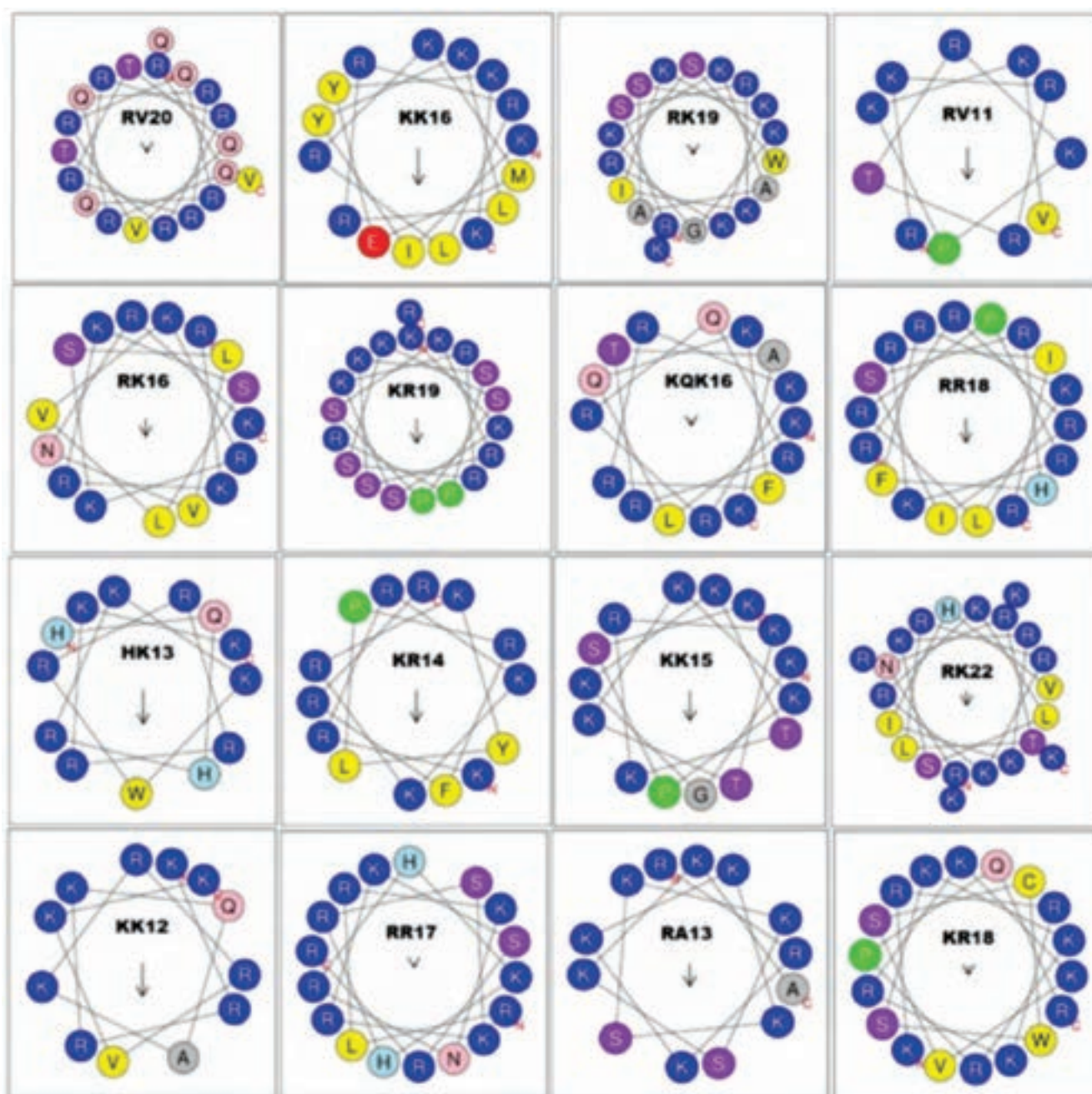


Fig.: Helical wheel projection of some of the identified novel cell penetrating peptides (CPPs) from fish virus proteins



Project: DBT-15	Mining fish proteome for discovery of novel peptide antibiotics
Period:	August 2025 - July 2028
Personnel:	Kh. Victoria Chanu (PI), D. Thakuria
Funding Support:	Dept. of Biotechnology, GOI, New Delhi

In silico method for discovery and characterization of novel peptide antibiotics

Peptides having antimicrobial activity are either gene encoded or may arise from fragments of proteins that are not related to immune functions. For this, the target protein can be digested in silico using different enzymes. The resulting fragments are then evaluated for their likelihood of exhibiting antimicrobial activity. The peptides predicted to have antimicrobial activity are further analysed for physicochemical properties, toxicity, haemolytic activity, membrane topology, and ADMET

properties using various web-based tools. The most promising peptide(s), exhibiting favourable characteristics for antimicrobial potency, are then analysed for synergistic effects with other AMPs or antibiotics against selected pathogens. The selected peptides are further evaluated for their ability to interact with potential drug targets through molecular docking. Thus, in silico approach may be utilised for prior identification and characterization of novel peptide antibiotics before carrying out the wet lab experiments.

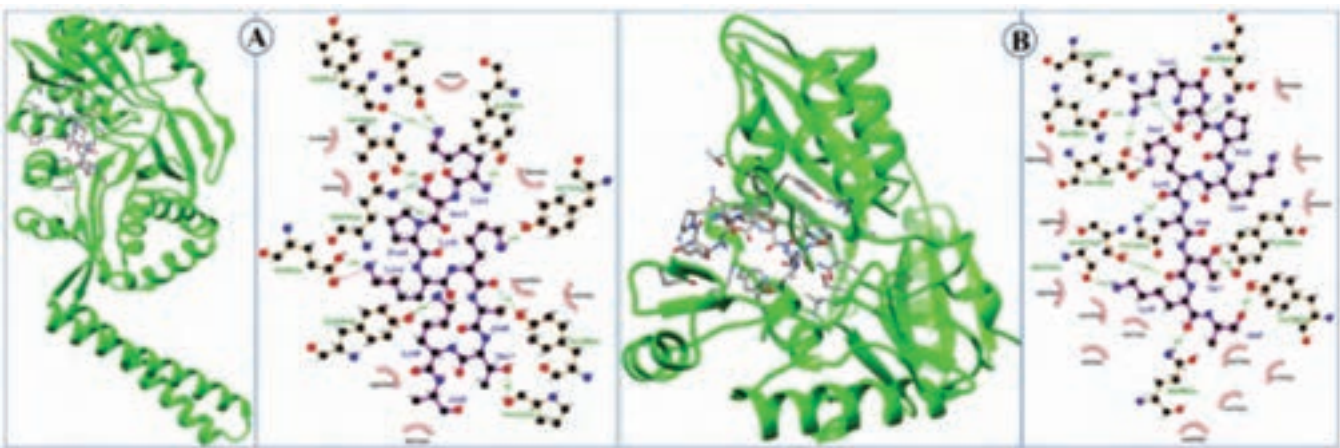


Fig.: 3D and 2D interaction of peptide antibiotic derived from histone protein of rainbow trout with potential drug targets of *S. aureus* (A) and *E. coli* (B).

Project: NMHS-1	Trout farming as backyard system in vibrant villages for livelihood and nutritional security
Period:	August 2024 - July 2027
Personnel:	Renu Jethi (PI), R.S. Patiyal
Funding Support:	National Mission on Himalayan Studies, GOI

Under the project, the major emphasis is being given to create awareness and demonstration on trout farming in backyard (Har Ghar Trout Model) for livelihood and nutritional security. Trout farming in FRP tanks with regular supply of water in backyard will be economic and viable system of farming in vibrant villages.

In initial phase, visits were conducted in vibrant village Sobla which lies in Darma Valley to study site suitability of the region for trout culture

in backyard system. This village is at the distance of 50 km from Dharchula and at an altitude in the range of 1500 to 2000 meter. Very few people have raceways for trout farming in the region. As the region is suitable for trout farming, four sites were selected for backyard trout farming. Four backyard trout farming model are installed at Sobla, Tejam in 2025. Farmers were provided fingerlings of rainbow trout and high-quality rainbow trout starter and grower feed at regular intervals. Regular monitoring is conducted to prevent fish mortality.



Project:	NMHS-2 Ecohydrology and vulnerability assessment in groundwater - fed and snow & glacial - fed river systems of Western and Eastern Himalaya under the warming climate
Period:	June 2025 - May 2028
Personnel:	M.S. Akhtar (PI), Ciji A, P.A. Ganie
Funding Support:	National Mission on Himalayan Studies, GOI

Under the project, the first round of sampling (post-monsoon) was carried out from 22 to 25 October 2025 in the Nayar River at four sampling sites, namely Vyasghat, Bansghat, Satpuli and Baounshal, covering a wide stretch of the river. Live fish, plankton, periphyton, breeding ground substratum samples, and water samples were collected to study fish diversity, habitat conditions and the present health status of the river. Early results showed the presence of several coldwater fish species. *Barilius bendelisis* was the most common species, contributing about 64.71% of the total catch, followed by golden mahseer, *Tor putitora*, at 23.53%, and *Barilius vagra* was

11.67%. Thermal sensitivity of three key species, *Tor putitora*, *Barilius bendelisis* and *Barilius vagra*, was assessed in the field (*in situ*) by measuring their upper temperature limits (CTmax) and routine metabolic rate. Around 300 live fish of these species were safely transported to the ICAR-CICFR laboratory for controlled temperature trials to understand how they adjust to higher temperatures over time. Detailed analysis of fish samples, plankton, periphyton and water quality is underway to link habitat conditions with fish health and distribution.



Sampling in the Nayar River



Project: NABARB	Innovative project for establishment and field demonstration of small-scale recirculating aquaculture system for rainbow trout farming in hilly region
Period:	January 2024 - June 2026
Personnel:	Rajesh M (PI), R.S. Patiyl, B.S. Kamalam (till May 2025), P.K. Pandey (till March 2025)
Funding Support:	NABARD

This innovative project funded by NABARD, aims to help farmers overcome challenges related to low water availability during the summer season and reduce risks associated with water flow stoppage and siltation during the rainy season. The project operates as a hybrid system combining flow-through and RAS, thereby reducing the high initial investment and operational costs associated with conventional RAS, while simultaneously mitigating the risks inherent in flow-through systems and enhancing fish production.

As per the project plan, two farmers were selected for this demonstration, and two small-scale RAS units were fabricated and installed. Each RAS model comprised two nursery tanks of 2 m³ capacity and one grow-out tank of 15m³ capacity, designed to produce approximately 700–800 kg of rainbow trout per production cycle. The systems were installed at the farm sites of Mr. Abhishek Harnwal and Mr. Prithavi Singh Dharmwal at Bohra Kote, Ramgarh, Nainital district. As part of the beneficiary contribution,

shed structures, inverters, and generators were installed by the farmers. One of the farmers has also expressed interest in installing a hybrid solar-based power system to generate electricity for RAS operation. Rainbow trout fingerlings were stocked in both systems, additionally, rainbow trout eyed ova were purchased and supplied to the farmers to initiate a fresh batch of trout farming in the RAS systems.

An exposure visit involving a group of 10 farmers was conducted at both demonstration sites on 13 November 2025 to familiarize them with RAS-based rainbow trout farming in water-limited hilly regions. Subsequently, a training programme on RAS-based fish farming was organized for 23 farmers, entrepreneurs, and Fisheries Department officials during 17–21 November 2025. A Project Monitoring Committee (PMC) meeting was held at the demonstration site on 15 December 2025, during which project activities were highlighted through Darshan media coverage.





Small scale RAS for rainbow trout at the demonstration site

Consultancy Project: NHPC	Hatchery management and seed production of golden mahaseer and snow trout as a part of fisheries management plan for Subansiri Lower Hydroelectric Project, Gerukamukh, Distt. Dhemaji, Assam
Period:	October 2022 - September 2025
Personnel:	M.S. Akhtar (PI from April 2025 onwards), P.K. Pandey (PI till March 2025)
Funding Support:	Department of Fisheries, Government of Arunachal Pradesh

Under the consultancy project on 'Hatchery management and seed production of golden mahaseer and snow trout as a part of Fisheries Management Plan for Subansiri Lower Hydro-Electric Project (NHPC Ltd)', at Dollungmukh, Arunachal Pradesh, 4th sampling was conducted during April, 2025 from four sites, two each from downstream and upstream. Samples were collected to analyse water quality parameters, plankton, periphyton, and benthos and brought to the ICAR-CICFR laboratory facility for further

analysis. Periphyton density ranged from 3900-4700 nos./cm². Bacillariophyceae continued to dominate the assemblage, with *Synedra* emerging as the principal genus, while Cyanophyceae appeared as a secondary group at select locations. Upstream stations consistently recorded relatively higher densities compared to downstream sites.

An inventory of items procured at the Hydro-Electric Project (HEP) site of NHPC has been prepared to assess their availability, condition and suitability for the planned hatchery and pond



facilities. In parallel, an onsite field laboratory was set up to support water quality monitoring for the upcoming hatcheries and ponds. Essential analytical facilities were organized to enable routine assessment of key parameters relevant to hatchery and pond management. Standard Operating Procedures for water quality monitoring and hatchery operations were prepared specifically for the Subansiri HEP.

Simultaneously, regular monitoring of the ongoing civil works related to hatchery and pond infrastructure has been undertaken. The progress of construction activities has been reviewed in relation to design specifications, and functional requirements.



Hatchery and pond civil work in progress at NHPC, Dollungmukh, Lower Subansiri

Consultancy Project: PMMSY	Recirculating Aquaculture System (RAS) for broodstock and production of rainbow trout
Period:	April 2022 - May 2026
Personnel:	Rajesh M (PI from Aug. 2025 onwards), P.K. Pandey (PI till March 2025), K.Kunal, R.S. Patiyl, Garima, B.S. Kamalam (till May 2025)
Funding Support:	Central Sector Scheme Component of PMMSY, Dept. of Fisheries, GOI

Under this research project, a state-of-the-art Recirculating Aquaculture System (RAS) facility is being established to develop standardized protocols for the extended seed production of rainbow trout. The facility has been designed with six independent RAS loops, enabling the maintenance of specific water quality parameters and environmental conditions required for controlled reproduction and broodstock management of rainbow trout. Each RAS loop

comprises a 30 m³ fish culture tank, radial flow settlers, a drum filter, a moving bed biological reactor (MBBR), a reservoir, water pumps, a low-head oxygenator, and other associated system components for manging required water quality. The hydraulic design of the system has been optimized to minimize dynamic pumping head, which is expected to reduce operational energy expenditure by approximately 30%. Each RAS loop is projected to support a fish production

capacity exceeding 1–2 tonnes per annum. At present, the rearing tanks, biological filtration units, and reservoirs have been successfully installed, while the remaining filtration components are under procurement. The facility is expected to be fully operational by June 2026.

During the reporting period, 1.6 million eyed ova produced from the broodstock maintained under the project were supplied to various states and Union Territories, namely Meghalaya, Arunachal Pradesh, Uttarakhand, and Ladakh, to support and promote rainbow trout farming in these regions.





3.7 Outreach Projects

NEH-1	Establishment of a golden mahseer hatchery unit in Manipur for its conservation (under NEH)
Period:	April 2023 - March 2026
Personnel:	M.S. Akhtar (PI), S.K. Mallik
Funding Support:	Institutional, ICAR-CICFR (NEH)

Under the project, the newly established Mahseer Hatchery by ICAR-Central Institute of Coldwater Fisheries Research, Bhimtal, and Manipur University was inaugurated by the Hon'ble Governor of Manipur, Shri Ajay Kumar Bhalla on 10 March, 2025, in the presence of Dr. J. K. Jena,

DDG (Fy.), Dr. Pramod Kumar Pandey, Director, ICAR-CICFR, Dr. B. K. Behera, CEO, NFDB and Prof. N. Lokendra Singh, Vice-Chancellor, Manipur University. The programme was attended by more than 200 participants, including students, farmers, academicians, and other stakeholders.



Inauguration of the mahseer hatchery established by ICAR-CICFR at Manipur university

Brooders of mahseer were collected from the districts of Ukhrul and Tamenglon. The brooders available were primarily juveniles, reflecting limited availability of larger mature individuals in the natural populations sampled. Transportation was undertaken over an approximate distance of 150 km. Owing to logistical constraints and terrain-related challenges, the fish were transported with periodic water exchange and were re-packed multiple times during transit to maintain dissolved oxygen levels and minimize metabolic waste accumulation. During the reporting period, three breeding operations were conducted involving Chocolate mahseer and Golden mahseer. Given that the brooders were relatively small in size, ranging between 250 and 300 g body weight, egg output per breeding attempt was very less. Nevertheless, reproductive performance indicators were satisfactory. The fertilization rate was 80 percent, hatching was recorded at around 85%, and larval survival was found to be around 80%. Several

operational challenges were encountered during the period. Brooder collection remained a major constraint due to limited availability of adequately sized individuals in accessible locations. Despite these challenges, the hatchery has transitioned from an infrastructural facility to an operational breeding unit. Successful breeding cycles with satisfactory fertilization, hatching, and larval survival rates establish proof of concept for functional hatchery operations under field-level constraints. However, scaling up seed production will require strengthening of broodstock development.



SCSP-1	Impact of fish farming on 'socio-economic' status of SC farmers in North-Western Himalayan Region (under SCSP)
Period:	April 2023 - March 2026
Personnel:	Renu Jethi (PI), K. Kunal
Funding Support:	Institutional, ICAR-CICFR (SCSP)

The study has been aimed to describe socio-economic impact and constraints that affects adoption of trout farming in Himalayan region. During the period, data was collected from 45 trout farmers from Himanchal Pradesh and 45 trout farmers from Uttarakhand. Data on socio-economic variables, trout yield, constraints faced by trout farmers were collected using structured

questionnaire.

Estimation of yield gap in trout farming

The mean trout yield was found to be 5.9 ± 2.5 kg/m³ and technology gap 4.1 kg/m³ in Himachal Pradesh whereas mean trout yield was 2.3 ± 1.4 kg/m³ and technology gap was 7.7 kg/m³ in Uttarakhand.

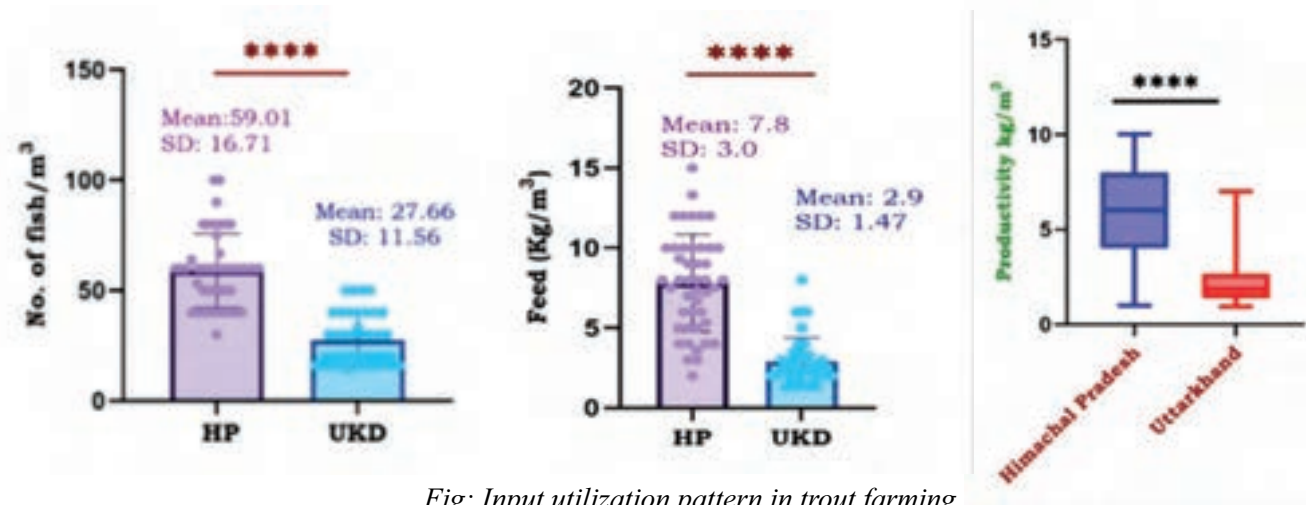


Fig: Input utilization pattern in trout farming

Multivariate regression analysis was done to study the relationship between trout productivity and independent variables viz., age, gender, education, main occupation, years of practicing trout farming, source of information, number of raceways, stocking density, feed used, fish mortality and training received. Data collected from Himachal Pradesh trout farmers shows that trout productivity was significantly impacted by

feed used and fish mortality. Stocking density was found to be high in Himachal Pradesh which was found significantly correlated with mortality. Mean stocking density was 59 fish seeds/m³ in Himanchal Pradesh whereas it was 28 fish seeds/m³ in Uttarakhand. In Uttarakhand, productivity was significantly impacted by mortality. Silty water during rainy season was the major factor for fish mortality.

Table: Estimation of yield gap in trout farming

Parameters	Himachal Pradesh	Uttarakhand
Range of the production (Kg/ m ³)	1-10	0.9 - 7
Demonstration yield (Kg/ m ³)	5.9 ± 2.5	2.3 ± 1.4
Potential Yield (Kg/ m ³)	10	10
Yield Gap (Kg/ m ³)	4.1	7.7



Economic analysis of trout farming

Economic analysis of trout farming based on data collected from trout farmers of Himachal Pradesh and Uttarakhand was worked out. Average Gross income/raceway (50 m³) was Rs. 1,47,500.00 and Rs. 57,500.00 for Himachal

Pradesh and Uttarakhand, respectively. Benefit Cost ratio of trout farming was 1.01 and 0.56 for Himachal Pradesh and Uttarakhand, respectively. Net returns include fixed cost component of the investment which includes interest on the capital invested and depreciation of the assets over time.

Table: Economic feasibility of trout farming

Parameters	Trout Productivity (Kg / Raceway)	Total cost	Gross return	Net return	B:C
Himachal Pradesh	295	1,46,165	1,47,500	1,335	1.01
Uttarakhand	115	1,02,325	57,500	-44,825	0.56



4. Technology Development

4.1 Mahseer larval feed for higher growth and survival (CICFR-MAHA-FirstFry)

A formulated larval feed (CICFR-MAHA-First Fry) has been developed to improve the growth performance, survival, and overall fitness of golden mahseer (*Tor putitora*) larvae. The feed is enriched with essential nutrients, including phospholipids and immunostimulants, and contains 52% crude protein and 10% crude lipid, meeting the specific nutritional requirements of mahseer during the critical early developmental stage. The absence of a nutritionally balanced and standardized larval feed has been a hurdle impeding the production of robust, stockable fry and fingerlings for conservation and stock enhancement programs. Early larval nutrition plays a critical role in determining growth, physiological resilience, and long-term fitness. Traditionally, hatcheries have relied on macerated goat liver as the feed for mahseer larvae. However,

this practice often results in suboptimal growth rates, pronounced size heterogeneity, extended nursery rearing duration, and challenges in maintaining water quality. Golden mahseer larvae can be successfully weaned onto CICFR-MAHA-



FirstFry as early as five days after the onset of exogenous feeding, significantly reducing dependence on live feeds or goat liver. The 'CICFR-MAHA-FirstFry' was developed by Dr. Ciji Alexander and Dr. M.S. Akhtar and team comprising Dr. B.S. Kamalam, Dr. M. Rajesh.

4.2 Technologies certified by ICAR

S. No.	Name	Developers
ICAR-FS-CICFR-Product-2025-045	Visual nano - biosensor for identification of oomycete pathogen, <i>Saprolegnia parasitica</i>	Dr. Kh. Victoria Chanu Dr. Dimpal Thakuria
ICAR-FS-CICFR-Product-2025-046	High performance rainbow trout brooder feed (DCFR PerforMAX-B)	Dr. Prakash Sharma Dr. Biju Sam Kamalam Dr. Rajesh M Dr. Kishor Kunal Dr. R.S Patiyal Dr. Ciji Alexander Dr. N.N. Pandey Dr. Pramod Kumar Pandey
ICAR-FS-CICFR-Product-2025-047	Ovaqua: A hormonal formulation for induced breeding in fish	Dr. Kh. Victoria Chanu Dr. Dimpal Thakuria Dr. N.N. Pandey
ICAR-FS-CICFR-Technology-2025-044	Recirculating aquaculture system-based hatchery and nursery technology for Rainbow trout	Dr. Rajesh M Dr. Biju Sam Kamalam Dr. R.S Patiyal Dr. Kishor Kunal Dr. Prakash Sharma





5. List of Research Projects

5.1 Institutional projects

Project Code	Project Title	Investigators	Year of Start	Year of Completion
A. Resource assessment and management				
CF-6	Ecosystem assessment and mapping of aquatic resources in Indian Himalayan regions			
	Sub-project 8 : Decision support framework for coldwater aquaculture in Ladakh, India using geospatial tools	P.A. Ganie K. Kunal Garima	2023	2026
	Sub project 9 : Assessment of microplastics in selected water bodies of Kashmir valley	K. Kunal P.A. Ganie Garima R.A.H. Bhat (till July 2025)	2023	2026
CF-8	Sub project 2: Assessment of IUCN threat status and distribution of freshwater fishes of the eastern and western Himalaya	S. K. Mallik (PI) P.K. Pandey (till March 2025) P.A. Ganie Rameshori Yumnam (PI) Assistant Professor Manipur University.	2022	2025
	Sub project 3: Revisiting the taxonomy of snow trout (<i>Schizothorax</i> sp.) from Indian Himalayan waters	Garima K. Kunal P.A. Ganie	2023	2026
	Sub project 4: Evaluation of genetic diversity, inbreeding effects and environmental landscape influences in rainbow trout populations in India	Ananya Khatei P.K. Pandey (till March 2025) Shahnawaz Ali P.A. Ganie	2024	2027
B. Aquaculture oriented research and development				
AQ-16	Captive management of golden mahseer in perspective to aquaculture and conservation.			
	Sub-project 6: Unravelling thermal and size-dependent fertility traits of male golden mahseer brooders in captive conditions	M.S. Akhtar Ciji A S. Ali	2022	2025

	Sub-project 7: Development of a weaning strategy for golden mahseer, <i>Tor putitora</i>	Ciji A. M.S. Akhtar B.S. Kamalam (till May 2025) Rajesh M	2023	2026
	Sub-project 8: Development of protocols for live transportation of mahseer brooders	M.S. Akhtar Ciji A R.S. Patiyal	2025	2028
AQ-19	Domestication, biology and breeding of selected species for species diversification in mid-hill aquaculture			
	Sub-project 6: Upscaling of the seed production protocol of chocolate mahseer, <i>Neolissochilus hexagonolepis</i> for technology dissemination	Ciji A M.S. Akhtar	2022	2025
NPOFBC	Network project on Ornamental fish breeding and culture (NPOFBC): ICAR-CICFR component: Development of breeding protocol and larval rearing technique of the selected indigenous hill stream ornamental loaches, suckers and hill trouts	Ananya K	2018	2026
C. Culture system diversification				
AQ-22	Subproject 3: Assessing the potential of cage farming for the production of quality seed of economically important indigenous and exotic fish species in Bhimtal lake	S. Chandra R.A.H. Bhat (till July 2025) P.A. Ganie	2023	2026
D. Fish Nutrition and feed development				
AQ-21	Sub project 5: Development and validation of RAS specific rainbow trout feeds	Rajesh M. (PI from Aug. 2025 onwards) B.S. Kamalam (PI till May 2025) R.S. Patiyal	2024	2027
	Sub project 6: Improving the growth and survival of snow trout larvae through nutritional intervention in captive condition	Pankaj Kumar Rajesh, M. K. Kunal	2025	2028



E. Molecular genetics and biotechnology				
AQ-18	Sub project 9: Evaluation of the effect of different temperatures on the sex differentiation and sex ratio in golden mahseer (<i>Tor putitora</i>)	Shahnawaz Ali M.S. Akhtar	2022	2025
	Sub project 10: Design and production of GnRH analog as an inducing agent for spawning in fish	K.V. Chanu D. Thakuria	2022	2026
	Sub project 11: Development of lab grown meat from coldwater fish	Amit Pande K.V. Chanu	2024	2027
	Sub project 12: Development of vaccine against <i>Aeromonas salmonicida</i> infection for rainbow trout, <i>Oncorhynchus mykiss</i> in India	Neetu Shahi Amit Pande S.K. Mallik	2024	2027
	Sub project 13: Production of fish recombinant gonadotropin hormone for use in aquaculture	D. Thakuria Amit Pande K.V. Chanu	2024	2027
F. Disease surveillance and health management				
AINP-AMRFL	All India Network project on antimicrobial resistance (AMR) in fisheries and livestock	S.K. Mallik N. Shahi R.A.H. Bhat (till July 2025)	2021	2026
G. Processing and value addition				
FP-01	Processing and value addition of rainbow trout	Garima K. Kunal B.S. Kamalam (till May 2025) Renu Jethi	2024	2027
5.2 Externally funded projects				
NSPAAD	National surveillance programme for aquatic animal disease-Surveillance of coldwater fish diseases in Himachal Pradesh and Uttarakhand (NFDB funded multi-institutional project)	Amit Pande S.K. Mallik R.A.H. Bhat (till July 2025)	2022	2026

AINP-Fish Health	All India Network Project on Fish Health- AINP-FH		2021	2026
NICRA	Development of climate resilient rainbow trout and innovative trout farming strategies to mitigate climatic stressors	P.K. Pandey (PI till March 2025) R.S. Patiyal (PI from April 2025 onwards) Rajesh M. P. A. Ganie B.S. Kamalam (till May 2025)	2021	2026
DBT-10	Translating the native fish germplasm for socio-economic benefits through aquaculture and fisheries in Himalayan region	Shahnawaz Ali R.S. Patiyal	2022	2025
DBT-11	Development of autogenous vaccine against <i>Lactococcus garvieae</i> in farmed rainbow trout: An alternative to antibiotics	N. Shahi S.K. Mallik S. Chandra	2023	2026
DBT-12	Development of Aquaphage therapy as an alternative to antibiotics for bacterial infections in rainbow trout farms of Indian Himalayan region (IHR)	S. Chandra (PI from Aug. 2025 onwards) R.A.H. Bhat (PI till July 2025)	2023	2026
DBT -13	Genom assembly, comparative genomics and transcriptomics of the endangered Himalayan golden mahseer (<i>Tor putitora</i>) to identify the genomic basis of sex differentiation and economically important traits for the development of aquaculture and conservation under climate change	Shahnawaz Ali Kh. Victoria Chanu (from Oct. 2025 onwards)	2024	2027
DBT -14	Computational prediction and characterization of novel cell penetrating peptides from fish virus protein	D. Thakuria Kh. Victoria Chanu Amit Pande	2024	2027
DBT -15	Mining of fish proteome for discovery of novel peptide antibiotics	Kh. Victoria Chanu D. Thakuria	2025	2028
NMHS-1	Trout farming as backyard system in vibrant villages for livelihood and nutritional security	Renu Jethi R.S. Patiyal	2024	2027



NMHS-2	Ecohydrology and vulnerability assessment in groundwater-fed and snow and glacial-fed river systems of Western and Eastern Himalaya under the warming climate	M.S. Akhtar Ciji Alexander P.A. Ganie	2025	2028
NABARD	Innovative project for establishment and field demonstration of small-scale recirculating aquaculture system for rainbow trout farming in hilly region	Rajesh M. R.S. Patiyal B.S. Kamalam (till May 2025) P.K. Pandey (till March 2025)	2024	2026
Consultancy project - NHPC	Hatchery management and seed production of golden mahseer and snow trout as a part of fisheries management plan for Subansiri Lower Hydroelectric project, Gerukamukh, Distt. Dhemaji, Assam	M.S. Akhtar (PI from April 2025 onwards) P.K. Pandey (PI till March 2025)	2022	2026
PMMSY	Recirculating Aquaculture System (RAS) for broodstock and production of rainbow trout	Rajesh M. (PI from Aug. 2025 onwards) P.K. Pandey (PI till March 2025) K. Kunal R.S. Patiyal Garima B.S. Kamalam (till May 2025)	2022	2026
Contract projects				
Contract Research P- 3	Evaluation of the potential benefits of Antarctic krill meal inclusion in low fish meal feeds for rainbow trout	B.S. Kamalam (till May 2025) Rajesh, M. Ciji A	2024	2025
Contract Research P-4	Evaluation of guar protein HP-75 as sustainable alternative for fish meal in rainbow trout feed	B.S. Kamalam (till May 2025) Rajesh, M. Ciji A	2024	2025
ICAR-National Fellow Project	Development of a fast, easy and on-site CRISPR/CFPS based detector of major bacterial pathogens of rainbow trout	N. Shahi	2025	2030

Outreach projects				
NEH-1	Establishment of a golden mahseer-hatchery unit in Manipur for its conservation (under NEH)	M.S. Akhtar S.K. Mallik	2023	2026
SCSP-1	Impact of fish farming on socio - economic status of SC farmers in North-Western Himalayan Region (under SCSP)	Renu Jethi K. Kunal	2023	2026
TSP-1	Validation and Demonstration of three production system for rainbow trout in tribal area of Indian Himalayan Region (under TSP)	R. S. Patiyl Rajesh M. Renu Jethi B.S. Kamalam (till May 2025)	2023	2026

6. Institute Technology Management Unit (ITMU)

The Institute Technology Management Unit (ITMU) plays a pivotal role in the management, protection, transfer, and commercialization of the Institute's intellectual assets and cutting-edge technologies. Under the ICAR project mode, the National Agriculture Innovation Fund (NAIF) scheme, ITMU operates in alignment with the guidelines established by the ICAR Intellectual Property and Technology Management (IP & TM) unit, ensuring proper execution of all related activities. Guided by the Institute Technology Management Committee (ITMC), decisions regarding inventions and technologies undergo rigorous evaluation before receiving approval from the competent authority. During the reporting period, ITMU actively undertook a range of initiatives, further strengthening the institute's commitment to innovation and technology dissemination.

- Provided comprehensive support to scientists in preparing documentation for the transfer and commercialization of prospective CICFR technologies through ICAR Agrinnovate.
- Assisted scientists in conducting patent prior art searches and drafting Intellectual Property Rights (IPR) registration applications, ensuring robust legal protection for innovations.
- Documented, processed, and managed all intellectual property protection applications through the Institute Technology Management Committee (ITMC), facilitating seamless approvals and compliance.
- Compiled and submitted detailed monthly progress reports to the ICAR Zonal Technology and Management Centre (ZTMC), ensuring transparency and efficient project tracking.

6.1 Filed patent applications

- Patent Application No. 202411056616, titled "A Peptide Nucleic Acid Probe for Detection and Identification of *Saprolegnia parasitica*" has been filed by the Indian Council of Agricultural Research (ICAR)-Central Institute of Coldwater Fisheries Research, Bhimtal. This innovative technology was

developed by Dr. Khangembam Victoria Chanu, Dr. Dimpal Thakuria, and Dr. Pramod Kumar Pandey. The patent application was officially filed on 25th July 2024, and subsequently published on 18th October 2024. The application is currently awaiting the First Examination Report (FER).

- A joint patent application (No. 202211067562) was filed by the Indian Council of Agricultural Research (ICAR)-Central Institute of Coldwater Fisheries Research, Bhimtal, in collaboration with the Department of Biotechnology (DBT), Ministry of Science and Technology, New Delhi. Titled "An Artificially Designed Antimicrobial Peptide," this innovation was developed by Dr. Dimpal Thakuria, Dr. Khangembam Victoria Chanu, Dr. Raja Aadil Hussain Bhat, Dr. Amit Pande, and Dr. Pramod Kumar Pandey. The application was officially filed on 24th November 2022, and later published on 10th February 2023. The patent is currently awaiting the First Examination Report (FER).
- Patent application no. 202511001964 titled "Antifungal Nanoemulsion for Treatment of Saprolegniasis" was filed by the Indian Council of Agricultural Research (ICAR)-Central Institute of Coldwater Fisheries Research, Bhimtal. This innovation was developed by Dr. Ritesh Shantilal Tandel, Dr. Pragyan Dash, Dr. Raja Aadil Hussain, Dr. Kishor Kunal, and Dr. Pramod Kumar Pandey. The application was officially filed on 9th January 2025, and its publication is awaited.

6.2 Trademark filed

- Trademark Application No. 7040034 – The logo for "CICFR Institute New Logo" has been filed under Class 44 on 2nd June 2025.
- Trademark Application No. 7040031 – The logo for "CICFR-PerforMAX (Rainbow Trout Feeds)" has been filed under Class 31 on 2nd June 2025.
- Trademark Application No. 7040032- The logo for "CICFR-MAHA-Poshan (Mahseer

Feeds)" has been filed under Class 31 on 2nd June 2025.

- Trademark Application No. 7040033 - The logo for "CICF Ovaqua (GnRH Formulation for Induced Breeding in Fish)" has been filed under Class 42 on 2nd June 2025.

6.3 Celebration of World Intellectual Property Day

On 2nd May 2025, the ICAR-Central Institute of Coldwater Fisheries Research, Bhimtal commemorated World Intellectual Property Day by organizing an insightful programme through its Institute Technology Management Unit (ITMU) Cell, aimed at sensitizing scientists, research scholars, students, and staff to the importance of Intellectual Property Rights (IPR) in fostering innovation and sustainable growth in aquaculture. The event began with an inaugural address by Dr. Amit Pande, Director, ICAR-CICFR, who underscored the critical role of intellectual property in strengthening research, development, and responsible commercialization of publicly funded technologies. This was followed by an expert online lecture delivered by Dr. Prasanna Kumar Patil, Principal Scientist and In-Charge

(ITMU), ICAR-Central Institute of Brackish water Aquaculture, on the theme "Technology Transfer and Intellectual Property Protection in Aquaculture". The lecture comprehensively covered various forms of IPR, mechanisms of technology transfer, strategies for IP protection, and the challenges and opportunities in IP management within the aquaculture sector. Special emphasis was placed on safeguarding and commercializing aquaculture innovations such as improved feed formulations, probiotics and nutraceuticals, disease diagnostics, selective breeding lines, seed production technologies, biosecurity protocols, and advanced culture systems including RAS and biofloc. Dr. Patil highlighted the pivotal role of ITMU in assessing technology readiness, facilitating patent filing, promoting licensing agreements, and fostering industry partnerships to ensure smooth transition of research outputs from laboratory to field application. The session provided valuable insights to the 22 participating scientists and research scholars, equipping them with essential knowledge to effectively protect and translate their innovations for enhanced productivity, sustainability, and economic growth in the fisheries sector.



Insightful online session delivered by Dr. Prasanna Kumar Patil

6.4 Important meetings

- The Institute Technology Management Committee (ITMC) meeting convened on 12th March 2025 under the Chairmanship of Dr.

Pramod Kumar Pandey, the meeting saw active participation from external member Dr. Veena Pande, ITMC members, and senior scientists from the institute. Among the

important agenda items, the Committee of ICAR-Central Institute of Coldwater Fisheries Research deliberated extensively on the trademark registration of the ICAR-CICFR logo and its branded aquaculture products, including Ovaqua, Mahseer feed, and Trout feeds, emphasizing the need to safeguard the institute's identity, prevent unauthorized use, and strengthen market recognition of its technologies. The Committee also reviewed the benefit-sharing mechanism in line with ICAR guidelines, discussing transparent procedures for equitable distribution of revenue generated through commercialization while ensuring due recognition and incentives to the inventors. Further, detailed discussions were held on the proposal to publish a comprehensive compendium of ICAR-CICFR technologies and products, aimed at systematically documenting research outputs, enhancing visibility among stakeholders, and facilitating wider dissemination and adoption by farmers, hatcheries, and industry partners. The meeting concluded with a strong resolve to streamline IP protection, branding, and technology outreach to reinforce the institute's role in advancing coldwater fisheries research and commercialization.

- The Institute Technology Management Committee (ITMC) again held a meeting on 22nd May 2025 under the chairmanship of the Director, Dr. Amit Pande, with participation from external member Dr. Veena Pande, ITMC members, and scientists. The Committee evaluated and shortlisted proposals for 2025 ICAR certification and copyright registration, including “*The Patent Guide for Fisheries Researchers*,” Policy Paper No. 2 on sustainable aquaculture development in Ladakh, Policy Paper No. 3 on Mahseer Ranching Guidelines, and the *Mahseer Hatchery – SOPs*, assessing their technical relevance, originality, and sectoral impact. The Committee also reviewed the patent proposal titled “*A Technique for Enhancing the Solubility of Domperidone in Propylene Glycol Water Mixture and Uses Thereof*” developed by Dr. Dimpal Thakuria and Dr. Victoria Chanu, and after examining its novelty and applicability in fisheries health

management, approved it for further patent filing. The meeting concluded with a strong emphasis on promoting IP protection and policy-driven technological advancement in coldwater fisheries.

- The ICAR-Central Institute of Coldwater Fisheries Research hosted a visit by Indian Immunologicals Limited, Hyderabad on 23rd May 2025, to explore collaborative opportunities in aquaculture health management. During the interaction, Dr. Priyabrata Pattnaik, Deputy Managing Director, IIL, presented the company's expertise in veterinary and human biologicals and its recent expansion into fish vaccine development, highlighting ongoing collaborations with ICAR institutes targeting major aquaculture diseases. A detailed discussion was held on the regulatory approval pathway for fish vaccines in India, covering safety, immunogenicity, potency evaluation, and compliance under national veterinary biological regulations. ICAR-CICFR showcased its novel fish anesthetic formulation, Aqua-FSD, developed as a cost-effective and safe alternative to MS-222, demonstrating proven efficacy across multiple freshwater finfish species and crustaceans. Deliberations centered on potential licensing mechanisms through a Confidential Disclosure Agreement (CDA) and Technology Licensing Agreement (TLA), facilitated by the Institute Technology Management Unit (ITMU) and Agrinnovate India Limited. The meeting was attended by 30 participants, including scientists and research scholars, and concluded with strengthened prospects for strategic collaboration to advance sustainable disease management and innovation in coldwater aquaculture.
- The Institute Technology Management Committee (ITMC) meeting of ICAR- Central Institute of Coldwater Fisheries Research was held on 19th July 2025 under the chairmanship of Dr. Amit Pande, with the participation of committee members. The Committee deliberated on the proposed Confidential Disclosure Agreement (CDA) between Indian Immunologicals Limited, Hyderabad and ICAR-CICFR, Bhimtal, concerning the DBT-

funded project titled “Development of Autogenous Vaccine against *Lactococcus garvieae* Infection in Farmed Rainbow Trout in India: An Alternative to Antibiotics.” After detailed discussion on the scope of collaboration, research objectives, and data-sharing provisions, the Committee approved continuation of the work under the project framework, facilitating further progress toward vaccine-based disease management solutions for coldwater aquaculture.

- The Institute Technology Management Committee (ITMC) again held a meeting on 24th December 2025 under the chairmanship of the Director Dr. Amit Pande, with the participation of external member Dr. Veena Pande and all committee members. The Committee deliberated on proposals for design registration under the National Innovations in Climate Resilient Agriculture (NICRA) for two innovative research systems, namely the “Fish Respiration and Metabolic Rate Oxy-Analyzer” developed for intermittent flow-through respirometry studies, and the “Thermal Ramping and Regulating Quadruplex Aquarium” designed for individualized heat hardening and thermal tolerance assessment in fish. The Committee carefully examined the novelty, technical utility, and relevance of these instruments in advancing climate-resilient aquaculture research, particularly in evaluating physiological responses of coldwater fish to thermal stress. After detailed deliberations, the Committee recommended proceeding with design registration to safeguard the institute's innovations and facilitate their standardization, wider adoption, and potential commercialization.

6.5 Webinar/training attended

- The online awareness programme on “AquaIP” was organized by the Intellectual Property and Technology Management (IP&TM) Unit of ICAR and the Zonal Technology Management Unit, ICAR-CIFT, Kochi, Kerala, from 23-30th January 2025. The programme was attended by the ITMU team, including Dr. R.S. Patiyal, Dr. Biju Sam Kamalam and Dr. Ann Pauline.

- The NAIF ZTMC/ITMU Review Meeting was organized by ICAR-Central Institute of Fisheries Technology, Cochin, on 2nd February 2025. The review meeting was attended by the ITMU members, including Dr. Biju Sam Kamalam and Dr. Ann Pauline.

6.6 Success story submitted to ZTMC under TSP

Empowering rainbow trout farming in Meghalaya through the Tribal Sub-Plan Programme

The ICAR-Central Institute of Coldwater Fisheries Research has played a pivotal role in establishing and strengthening rainbow trout farming in Mawphlang, East Khasi Hills, Meghalaya, in partnership with tribal farmers society the Latreilang Foundation Multipurpose Cooperative Society Ltd. The initiative began with ICAR-CICFR providing technical guidance for site selection and farm construction for rainbow trout culture. Following this, under the Tribal Sub-Plan (TSP) programme, the Institute supported the construction of two raceways and provided two vertical and horizontal trout hatchery each to the cooperative. As part of the programme, 1.2 lakh rainbow trout eyed ova and 2.6 metric tonnes of rainbow trout formulated feed were supplied. To strengthen local capacity, ICAR-CICFR conducted comprehensive training and skill-development programmes for members of the cooperative society, covering hatchery operations, feeding, water quality management, and marketing. These interventions transformed the Latreilang Cooperative into a self-reliant and fully functional trout seed production centre. Today, the society is the primary supplier of rainbow trout alevins across Meghalaya and caters to premium markets with a range of high-quality trout products.

Building on their success, the cooperative has further expanded operations by constructing five additional raceways, significantly enhancing production capacity. The collaborative efforts under the TSP programme have not only strengthened local livelihoods but also established a sustainable model for coldwater aquaculture development in the region.



First private trout farm in Meghalaya





7. Extension Activities, Consultancy and Services

7.1 Extension Activities

7.1.1 Programmes organized under *Mera Gaon Mera Gaurav* (MGMG)

Name of Nodal Officer	Designation of Nodal Officer
Dr. Suresh Chandra	Principal Scientist (Fish Pathology)

Details of MGMG Team

Team	Name of team coordinator	Name of scientists	Name villages adopted	No. of villages
Team 1	Dr. Suresh Chandra Principal Scientist	- Dr. Neetu Shahi, Sr. Scientist - Dr. Ciji Alexender, Sr. Scientist - Mr. T.M. Sharma, Tech. Officer	Jantwalgaon, Jangiliygaon, Ram Niwas, Pandeychor (Nainital)	4
Team 2	Dr. R.S. Patiyl Principal Scientist	- Dr. M.S. Akhtar, Sr. Scientist - Sh. S.K. Mallik, Scientist (SG) - Dr. Victoria Chanu, Sr. Scientist	Sangudi (Nanital), Pangu (Pithoragarh), Amrukhurad (U.S Nagar)	3
Team 3	Dr. S. Ali Principal Scientist	- Dr. Renu Jethi, Sr. Scientist - Dr. Parvaiz A. Ganie, Scientist - Ms. Ananya Khatei, Scientist - Mr. R.K. Arya, Tech. Officer	Khairola, Pandeygaon, Malla Ramgarh, (Nainital) Nail (Almora)	4
Team 4	Dr. D. Thakuria, Senior Scientist	- Dr. Raja A.H. Bhat, Scientist - Mr. Santosh Kumar, STO	Jyurkafun (Almora), Vinayak, Maldhan Chaur, Amritpur (Nanital)	4
Team 5	Dr. Pankaj Kumar Scientist	- Dr. Kishor Kunal - Mrs. Garima, Scientist - Mr. Hansa Dutt, Tech. Officer - Mr. B.D. Mouni (Technician)	Mudyani, Banlakh, Dudhpokhara, Saktipur bunga (Champawat)	4

7.1.2 Field Day organised

- A field day was organised on vaccination of rainbow trout and good management practices at Harnwal Trout Farm, Ramgarh in Nanital district, Uttarakhand on 9th May 2025. The main purpose was to create the awareness among the rainbow trout growers about the *Lactococcus garvieae* disease, its vaccine and advantage of vaccine over the use of antibiotics. The farmer was also distributed the vaccinated rainbow trout advanced fry (weight range: 0.53–1.12 g), which was immunized against *L. garvieae*. It was coordinated by Dr. Neetu Shahi and Dr. Suresh Chandra.
- Field Days on healthy seed stocking of rainbow trout was conducted by Dr. S. Chandra at villages Jantwalgaon and Ram Niwas on 8th February 2025 and 23rd April 2025. On the occasions, trout seeds were also stocked in ponds.
- Field day cum demonstrations on rearing of colored fishes to enhance carp growers' income at villages Saladi and Pandeychor in Bhimtal on 4th and 5th June 2025 was organized by Dr. S. Chandra.
- Field investigation was conducted at biofloc-based fish farm in Dehradun to examine the

incident of mass mortality among murels during 9th – 11th September 2025. Diseased samples and water quality parameters collected and suitable corrective measures were suggested to the fish farmer. It was conducted by Dr. S. Chandra and Mr. S.K. Mallik.

- A field day was organized on rearing of

ornamental fish at village Alchauna on 25th November 2025 in which ornamental carp seeds were distributed to farmers. Farmers were sensitized on the importance of maintaining optimum water quality in fish rearing units. It was coordinated by Dr. S. Chandra, Dr. P.A. Ganie, Ms. Ananya Khatei.



Field day organised at village Alchauna, Nanital

7.2 Extension Activities at Experimental Field Centre, Champawat

7.2.1 Farm advisories and field days organized at EFF, Champawat

- A one-day awareness program on “Water quality and feed management in carp pond” was conducted on 13th January 2025 at Chaikuni Bora village of Champawat District, Uttarakhand. Dr. Kishor Kunal, Mrs. Garima, and Mr. Bhola Dutt Mouni conducted the programme.
- A field day on “Feed management in carp ponds” was conducted on 10th February 2025 at Forti village of Champawat district, Uttarakhand. Dr. Kishor Kunal, Mrs. Garima, and Mr. Bhola Dutt Mouni conducted the programme.
- A field day on “Health and disease management in rainbow trout raceway was conducted on 20th March 2025 at Kathar

village of Champawat district, Uttarakhand. It was coordinated by Dr. Pankaj Kumar, Dr. Kishor Kunal, and Ms. Garima.

- A one-day awareness program was conducted on 5th May 2025 on “Water quality and feed management in rainbow trout raceways” in village of Nariyal Gaon of Champawat district, Uttarakhand. It was coordinated by Dr. Pankaj Kumar, Dr. Kishor Kunal, and Ms. Garima.
- A one-day awareness program was conducted on 20th June 2025 on “Water quality, feed and health management in rainbow trout raceways” in village of Chakuni bora of Champawat district, Uttarakhand. It was coordinated by Dr. Pankaj Kumar, Dr. Kishor Kunal, and Ms. Garima.

7.2.2 Revenue generation

Experimental Fish Farm, Champawat generated revenue of Rs. 32,49, 654.00 (Rupees Thirty two



lakh forty nine thousand six hundred fifty five only) through the sale of fishes and fish seeds (eyed ova, fingerlings and grow-out) raised at the farm to different fish farmers, government and private agencies. (Sale of rainbow trout eyed ova - Rs 28,41,000.00, sale of rainbow trout grow-out - Rs. 2,53,964.00, sale of rainbow trout fingerlings/fry - Rs 1,10,040.00, sale of common carp seeds - Rs 5,170.00, sale of ornamental fishes - Rs 23,865.00, training fee- Rs. 9,440.00, and guest

house- Rs.6175.00)

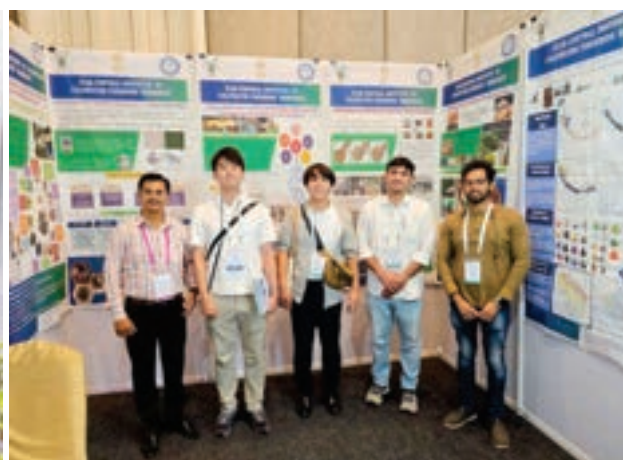
7.3 Participation in exhibitions

The research and development activities of the Institute were exhibited and disseminated to scientists, farmers, students, faculty members of different universities and other stakeholders at several seminar, symposia, workshop, conference and farmer's fairs etc. organized across the country. Institute has participated in some exhibitions during the year 2025 which are listed below:

Name of the programme	Organizer	Duration	Place/venue
14 th Asian Fisheries and Aquaculture Forum	Asian Fisheries Society, Kuala Lumpur and Indian Council of Agricultural Research, New Delhi	12 th – 15 th February 2025	NASC Complex, New Delhi
4 th Biotechnology Conclave cum International Conference on Strategies for Sustainable Agriculture, Environment & Health for Viksit Bharat	Uttarakhand Council for Biotechnology	3 rd – 5 th February 2025	Biotech Bhavan, Haldi, Pantnagar, Uttarakhand
17 th Agricultural Science Congress & ASC Expo	National Academy of Agricultural Sciences, New Delhi and G.B.P.U.A&T, Pantnagar	20 th - 22 nd February 2025	G.B.P.U.A&T, Pantnagar, Uttarakhand
Farmers Fair	ICAR-IVRI, Mukteshwar, Uttarakhand	6 th March 2025	ICAR-IVRI, Mukteshwar, Uttarakhand
2 nd Indian Fisheries Outlook (IFO) - 2025	Inland Fisheries Society of India (IFSI), Barrackpore	12 th - 14 th July 2025	College of Fisheries, OUAT, Odisha
National Agriculture Exhibition	Central Calcutta Science & Cultural Organisation for youth	21 st - 24 th August 2025	Central Park Maidan, Salt Lake, Kolkata
12 th Symposium on Diseases in Asian Aquaculture (DAAI2)	ICAR-CIBA, Chennai and Fish Health Section (FHS) of the Asian Fisheries Society	23 rd - 27 th September 2025	Hotel Leela Palace, Chennai
Farmers Fair	ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan, (ICAR-VPKAS) Almora, Uttarakhand	3 rd October 2025	ICAR-VPKAS, Almora, Uttarakhand
Rejat Jayanti Semaroha	G.B.P.U.A & T, Pantnagar, Uttarakhand	7 th November 2025	G.B.P.U.A & T, Pantnagar, Uttarakhand



Union Minister of Fisheries, Animal Husbandry and Dairying (MoFAHD) & Panchayati Raj, Shri Rajiv Ranjan visiting the ICAR-CICFR stall during 14th Asian Fisheries and Aquaculture Forum



Dignitaries visiting ICAR-CICFR stall during 2nd Indian Fisheries Outlook (IFO) – 2025 and 12th symposium on Diseases in Asian Aquaculture (DAAI2)



Minister of State, Ministry of Road Transport and Highways and M.P Lok Sabha, Mr. Ajay Tamta visiting ICAR-CICFR exhibition stall in Farmer's Fair at Almora



Exhibition stalls of ICAR-CICFR in 4th Biotechnology Conclave at Pantnagar and Farmer's Fair at IVRI Mukteshwar

7.4 Visitors

7.4.1 Dignitaries visit

- Hon'ble Secretary DARE & DG, Indian Council of Agricultural Research (ICAR), Dr. Himanshu Pathak visited ICAR-CICFR, Bhimtal on 21st February 2025.



Visit of Dr. Himanshu Pathak, Secretary DARE & DG, ICAR at ICAR-CICFR, Bhimtal

- Dr. Devika Pillai, Assistant Director General (Inland Fy.) of ICAR, New Delhi visited the Experimental Fish Farm, Champawat on 22nd February 2025.



Visit of Dr. Devika Pillai, ADG (Inland Fy.) at EFF, Champawat

- Prof. P.S. Bisht of S.S.J University, Almora, visited the Experimental Fish Farm, Champawat on 23rd May 2025.
- RAC chairman and RAC members, ICAR-Central Institute of Coldwater Fisheries Research, Bhimtal visited different facilities of the institute on 5th – 6th May 2025.



Visit of RAC at CICFR, Bhimtal



- Dr. Abhilaksh Likhi, IAS, Secretary, Department of Fisheries, Govt. of India, visited the ICAR-Central Institute of Coldwater Fisheries Research, Bhimtal on 21st June 2025.



Visit of Dr. Abhilaksh Likhi (IAS) at CICFR, Bhimtal

7.4.2 Students / Farmers' visit

S.No	Name of programme	Coordinated by
1.	One day exposure visit of a group of 54 trainees of Bihar Institute of Public administration and Rural Development officials was conducted at ICAR-CICFR, Bhimtal on 21 st January 2025	Dr. Biju Sam Kamalam Dr. Renu Jethi
2	One day exposure visit of a group of 158 students of PM Shri Govt. Inter College, Digalichaur (Lohaghat), Champawat was conducted at Experimental Fish Farm, Champawat on 9 th February 2025	Dr. Kishor Kunal Dr. Pankaj Kumar Ms. Garima
3	A group of 115 students of PM Shri Govt. Inter College, Pati, Champawat visited Experimental Fish Farm, Champawat on 10 th February 2025.	Dr. Kishor Kunal Dr. Pankaj Kumar Ms. Garima
4	One day exposure visit of a group of 10 students of Happy School, Champawat was conducted at Experimental Fish Farm, Champawat on 13 th February 2025.	Dr. Kishor Kunal Dr. Pankaj Kumar Ms. Garima
5	One day exposure visit of a group of 10 fish farmers from Rudraprayag, Uttarakhand was conducted at ICAR-CICFR, Bhimtal on 18 th February 2025	Dr. Renu Jethi Mr. Vivek Pandey
6	A group of 61 students of Govt. Inter College, Mulakot, Distt - Champawat visited Experimental Fish Farm, Champawat on 24 th March 2025	Dr. Kishor Kunal Dr. Pankaj Kumar Ms. Garima

7	A group of students from PM Shri Govt. Inter College, Tamli, Distt- Champawat visited Experimental Fish Farm, Champawat on 27 th March 2025	Dr. Kishor Kunal Dr. Pankaj Kumar Ms. Garima
8	One day exposure visit of a group of students from Atharva School of Business, Mumbai was conducted at ICAR-CICFR, Bhimtal on 4 th April 2025	Mr. Santosh Kumar
9	A group of 23 students (M. Sc.) of L.S.M Campus, Pithoragarh visited Experimental Fish Farm, Champawat on 09 th April 2025.	Dr. Kishor Kunal Dr. Pankaj Kumar Ms. Garima
10	One day exposure visit of a group of B.F.Sc students from Fisheries college and Research Institute, Thoothukudi, Tamil Nadu was conducted at ICAR-CICFR, Bhimtal on 11 th April 2025	Dr. Biju Sam Kamalam Mr. Vivek Pandey
11.	One day exposure visit of a group of B.F.Sc students from College of Fisheries, Kawardha, Chattisgarh was conducted at ICAR-CICFR, Bhimtal on 11 th April 2025	Dr. Renu Jethi Dr. M.S Akhtar
12.	One day exposure visit of a group of B.F.Sc students from Dolphin (PG) Institute of Biomedical and Natural Sciences, Dehradun was conducted at ICAR-CICFR, Bhimtal on 1 st May 2025	Mr. Santosh Kumar
13.	One day exposure visit of a group of students from Woodbridge School, Bhowali was conducted at ICAR-CICFR, Bhimtal on 4 th June 2025	Dr. Renu Jethi Dr. S.K Mallik
14.	One day exposure visit of a group of B.F.Sc students from college of Fisheries, GADVASU, Ludhiana was conducted at ICAR-CICFR, Bhimtal on 13 th June 2025	Dr. Ananya Khatei Mr. Vivek Pandey
15.	One day exposure visit of a group of students from Department of Zoology, University of Burdwan, Kolkata was conducted at ICAR-CICFR, Bhimtal on 20 th June 2025	Dr. Ananya Khatei Mr. Santosh Kumar
16.	One day exposure visit of a group of 83 trainees of Bihar Institute of Public administration and Rural Development officials was conducted on 9 th July 2025	Dr. M.S Akhtar Dr. Renu Jethi
17.	One day exposure visit of a group of 51 B.F.Sc students of College of Fisheries, Dr. BS Konkan Krishi Vidhyapeeth, Dapoli was conducted at ICAR-CICFR, Bhimtal on 17 th November 2025	Dr. Ananya Khatei Mr. Vivek Pandey
18.	One day exposure visit of a group of 49 B.F.Sc students of Karnataka Veterinary, Animal and Fisheries Sciences University, Manglore was conducted at ICAR-CICFR, Bhimtal on 25 th November 2025	Dr. Rajesh M Mr. Vivek Pandey
19.	One day exposure visit of a group of 28 students of Department of Zoology, Sidho Kanho Birsha University, Purulia, West Bengal was conducted at ICAR-CICFR, Bhimtal on 3 rd December 2025	Dr. Ananya Khatei Mr. Santosh Kumar



20.	One day exposure visit of a group of 22 students College of Fisheries, GADVASU, Ludhiana was conducted at ICAR-CICFR, Bhimtal on 11 th December 2025	Mr. Santosh Kumar Mr. Vivek Pandey
21.	One day exposure visit of a group of 35 students Department of Zoology, MB PG College Haldwani, Uttarakhand was conducted at ICAR-CICFR, Bhimtal on 12 th December 2025	Dr. Renu Jethi Mr. Vivek Pandey



7.5 Consultancy & Other Services

- Technical consultancy was provided to rainbow trout fish growers of different villages viz., Bageshwar, Chamoli, Dharkudi and Ramgarh, Uttarakhand on monitoring key water quality parameters such as temperature, dissolved oxygen and flow rate and their impact on the survival and growth. Field visits were also undertaken to guide farmers on broodstock management, breeding, egg incubation, fry rearing, feeding schedules, and disease prevention measures, aiming to improve survival, growth performance, and production efficiency. This activity was carried out by Dr. S. Chandra, Dr. P.A. Ganie, Dr. R.A.H Bhat, and Ms. A. Khatei.
- Technical consultancy on common carp culture was extended to the fish farmers of villages viz., Alchauna, Pandey Gaon, Harinagar, and Bhimtal, with a focus on scientific water-quality management, appropriate stocking density, balanced nutrition, and effective health care practices. Regular field visits were conducted to provide on-site guidance on pond preparation, breeding techniques, seed rearing, feeding management and disease prevention. This activity was carried out by Dr. S. Chandra, Dr. P.A. Ganie, Dr. R.A.H Bhat, and Ms. A. Khatei
- During 2025, technical advisory services were extended to fish farmers in the Anantnag, Kulgam, Pulwama, Shopian,

Ganderbal, and Kargil districts of Jammu and Kashmir on scientific rainbow trout farming. Special emphasis was placed on monitoring critical water quality parameters, including temperature, dissolved oxygen, and flow rate. The importance of regular cleaning and maintenance of raceways was communicated through on-site field visits and practical demonstrations of measuring key water quality parameters. Farmers were also sensitised to appropriate feeding schedules and disease prevention practices to improve survival, growth, and overall production efficiency. This activity was carried out by Dr. S. Chandra, Dr. P.A. Ganie, Dr. R.A.H Bhat, and Ms. A. Khatei

- Technical guidance was provided on quarantine and rearing of imported rainbow trout-eyed ova at Trout Brood Bank, Dharkudi, Rudraprayag. As per the communication from the Ministry of Fisheries, Animal Husbandry and Dairying, and Uttarakhand State Fisheries Department, Dr. Suresh Chandra, Principal Scientist,

visited the Trout Brood Bank at Dharkudi (Rudraprayag) from 17th – 19th January 2025. The visit was undertaken to assess the infrastructure for rearing imported rainbow trout eyed ova from Aquasearch, Denmark and to evaluate the health status of eyed ova. Detailed observations were made on egg incubation facilities, rearing conditions, water quality, and ova damage. Egg damage during transit was approximately 0.026%. Samples of eyed and dead ova were collected aseptically for RNA later, along with water samples from inflow and outflow sources. Hatchery practices include disinfection of effluent water and maintenance of hygiene standards. Daily records of temperature and mortality were maintained. As maximum losses occur during the hatching stage, special care is advised. Recommended improvements include aeration systems, temperature-controlled incubation (10–11°C) using RAS, emergency feed production, and real-time water quality monitoring.



Quarantine and rearing of imported rainbow trout-eyed ova at Trout Brood Bank, Dharkudi, Rudraprayag

8. Coldwater Fish Breeding and Seed Production

8.1 Seed production of mahseer

Breeding and seed production of Golden mahseer, *Tor putitora* remains one of the central strengths of ICAR-CICFR and continues to support conservation and rehabilitation efforts. During 2025, the institute carried out hatchery operations with special focus on inducing captive maturation of broodstock through controlled photothermal manipulations. A total of 3.24 lakh eggs were stripped during the year. However, this year, due to non-availability of brooder feed (few essential ingredient constraints) and probably due to repeated use of brooders for extended period, the breeding performance indicators were found comparatively lower, with fertilization rates ranging between 55 and 62% and hatching rate between 60 and 65% and survival in the range of 60 – 70%. The fry was reared for three to four months in FRP tanks and later shifted to nursery ponds at the Mahseer Hatchery Complex for further growth and subsequent ranching. About 30,000 eggs and fry were also utilized for scientific studies and

student research, strengthening the research and training mandate of the institute. The institute could also sell mahseer fry of Rs. 0.4 lakh. Broodstock management and nursery rearing were carried out in a systematic manner throughout the year to ensure quality seed production.

Apart from golden mahseer, seed production of Chocolate mahseer (*Neolissochilus hexagonolepis*) was also carried out. A total of 15 thousand eggs were stripped. Fertilization rates were 75 -80% and hatching rates were 74 -82%. During the year, hands on demonstrations on breeding and seed production of mahseer were conducted for trainees and student visitors, providing practical exposure to hatchery operations and seed rearing practices. All hatchery activities were coordinated by Dr. M.S. Akhtar, Senior Scientist and In-charge of the Mahseer Hatchery, along with Dr. Ciji Alexander, Senior Scientist.

[Report by: Dr. M.S. Akhtar, Sr. Scientist, ICAR-CICFR]



Golden mahseer brooders



Stripping of brooders



Golden mahseer eggs



Golden mahseer early fry

8.2 Breeding and seed production of improved common carp at Experimental Fish Farm, Champawat

Breeding common carp in coldwater environments requires adapting to lower metabolic rates and extended developmental timelines. While these fish are hardy, natural spawning in upland regions is often delayed by low temperatures. Breeding of improved common carp was carried-out using conventional “Hapa” breeding method without hormone administration. Brooders were stocked in the ratio of 2:1 (male:female) in the hapa for breeding. Eggs were collected using plastic twines from unused plastic sacks. These twines are scattered inside the breeding hapa for the attachment of adhesive eggs of these fishes. About 500-600g of twines per kg of female was used to

collect eggs. Fertilized eggs of carps are adhesive, pale yellow in colour and diameter ranges from 1.2-2.1 mm. Recorded fecundity was about 0.5-1.0 lakh eggs/kg body weight. At 15-20° C, hatching was observed 80-120 hrs post fertilization and yolk absorption was observed at 70-90 hrs post hatching. The survival percentage of egg to spawn and spawn to fry was found 45-48% and 33-35%, respectively. During June-July 2025, 0.8-0.9 lakh fry (30 dph) were produced from the improved Hungarian common carp strains. A total of 62 numbers of female brooders of size range 230 g to 490g were used for the breeding purpose. The breeding program was jointly coordinated by Dr. Pankaj Kumar, Dr. K. Kunal and Ms. Garima.

[Report by: Dr. Pankaj Kumar, Dr. K. Kunal, and Mrs. Garima, Experimental Fish Farm & Field Centre, ICAR-CICFR, Champawat]



Common carp brooders in pond



Common carp fingerlings

8.3 Breeding and seed production of rainbow trout (*Oncorhynchus mykiss*)

Rainbow trout (*Oncorhynchus mykiss*) are the cornerstone of coldwater aquaculture, requiring highly oxygenated water below 15°C. Breeding typically involves artificial stripping, where eggs from ripe females and milt from males are manually expressed and mixed using the “dry method”. Since trout are non-adhesive spawners, the fertilized eggs are placed in specialized incubation units like horizontal flow trays or vertical flow trays.

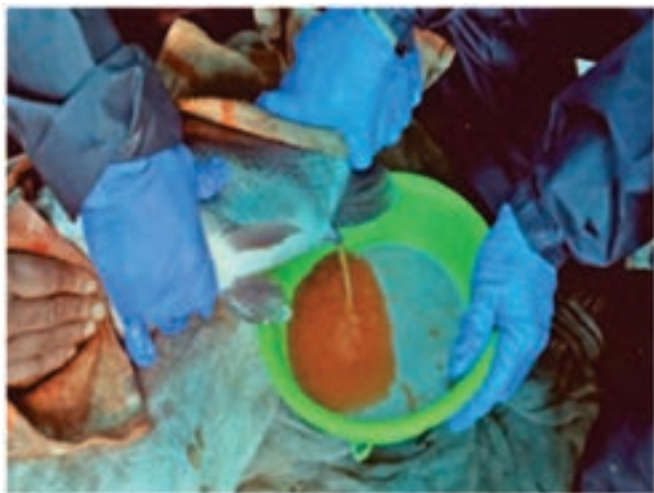
Seed production is a slow, delicate process; embryos are sensitive to light and physical shock during the “eyed stage”. Depending on water temperature, hatching occurs after several weeks.

Once the yolk sac is absorbed, “buttoned-up” fry transition to high-protein micro-pellets. Success relies on consistent flow rates and strict biosecurity to prevent fungal infections.

Breeding, seed production, and culture of rainbow trout is an important activity at the Experimental Fish Farm, ICAR-CICFR, Champawat. Currently, 2000 adult (1.1 - 4.2 kg), and 2000 yearlings (180-230 g) are being maintained at the farm. The farm raised rainbow trout brooders were used for the breeding and seed production during Jan-Mar, 2025 and December 2025. Sixteen lakh fifteen thousand eyed ova, including 30 thousand advanced rainbow trout fry, were produced at EFF, Champawat using 1400 kg female brooders and 1200 kg male brooders.

Recorded fertilization rate was about 70-75%. With the use of a RAS system for incubation of rainbow trout eggs, the survival rate of 60-65 % (green egg to eyed ova) could be achieved. The seed production and rearing of rainbow trout were

coordinated by Dr. Kishor Kunal, Dr. Pankaj Kumar and Mrs. Garima at EFF, Champawat. [Report by: Dr. Pankaj Kumar, Dr. K. Kunal, and Mrs. Garima, Experimental Fish Farm & Field Centre, ICAR-CICFR, Champawat]



Stripping of female brooders



Stripping of male brooders



Mixing of ova and milt for fertilization



Washing of eggs post-fertilization



Incubation of eggs



Packing of eyed ova for transportation



Sac fry of rainbow trout



Rainbow trout swim-up fry



Nursery pond for rainbow trout



Grow out pond for rainbow trout



RAS system for eyed ova production



Vertical system for eyed ova production



8.4 Breeding and seed production of ornamental fishes at Experimental Fish Farm, Champawat

Ornamental fishes were bred at EFF during the month of June- August 2025. For the breeding purpose 51 female brooders of Koi carp and 54 female brooders of gold fish were used in separate hapa with their respective male brooders (male: female, 2:1). The weight of koi carp female brooders varied between 90-350g and that of gold

fish from 65-120g. About 3000-4000 nos. of fingerlings (5-8 cm) of koi carp and 3500-4500 of fingerlings of gold fishes were produced during the breeding and seed production cycle. The activities of breeding, seed production and rearing were coordinated by Dr. Pankaj Kumar, Dr. Kishor Kunal and Ms. Garima.

[Report by: Dr. Pankaj Kumar, Dr. K. Kunal, and Mrs. Garima, Experimental Fish Farm & Field Centre, ICAR-CICFR, Champawat]



Ornamental fish brooders



Ornamental fish fingerlings



9. Tribal Sub Plan (TSP) Activities

During the reporting period 2025, the tribal sub-plan activities of the ICAR-Central Institute of Coldwater Fisheries Research was mainly focused on aquaculture development activities and socio-economic upliftment of tribal farmers of Ladakh, Uttarakhand, and Meghalaya. The various TSP activities were coordinated by Dr. R.S. Patiyl (Nodal Officer), Dr. Biju Sam Kamalam (till May 2025), Dr. Rajesh, M., Sh. S.K. Mallik and Sh. T.M. Sharma (Co-Nodal Officers).

9.1 Training programmes

Training programme on 'Culture, breeding, hatchery management, and disease control in rainbow trout' at Experimental Field Centre, ICAR-CICFR, Champawat

Under the TSP programme, two batches of training programmes were conducted for tribal farmers from Pithoragarh and Chamoli districts

ova, egg disinfection, and hatchery management. The training also covered an introduction to common diseases in rainbow trout and their treatment under practical farming conditions. The programme was conducted by Dr. Kishor Kunal, Mrs. Garima, and Dr. Pankaj Kumar.

Training programme on 'Best farm management practices and seed production of rainbow trout' at Sirkha, Pithoragarh

Under the Tribal Sub-Plan programme, a two-day training programme titled "Best farm management practices and seed production of rainbow trout" was conducted at farm site of Co-operative society Mahamati, Matsya Swayatha Shakaritha, Sirkha Village (Village Code: 25323), Dharchula, Pithoragarh District, Uttarakhand, on 17-18th December 2025. A total of 26 tribal farmers, including 8 women, participated in the training.



from 12-16th January and 18-22nd January 2025 at the EFC, ICAR-CICFR, Champawat. A total of 14 farmers attended the training, with seven participants from each district. The programme included hands-on practical sessions on rainbow trout farming in raceways, broodstock management, stripping and artificial fertilisation, packing of eyed ova for transport, receipt of eyed

The programme focused on practical, hands-on learning, covering key aspects such as broodstock selection, anaesthetisation, stripping, fertilisation, hatchery setup and management during embryonic development, water quality monitoring, and brood stock welfare. Demonstrations were also provided on feeding and feed management based on biomass and water temperature, as well as

improved raceway design for efficient farm management. In addition, advisories were given on mitigating risks associated with flooding and siltation in hill aquaculture systems. During the hands-on training sessions, approximately 40,000 eggs were stripped from 67 female and 42 male brood stock, resulting in the production of around

15,000 alevins, which will help meet the seed requirements of nearby farmers. Essential inputs, including water quality testing kits, hand nets, waders, larval and early grower rainbow trout feed, were distributed to the participants. The training programme was led by Dr. Rajesh M., Dr. R.S. Patiyl, and Sh. Bhola Dutt Mouni.





Glimpses of training conducted at Sirkha, Pithoragarh

9.2 Awareness programmes

A one-day awareness-cum-training programme on “Hatchery management and best management practices” was conducted at Himkhola and Sirdhang in March 2025. As part of the programme, farm visits were organized to provide hands-on exposure to the participants. Farmers were trained in hatchery operations, including the scientific handling of eyed ova in vertical incubators during incubation, development, and post-hatching stages. To support the production of quality seed for stocking, high-quality rainbow trout larval feed was supplied. Regular advisories were also provided to farmers to ensure successful seed production and to guide them during the subsequent grow-out period. In addition, farmers were encouraged to maintain their own broodstock to achieve self-sufficiency in critical inputs such as seed.

Further to strengthen technical capacity at the grassroots level, a similar awareness session and practical demonstration on best management practices for rainbow trout farming was organized at Bungbung on 25th May 2025. A total of 10 farmers participated in the programme. During the session, essential farm inputs were distributed to help farmers effectively monitor water quality parameters and manage their farms more efficiently for improved productivity. Farm water quality was assessed on-site, and appropriate management advisories were provided to enhance overall farm performance.

Continuing the outreach and capacity-building initiatives in the region, an awareness programme on various rainbow trout farming models developed by ICAR-CICFR was conducted at Hongtongtee, Rimjhim, on 10th June

2025. The one-day programme was attended by 52 participants, including tribal farmers and youth from Pangu, Himkhola, Ronto, and Sosa. During the programme, farm inputs such as feed, ice boxes, pH meters, weighing balances, and thermometers were distributed to strengthen on-farm management practices and promote scientific trout farming.

Further expanding the scope from technical training to entrepreneurial development, Dr. R. S. Patiyl delivered an informative lecture and conducted an engaging interactive session on the

prospects of coldwater aquaculture as a viable entrepreneurial opportunity. The programme, organized by Rang Kalyan Samstha in Dharchula on 12th January 2025, was attended by 93 tribal youth. Participants actively engaged in discussions and gained valuable insights into the technical, financial, and marketing aspects of trout farming, seed production, and other coldwater aquaculture avenues. The session aimed to motivate rural youth to explore sustainable livelihood options and adopt aquaculture-based enterprises as a pathway toward income generation and self-employment.



Awareness programme on rainbow trout farming at Hongtongtee, Rimjhim, Dharchula



Awareness cum training programme on best management practices for rainbow trout farming at Bungbung



Best farm and hatchery management hands on training programme in Himkhola and Sirdhang



Dr. R.S Patiyl participating in an interactive session and delivering lecture in the programme organised by R.K.S. Dharchula

9.3 On farm demonstration of 'Har Ghar Trout' a backyard trout farming model

Under the TSP programme an on-farm demonstration of a small-scale/backyard rainbow trout farming model developed by ICAR–CICFR was conducted to promote household-level aquaculture in hill regions. The culture unit had been installed at Pangu and Sosa village, Dharchula, District Pithoragarh during the previous financial year; however, seed and feed were supplied during 2025 to operationalize the system. This model is designed as a convenient and low-investment farming system, suitable for farmers with access to a continuous water source of 5-10 litres per minute, typically from nearby natural springs. Under such conditions, farmers can produce approximately 40-50 kg of rainbow

trout per crop cycle. The harvested fish can be primarily used for household consumption, thereby contributing significantly to nutritional security and improving the family's protein intake. To ensure successful production, quality seed and nutritionally balanced feed were supplied to the farmer. In addition, regular water quality monitoring was conducted, and technical advisories were provided throughout the culture period to support optimal growth, survival, and overall farm performance. This model allows possibility of rainbow trout farming in all remote households with minimum input and footprint. This farm demonstration activity was carried out by team Dr. R.S. Patiyl and Dr. Rajesh M under the TSP programme.



Har Ghar Trout/ a backyard trout farming model under the field demonstration at Pangu

9.4 Input distribution activities

UTTARAKHAND

To enhance income generation and livelihood diversification among farmers in the mid and lower regions of Uttarakhand, targeted support was extended to members of the Co-operative Society *Purna-Kila Matsyajeevi Sahakari Sameeti*, Nandanagar, Chamoli. A total of 11 farmers were provided with 1320 kg of carp feed to promote the culture of carps under region-specific farming conditions. In addition, 2000 kg of quality fish feed was distributed to tribal farmers from Gadarpur, Bazpur, and Sitarganj to strengthen their aquaculture activities and encourage sustainable fish production practices. This intervention aimed to provide a stable supplementary income source through scientific fish farming.

To further strengthen fish farming as a viable alternative livelihood in high-altitude tribal regions, focused efforts were made to promote rainbow trout farming in Pithoragarh district. Two vertical hatchery units were established to address the critical bottleneck of seed availability, thereby supporting the expansion of trout farming clusters in Sirkha and Himkhola. The Co-operative Society *Mahamati Matsya Swayatha Sahakarita*, Sirkha was supported with water quality analysis kits,

nutritionally balanced feed, and a vertical hatchery setup to enhance local seed production capacity and technical self-reliance. Additionally, 60,000 eyed ova were supplied to benefit a cluster of fifteen farmers in the region.

Further strengthening the trout farming initiative, 30,000 eyed ova were provided to *Johar Matsya Swayatha Sahakarita*, Namjala, Munsiyari, to promote decentralized seed production and cluster-based aquaculture development. To directly support on-ground farming activities, 10,000 eyed ova and 2,000 rainbow trout seeds were distributed to four tribal farmers of Munsiyari. Moreover, 2 tonnes of high-quality rainbow trout feed were supplied to ensure optimal growth, survival, and productivity under coldwater farming conditions for rainbow trout farming clusters in Pithoragarh District. These interventions collectively aim to promote aquaculture as an alternative livelihood option, particularly for tribal and marginal farmers in remote hill regions. By strengthening access to quality seed, feed, infrastructure, and technical inputs, the programme contributes to enhanced fish production, improved household income, and long-term livelihood security while improving community-based aquaculture development in Uttarakhand.



Carp feed distributed to tribal farmers of the *Purna-Kila Matsyajeevi Sahakari Sameeti*



Feed distributed to tribal farmers of Gadarpur, Bazpur and Sitarganj



Tribal farmers undergoing exposure visit and receiving input



Farmers from Munshyari receiving rainbow trout fingerling from EFF, Champawat under TSP programme.



Member of Co-operative society Mahamati, Matsya Swayatha Shakaritha, Sirkha Village, Pithoragarh receiving water quality analysis kits and vertical hatchery



Feed and farm input distribution at Himkhola village

MEGHALAYA

To strengthen the introduction of rainbow trout farming in Meghalaya under the TSP programme during 2025, a total of 60,000 eyed ova were supplied to the Tribal farmers society - Iatreilang Foundation Multipurpose Cooperative Society Ltd., Mawphlang, East Khasi Hills, Meghalaya facilitating the establishment of coldwater aquaculture in the region. In addition,

approximately 2.5 tonnes of high-quality rainbow trout feed were provided to ensure adequate nutrition and optimal growth during the initial production cycle. Regular technical advisories were also extended on hatchery management, feeding practices, water quality management, and disease prevention and control under field conditions. The intervention supported the development of 22 farmers through input support,

and continuous technical guidance for promoting livelihood opportunities through Rainbow trout

farming in Meghalaya.

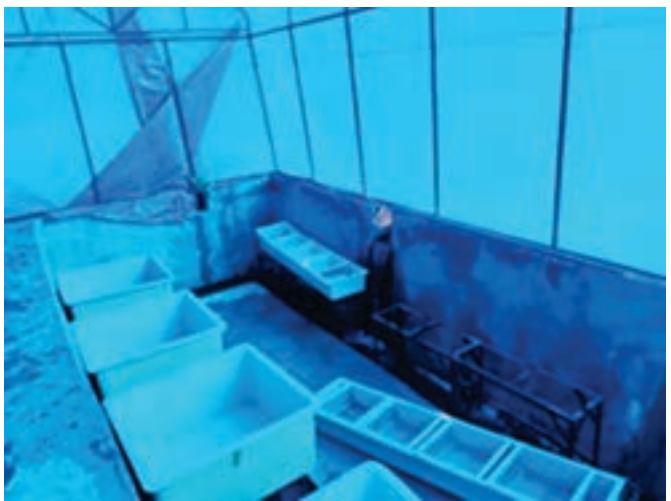


Eyed ova supplied to the tribal farmers of Mawphlang, East Khasi Hills, Meghalaya

LADAKH

To promote self-sufficiency in rainbow trout seed production in the Ladakh region, two horizontal hatchery units, each with a capacity of 12,000 eggs, along with four alevin rearing troughs, were installed at the Government Farm in Wakha, Kargil District, Ladakh. In addition, two vertical hatching system was provided to a tribal farmer in the Diskit and Turtuk areas of Leh District to strengthen local hatchery capacity at the farm level. To provide initial support for the expansion of rainbow trout farming in Ladakh, a total of 150,000 eyed ova

were supplied to farmer clusters and government hatcheries located in Leh, Nubra and Drass. This intervention was aimed at ensuring the timely availability of quality seed. Furthermore, total of four tonnes of rainbow trout feed were supplied during 2025 to support 30 farmers across the Ladakh region. These efforts significantly contributed to enhancing local production capacity, strengthening hatchery infrastructure, and promoting sustainable trout farming in the high-altitude coldwater conditions of Ladakh.



Rainbow trout hatchery set up installed at Government hatchery, Wakha, Kargil district and Diskit, Leh district



Rainbow trout eyed ova supplied to farm clusters at Drass, Kargil district

9.5 Celebration of Janjatiya Gaurav Varsh Pakhwada

From 01–15 November 2025, the ICAR-Central Institute of Coldwater Fisheries Research (ICAR-CICFR), Bhimtal, observed *Janjatiya Gaurav Varsh Pakhwada* under the Tribal Sub Plan scheme to commemorate the 150th Birth Anniversary of Bhagwan Birsa Munda. As part of the celebrations, the ICAR-CICFR organized a series of awareness programmes across the tribal regions of Uttarakhand and Meghalaya. These initiatives focused on strengthening livelihoods, promoting entrepreneurship, and fostering sustainable coldwater aquaculture practices. The programmes brought together scientific knowledge, community participation, and cultural values to uplift some of India's most remote tribal communities in Uttarakhand.

During the *pakhwada*, ICAR-CICFR undertook extensive awareness campaigns and hands-on demonstrations showcasing coldwater fish farming models developed under the TSP. These included rainbow trout raceways, carp culture ponds, recirculating aquaculture systems (RAS), aqua-gardens, and small-scale hatcheries. Farmers were introduced to scientific techniques in seed production, feeding, water quality management, stocking, and disease prevention. Emphasis was placed on enabling tribal farmers to become self-reliant in fish seed production.

Demonstrations on hatchery technology and seed transport equipped farmers with the skills to produce their own fish seeds. The impact of TSP interventions was especially visible in the remote Himalayan villages of Gunji, Dharchula, Pangu, Himkhola, Sirka, Ronto, and Kalika in Uttarakhand. Here, the tribal farmers many of whom had limited exposure to scientific aquaculture successfully transitioned to commercially viable fish farming enterprises.

Farmers were trained in rainbow trout framing, carp farming, ornamental fish culture, aqua gardening, value addition, fish-based product development and marketing strategies. Exposure visits to successful trout farms, recirculating aquaculture units, hatcheries, aqua-gardens, and value-addition centers helped farmers visualise practical models that could be replicated in their own villages. Inspired by these live demonstrations, several tribal farmers especially women shown interest in adopting aquaculture as a supplementary or primary livelihood activity. Women participants were provided ornamental fish seeds, enabling them to initiate backyard ornamental fish farming units. This low-input, high-value activity can serve as a profitable micro-enterprise for rural households. To ensure better market access and consistent income, ICAR-CICFR facilitated farmgate sale points for direct consumer access, bulk supply linkages with

paramilitary forces stationed in border regions, training in value-added fish products, including fish balls, pickles, fillets, cutlets, and finger-chips. These initiatives significantly increased profit margins by reducing intermediaries and expanding product diversity. Under the Pakhwada activities, CICFR emphasized the importance of conserving indigenous coldwater fish species such as golden mahseer and other indigenous hill fishes and ecological importance and as potential ornamental fishes. Demonstrations on hatchery and ranching technologies strengthened community understanding of ecological balance and culture-based fisheries.

The programmes also highlighted the cultural richness of Uttarakhand's tribal communities. Activities were conducted to promote traditional attire, architecture, carpentry designs, and indigenous crafts. Public exhibitions, community demonstrations, and digital campaigns helped raise awareness and popularise traditional clothing among younger generations. Museum displays developed under the initiative now serve as a repository of tribal heritage and identity. An educational initiative to commemorate the contributions of tribal freedom fighter Shri Parmal Singh Hyanki was organised. The programme highlighted Shri Parmal Singh's role in the region's struggle for independence and his contribution to education. A commemorative

booklet on his life was released, and his family members were honoured by the Chief Guest Shri Ashok Nabiya, Vice Chairman of the State Tribal Advisory Council (State Minister), Uttarakhand.

In partnership with the Indo-Tibetan Border Police (ITBP), ICAR-CICFR organized Health and Wellness Camps in remote villages such as Gunji. These camps provided general health check-ups, free medical consultations, and nutrition education. Awareness was created on the health benefits of fish consumption especially its role in brain development in children and cardiovascular health in adults. This encouraged households to incorporate fish more regularly into their diets.

The Janjatiya Gaurav Varsh Pakhwada-2025 celebrations showcased how scientific aquaculture, when combined with community participation, cultural pride, and government support, can transform lives in remote tribal regions. The TSP interventions led by ICAR-CICFR have empowered tribal households to generate sustainable income, preserve their cultural heritage, and protect local biodiversity while becoming self-reliant in coldwater aquaculture. Janjatiya Gaurav Varsh Pakhwada – 2025 was led by the team Dr. R.S. Patiyal, Dr. Rajesh M, and Dr. Renu Jethi.

Date-wise activity undertaken under Jan Jatiya Gaurav Varsh Pakhwada-2025

Sl. No.	Date	Activities	No Participants
1.	1.11.2025	Socio Economic Development and Awareness	21
2.	2.11.2025	Education and Skill Development	25
3.	3.11.2025	Livelihood and Entrepreneurship SHGs, Startups, Tribal Product Branding	30
4.	4.11.2025	Health and Wellness Health Units, Nutrition, AYUSH, Disease Screening	45
5.	5.11.2025	Art GI-tagged crafts etc.	15
6.	6.11.2025	Culture & Heritage Digital Tribal etc.	21
7.	7.11.2025	Infrastructure Development	17
8.	8.11.2025	Governance and Institutional Strengthening	65
9.	9.11.2025	Awareness of 'on-going' schemes and field presence	15
10.	10.11.2025	Digital Inclusion and Sustainable Development	15



11.	11.11.2025	Educational initiatives that highlight the legacy of tribal freedom fighters	130
12.	12.11.2025	Public Awareness Campaigns in area with predominantly tribal population	20
13.	13.11.2025	Hold Tribal Agri- Entrepreneurship Summits connecting farmers and agri-start-ups	17
14.	14.11.2025	Establish Tribal farmers 'Markets of direct sale of produce	20
15.	15.11.2025	Set up Seed Banks to preserve indigenous crop varieties	25







Glimpses of Janjatiya Gaurav Varsh Pakhwada activities

9.6 Development of Seed Village

Pithoragarh district possesses abundant cold-water resources that are highly suitable for rainbow trout farming. However, the timely availability of quality rainbow trout seed and the logistical challenges associated with transporting seed to remote locations have constrained the expansion of trout farming in the region. Limited seed availability has therefore remained a major bottleneck in the wider adoption of rainbow trout culture. Recognizing this constraint, a cooperative society was identified and supported to maintain broodstock and undertake local seed production, thereby improving seed availability and promoting self-sufficiency in remote regions of Uttarakhand.

In this context, a Seed Village initiative was undertaken in convergence with the Village Action Plan (VAP)/District Tribal Development Plan (DTDP) under the Adi Karmyogi Abhiyaan. Accordingly, a seed village was established at Mahamati Matsya Swayatha Shakaritha Cooperative Society, Sirkha Village (Village Code: 25323), Dharchula, Pithoragarh District, Uttarakhand. During 2023–2024, Rainbow trout

seed was initially supplied for broodstock development, and regular technical guidance was provided for nursery rearing, grow-out management, and subsequent broodstock management. Broodstock feed was also supplied to ensure proper conditioning of the broodstock. In addition, a vertical hatchery unit was provided and successfully installed at the site to facilitate proper embryonic development and larval rearing.

A training programme on rainbow trout seed production was conducted on 17–18 December 2025, which included practical demonstrations of key aspects such as broodstock selection, anaesthetisation, stripping, fertilisation techniques, hatchery setup and management during embryonic development, water quality monitoring, and broodstock welfare. Continuous technical support and advisories were also provided on a regular basis. Furthermore, Rainbow trout larval feed was supplied to support the production of healthy and high-quality larvae. During the reporting period, approximately 60,000 eggs from 112 females and 78 males of two-year-old broodstock, leading to the production of around

25,000 alevins, which will help meet the seed requirements of nearby farmers. The cooperative society has now become self-sustaining in seed production, supporting 12 tribal farmers in the

region. The team of scientists and technical staff involved in the planning and development of the Seed Village at Sirkha included: Dr. R. S. Patiylal, Dr. Rajesh, and Mr. Bhol Dutta Mouni.



Glimpses of seed village development activities carried out at the Sirkha Village

10. North East Region (NER) Activities

10.1 Formation of 'Oinam women led integrated fish farming' cluster at Oinam, Bishnupur district, Manipur and empowering them through hands-on training, field visits and capacity building programs

In a significant step toward empowering rural women and strengthening aquaculture-based livelihoods in Manipur, the ICAR–Central Institute of Coldwater Fisheries Research (ICAR-CICFR), Bhimtal, in collaboration with the Department of Fisheries, Government of Manipur, and the Bishnupur District Milk Cooperative Union Ltd. (BIMUL), successfully formed the “Oinam Women-Led Integrated Fish Farming (OWIFF)” cluster comprising 25 women fish farmers of Oinam village, Bishnupur district. The initiative was undertaken with the vision of enhancing fish productivity, improving income generation, and promoting sustainable farming practices. To achieve these goals, the members were provided with hands-on training, capacity building programs and field visits to strengthen their technical knowledge and practical skills.

Building capacities for sustainable livelihoods

To equip the members of the newly formed cluster with modern and scientific knowledge, a five-day capacity-building programme on “Integrated fish farming for livelihood generation” was organized from 27–31st October 2025 at Oinam Community Hall. The training aimed to strengthen the technical competencies of women farmers by familiarising them with improved aquaculture practices and integrated farming models suitable for the local ecosystem of Manipur. The programme was inaugurated with the distribution of fish seed and quality feed to all participants, followed by the release of an informative bulletin on 'Integrated fish farming', specially developed for farmers of the region. The gesture symbolized the beginning of an empowering journey toward self-reliant aquaculture entrepreneurship.

Hands-On training and exposure to modern technologies

Throughout the five days, participants engaged in expert lectures, demonstrations, and

interactive learning sessions on breeding and seed production of important cultivable carp species, carp polyculture techniques, integrated farming systems; fish–pig, fish–duck, poultry–fish, paddy–fish, and fish-horticulture, scientific pond management and feeding strategies, water quality monitoring and fish health management, value addition and market linkages for enhancing profitability, introduction to Recirculatory Aquaculture Systems (RAS) and other advanced production technologies, facilitated by ICAR-CICFR scientists; Dr Suresh Chandra, Dr Kh. Victoria Chanu and fisheries officials. These sessions exposed the women farmers to a wide range of innovative and practical methods, enabling them to diversify their income sources and adopt more efficient farming systems.

Learning through field visits

Field exposure formed a crucial component of the programme. Participants visited nearby Oinam fish farms to observe best management practices and gained hands-on experience in farm operations. A visit to a carp hatchery at Kamong in Imphal West provided insights into carp seed production methods; experts offered recommendations for hatchery renovation to improve local seed availability. A highlight of the field exposure was a visit to Loktak Lake, where participants were introduced to cage culture technologies- a promising approach for enhancing fish production in large water bodies. The exposure broadened their understanding of resource utilization and opened doors to alternative methods of fish cultivation.

Empowering women for the future

The formation of the Oinam Women-Led Integrated Fish Farming Cluster marks a transformative milestone for rural women in Bishnupur district. The farmers expressed renewed confidence and enthusiasm after completing the training, recognizing the immense potential of integrated fish farming to improve household income and nutritional security. Under future North East Region activities, ICAR-CICFR will continue to support these 25 women farmers by providing:

- Advanced technical training

- Exposure visits to successful aquaculture models
- Critical aquaculture inputs such as carp seed, feed, nets, aerators, and other essential items

This sustained support aims to establish Oinam as a model women-led aquaculture hub in Manipur, setting an example for community-driven fisheries development across the state.



Glimpses of training and field visits

10.2 Training programme on 'Diagnosis of diseases in Rainbow trout'

The ICAR-Central Institute of Coldwater Fisheries (CICFR), in collaboration with the Department of Fisheries, District Fisheries Development Officer (DFDO), Bomdila, West Kameng District, Arunachal Pradesh, successfully organized a one-day training programme titled “Diagnosis of diseases in rainbow trout” at Shergaon on 28th July 2025. The objectives of the training were to educate farmers on the importance of health management in rainbow trout aquaculture, to train farmers on conducting first-level (primary) disease diagnosis and to disseminate knowledge about symptoms, causes, and control measures of common trout diseases. A total of 55 rainbow trout farmers from Shergaon and nearby areas actively participated in

the training. The farmers, engaged in trout aquaculture, were keen to improve their understanding of disease management to enhance fish health and reduce mortality rates. The programme commenced with a welcome address and a brief introduction to the objectives and significance of the training by Nodal Officer, ICAR-CICFR, Bhimtal. A detailed lecture was delivered on common bacterial, parasitic, and fungal diseases in Rainbow trout, identification of the clinical signs and primary level diagnosis and importance of maintaining good water quality and biosecurity measures at the farm level. Many rainbow trout farmers shared their local experiences on trout health issues. The programme was well-received, and farmers expressed their appreciation for the practical knowledge gained.

The following recommendations emerged from the programme:

- Farmers should be encouraged to monitor fish behaviour and water quality regularly.
- Training on advanced diagnostics and disease management should be conducted periodically.
- Development of farmer-friendly resource material in local language for disease identification and control measures.

- Strengthening linkages between research institutions and farmers for timely advisory support.

The training concluded with a vote of thanks to all participants and organisers by DFDO, West Kameng district, Arunachal Pradesh. The programme was coordinated by Nodal officer, NEH, ICAR-CICFR, Mr. Pema Khandu, Fishery Officer (FO) and Mr. M.C. Adak, DFDO, West Kameng district, Arunachal Pradesh.



Glimpses of the training programme

10.3 Training programmes on 'Prudent usage of antibiotics, veterinary medicinal products and aquadrugs in Rainbow trout farming'

A one-day training programme on “Prudent usage of antibiotics, veterinary medicinal products and aquadrugs in rainbow trout farming” was successfully organized by the ICAR-CICFR in collaboration with the Department of Fisheries, District Fisheries Development Officer (DFDO), Bomdila, at Shergaon, Arunachal Pradesh on 28th July 2025. The programme aimed to promote responsible and informed use of aquadrugs and veterinary medicinal products (VMPs) among rainbow trout farmers to ensure sustainable aquaculture practices and safeguard fish health and consumer safety. A total of 55 rainbow trout farmers from Shergaon and neighbouring areas actively participated in the training programme. A detailed lecture was delivered by Nodal officer, NEH, ICAR-CICFR, Bhimtal on the prudent and regulated usage of antibiotics and VMPs for disease prevention and treatment in rainbow trout farming. Emphasis was laid on understanding fish health management protocols based on scientific

diagnosis, avoiding indiscriminate and prophylactic use of antibiotics, using approved aqua-drugs as per recommended dosage, duration, and withdrawal period. Farmers were introduced to the concept and procedure for preparation of top-surface coating of medicated feed using antibiotics, in compliance with Food and Drug Administration (FDA) guidelines for oral administration in rainbow trout farming. A demonstration was conducted by Dr. Krishna Kala, Young Professional II & Mr. Mohan Singh, Young Professional II, ICAR-CICFR on the preparation of antibiotic-medicated feed, focusing on the correct technique, calculation of dose, and uniform coating to ensure effective therapeutic delivery. A range of veterinary medicinal products and aquadrugs were physically displayed and discussed, including antibiotics; oxytetracycline (OTC), sulfa drugs, antiparasitics; emamectin benzoate and praziquantel, antifungals and disinfectants; iodophore, benzalkonium chloride (BKC) and other supportive chemicals for pond and fish health management. Proper storage practices of medicinal products, safety

precautions, and environmental considerations were also shared during the display and interaction session. The training enhanced the participants' awareness about the judicious use of antimicrobial agents and promoted a science-based approach to disease management in trout farming. Farmers appreciated the clarity provided on legal and safety aspects associated with veterinary drug use, particularly in light of growing concerns regarding antimicrobial resistance (AMR).

This one-day training served as an important capacity-building initiative under the

NER activity of ICAR-CICFR, aimed at improving trout health management and promoting responsible aquaculture practices in Arunachal Pradesh. The collaborative efforts of ICAR-CICFR and Department of Fisheries, Arunachal Pradesh were instrumental in successfully delivering scientific knowledge and practical skills to the rainbow trout farmers of Shergaon and surrounding regions. Continued training on such themes will further support sustainable and compliant aquaculture development in the North Eastern states.



Lectures and demonstrations during the training

10.4 Field level demonstration programme on 'Water quality parameters estimation' for Rainbow trout farmers

A two-day Field Level Demonstration (FLD) Programme on “Water quality parameters estimation” was successfully conducted by ICAR-CICFR, Bhimtal in collaboration with the Department of Fisheries, District Fisheries Development Officer (DFDO), Bomdila, West Kameng District, Arunachal Pradesh. The programme took place at Shergaon during 28–29th July 2025. The primary objective of the programme was to educate and train rainbow trout farmers on the estimation and interpretation of essential water quality parameters that directly affect fish health and productivity in coldwater aquaculture systems. A total of 55 Rainbow trout farmers from Shergaon and surrounding areas participated in the demonstration programme. The demonstration focused on the estimation of the following critical water quality parameters; dissolved oxygen (DO), alkalinity, total hardness, pH, water temperature, ammonia (NH_3) & nitrate

(NO_3^-). Each parameter was explained in detail, covering its significance in trout culture, the acceptable ranges, and its impact on fish physiology, survival, growth performance and fish health management. Hands-on training was provided using field test kits procured from Aquasol. Participants were also made aware of the seasonal variations in water parameters and the importance of regular monitoring for maintaining optimal culture conditions. The trout farmers gained practical skills and confidence in testing water quality independently. An awareness was created regarding the direct linkage between water quality and fish health. The programme promoted sustainable aquaculture practices and emphasized the importance of preventive health management in rainbow trout farming. The trout farmers were encouraged to maintain regular records of water quality to support better decision-making in farm management.

This Field Level Demonstration (FLD) programme on 'water quality parameters estimation'

was well - received and proved to be highly beneficial for the participating trout farmers. The team, ICAR-CICFR, in collaboration with the DFDO, Bomdila, effectively imparted practical knowledge and skills required to enhance water quality management practices in rainbow trout

aquaculture systems of the coldwater regions. Such initiatives under NER activities are vital for the capacity building of farmers and the sustainable development of aquaculture in Arunachal Pradesh.



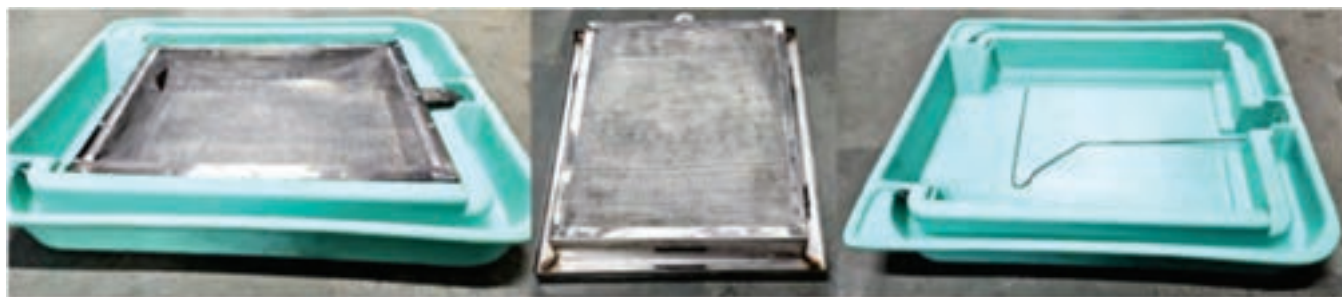
Glimpses of FLD programme on water quality parameters estimation

10.5 Field level demonstration programme on 'Vertical incubator hatchery for hatching and hatching of rainbow trout eyed ova'

A one-day Field Level Demonstration (FLD) programme on “Vertical incubator hatchery for incubation and hatching of rainbow trout eyed ova” was conducted by the ICAR-Central Institute of Coldwater Fisheries Research, Bhimtal in collaboration with the Department of Fisheries, District Fisheries Development Officer (DFDO), Bomdila, at Shergaon, Arunachal Pradesh on 28th July 2025. The programme was specifically aimed at enhancing the technical capabilities of trout farmers in efficient seed production practices. The key objective of this programme was to train and encourage 55 rainbow trout farmers on the usage of vertical incubator hatchery systems for successful incubation and hatching of rainbow trout eyed ova. The demonstration also focused on explaining the design and fabrication features of the vertical incubator, including its scientific and practical advantages. The vertical incubator hatchery demonstrated during the programme was designed and fabricated by Mr. Bipul Bhoumik of M/s UB Industry, Kolkata, based on the technical inputs and specifications provided by scientist of ICAR-CICFR, Bhimtal. Mr Bipul Bhoumik showcased the modified vertical incubator hatchery as a compact and efficient solution for small-scale trout hatcheries, especially where space is a limiting factor. The key advantages highlighted were improved space utilization, better water flow rate,

reduced egg mortality, ease of handling and maintenance and scalability for various hatchery sizes. A total of 55 rainbow trout farmers actively participated in the demonstration. Trout farmers were introduced to setup and operation of the vertical incubator, water management and flow regulation. Interactive sessions allowed farmers to ask questions, share their challenges with traditional systems, and discuss how the vertical system could be adapted to their local conditions. The farmers acknowledged the scientific merits and practical utility of the vertical incubator system, especially for improving hatchery productivity and efficiency. The demonstration was successful in promoting the adoption of scientific innovations in coldwater aquaculture in Arunachal Pradesh. Many participants expressed interest in installing vertical incubators in their trout farms, and follow-up support from ICAR-CICFR was assured.

The said Field Level Demonstration (FLD) programme proved to be highly beneficial and informative for the participating farmers. It showcased how collaborative innovation between scientists and industry can result in farmer-friendly technologies that support sustainable aquaculture development in coldwater regions. The continued efforts of ICAR-CICFR under the NER Activity are instrumental in improving rainbow trout aquaculture practices and seed production systems in Arunachal Pradesh.



Vertical incubator

10.6 Input distribution programmes

ICAR-Central Institute of Coldwater Fisheries Research, Bhimtal, in collaboration with the Department of Fisheries, District Fisheries Development Officer (DFDO), Bomdila, West Kameng District, Arunachal Pradesh, successfully organized a two-day Input Distribution Programme at Shergaon during 28–29 July 2025. The programme aimed at empowering trout farmers with essential tools and materials to enhance their capacity for effective aquaculture management, particularly in rainbow trout farming. A total of 55 Rainbow trout farmers from Shergaon and surrounding areas participated enthusiastically in the programme. Each participating farmer was provided with a set of vital aquaculture inputs to support better management of water quality and fish health. The distributed items included 275 numbers of water quality analysis kits (for dissolved oxygen, alkalinity, hardness, ammonia and nitrate; 5 nos. of kits to each trout farmer), 220 nos. of hand nets with big and small handle (2 nos. to each trout farmer), 55 nos. of pH meter (1 no. to each trout farmer), 55 nos. of thermometer (1 no. to each trout farmer), 55 nos. of ice box (1 no. to each trout farmer) and 55 nos. of plastic carat (1 no. to each trout farmer).

The input distribution programme not only addressed the immediate needs of the farmers but also reinforced the institutional commitment to sustainable aquaculture development in the coldwater regions of Arunachal Pradesh. These inputs are expected to strengthen on-farm monitoring capabilities, promote scientific aquaculture practices, and ultimately increase the productivity and sustainability of Rainbow trout farming in the NER. The programme was effectively coordinated by Nodal Officer, NER

from ICAR-CICFR, with active support from Mr. Prema Khandu, Fishery Officer (FO), and Mr. M.C. Adak, District Fisheries Development Officer (DFDO), West Kameng District, Bomdila. Their collaborative efforts ensured smooth execution and enthusiastic participation throughout the programme.

In addition, ICAR-CICFR, Bhimtal organized several input distribution programmes for fish farmers in Sikkim and Nagaland as detailed below:

- Supplied 600 hand nets with big/small steel/aluminum handle to the State Department Fisheries, Gangtok, Sikkim as input distribution among 300 rainbow trout farmers in Sikkim.
- Supplied 400 hand nets with big/small steel/aluminium handle to the State Department Fisheries, Kohima, Nagaland as input distribution among 200 fish farmers in Nagaland.
- Supplied 650 units of water testing kits to the State Department Fisheries, Gangtok, Sikkim as input distribution among 150 rainbow trout farmers in Sikkim.
- Supplied 600 units of water testing kits to the State Department Fisheries, Kohima, Nagaland as input distribution among 200 fish farmers in Nagaland.
- Supplied 300 units of ice box water to the State Department Fisheries, Gangtok, Sikkim as input distribution among 300 rainbow trout farmers in Sikkim.
- Supplied 200 units of ice box to the State Department Fisheries, Kohima, Nagaland as input distribution among 200 fish farmers in Nagaland.
- Supplied 300 units of digital pH meter to

- the State Department Fisheries, Gangtok, Sikkim as input distribution among 300 rainbow trout farmers in Sikkim.
- Supplied 300 units of digital thermometer to the State Department Fisheries, Gangtok, Sikkim as input distribution among 300 Rainbow trout farmers in Sikkim.
 - Supplied 200 units of pH meter to the State Department Fisheries, Kohima, Nagaland as input distribution among 200 fish farmers in Nagaland.
 - Supplied 200 units of digital thermometer to the State Department Fisheries, Kohima, Nagaland as input distribution among 200 fish farmers in Nagaland.
 - Supplied 300 units of plastic crate to the State Department Fisheries, Gangtok, Sikkim as input distribution among 300 Rainbow trout farmers in Sikkim.
 - Supplied 200 units of plastic crate to the State Department Fisheries, Kohima, Nagaland as input distribution among 200 fish farmers in Nagaland.



Glimpses of input distribution programmes organized by ICAR-CICFR



11. Scheduled Caste Sub Plan (SCSP)

During the year 2025, focus of Scheduled Caste Sub-Plan activities was mainly on promotion of best aquaculture practices for socio-economic upliftment of SC population in Uttarakhand, Himachal Pradesh, Jammu and Kashmir and Assam. The various activities were coordinated by Dr. Renu Jethi (22nd April 2025 onwards), Dr. R.A.H Bhatt (till 17th July 2025), Dr. Neetu Shahi (till 29th October 2025), Dr. Shahnawaz Ali (30th October 2025 onwards), Dr. Pankaj Kumar, Dr. Kishor Kunal, Dr. Parvaiz Ahmad Ganie (till 21st April 2025) and Sh. Santosh Kumar.

11.1 Front line demonstrations

Frontline demonstrations were conducted on polytank based integrated polyculture of exotic

carp (common carp, grass carp and silver carp) with Good Management Practices (GMP) at villages; Darim, Pandechhore, Harinagar, Bhumiadhaar, Ramgarh in Nainital. One new cluster on carp culture was developed with 10 fish farmers at village Jadapani in Nainital District, Uttarakhand. Major scientific intervention has been done for the stocking of proper sized quality seed, appropriate feeding, health care and water quality monitoring to achieve the optimum fish production in carp. More than 25 polytanks have been constructed with active participation of farmers for carp culture in villages viz., Bhumiyadha, Harinagar, Ramgarh, Dhari, Pandechorre.



Cluster formation on carp culture

11.2 Training and demonstrations on Rainbow trout farming

As a part of SCSP activities in Himachal Pradesh, training-cum-input distribution programme on “Health management in trout farming” was conducted at Patlikuhl, Kullu on 5th February 2025 in collaboration with Fisheries Department, Himachal Pradesh, benefitting 25 SC trout farmers.

One-day training programme on “Rainbow trout farming” was organised on 29th November 2025, in Pithoragarh district of Uttarakhand in collaboration with State fisheries Department, Pithoragarh. On the occasion inputs like KMnO_4 , weighing balance, feed, hand nets, anti-bird nets etc were distributed to 20 SC farmers engaged in

trout farming. Programme was coordinated by Dr. Pankaj Kumar and Dr. Kishor Kunal.



Input distribution during the training

11.3 Training and demonstrations on modern aquaculture practices in Jammu & Kashmir

As a part of SCSP activities in Jammu and Kahsmir, three training programmes were conducted for SC farmers in collaboration with SKUAST-K.

- Modern Approaches to Aquaculture Nutrition and Feeding: Enhancing Growth and Sustainability (17 - 19 March 2025).
- Advanced fish seed production techniques for sustainable aquaculture practices for SC fish farmers of Jammu and Kashmir (16 - 18 March 2025).
- Modern Aquaculture Technologies:

Innovations for sustainable growth for Scheduled Caste (SC) fish Farmers” of Jammu and Kashmir (UT) (22 - 24 March 2025)

11.4 Training and demonstrations on carp culture in Uttarakhand

Hands-on training programme on “Breeding and seed production of carps in mid-hills” from 19th-21st May 2025 was conducted at Experimental Fish Farm, Champawat for farmers of Pithoragarh, Nainital & Champawat District (Uttarakhand). A total of 25 SC fish farmers participated in the training. It was coordinated by Dr. Kishor Kunal, Dr. Pankaj Kumar and Ms. Garima.



Glimpses of the training and demonstration programme

Four one-day training-cum-input distribution programmes on “Fish seed stocking and feed management in carp culture” was conducted on 09th September, 11th September, 17th September and 24th September 2025 at ICAR-CICFR, Bhimtal to enable farmers to learn fish stocking density and feed management practices of carp farms. It was attended by total 78 SC fish

farmers of village Harinagar, Pandechhore, Jadapani and Talli Dini, Darim and Bhumiyadhaar in Nanital district of Uttarakhand. On the occasions, certificates along with inputs like carp feed, fish seed, hand nets and anti-bird nets were distributed to farmers. These programmes were coordinated by Dr. Renu Jethi, Dr. Neetu Shahi, and Mr. Santosh Kumar.



Training cum input distribution programme

Training programme on “Disease management in composite carp farming” was organized on 11th October 2025 at ICAR-CICFR, Bhimtal along with PM Dhan Dhanya Yojna. The training was attended by 74 SC farmers engaged in carp farming from village Darim and Bhumiyadhaar in Nainital district of Uttarakhand. It was coordinated by Dr. Renu Jethi and Mr. Santosh Kumar.

One-day training on “Carp culture practices in mid-hills” was organised on 28th November 2025. Programmes were organised in Pithoragarh district in collaboration with State fisheries Department, Pithoragarh. On the occasion inputs like KMnO_4 , weighing balance, carp feed, hand nets, anti-bird nets etc were distributed to 20 SC Fish farmers engaged in carp farming. It was coordinated by Dr. Pankaj Kumar and Dr. Kishor Kunal.



11.5 Integrated fish-based duck cum horticulture

Integrated Fish-based duck cum horticulture farming for SC farmers is being promoted in Hailakandi district in collaboration with ICAR-Krishi Vigyan Kendra, Hailakandi, Assam. During the reporting period baseline survey was conducted for selection of beneficiaries for intervention. Total 26 SC farmers from three forest fringe villages, viz., Garmurra, Jacobpur, and Duttapur/

Ramnathpur, were selected to enhance their technical capabilities in sustainable and integrated aquaculture practices. Critical inputs including fish fingerlings, ducks, duck feed, lime, and horticultural seedlings were distributed to farmers with the aim to facilitate immediate on-ground adoption of integrated farming practices, boost economic resilience, and improve livelihood security through sustainable resource utilization.



11.6 Training programme on 'Livelihood generation through value-added fish and fishery products'

Three days training programmes on “Livelihood generation through value-added fish and fishery products” was conducted at Experimental Fish Farm, Champawat during 22nd-

24th May 2025 for 25 SC farmers of Pithoragarh, Nainital and Champawat districts of Uttarakhand. Farmers were given practical demonstration on preparation of fish kebab, fish tikki, fish soup, fish pickle, fish momo, fish kofta, fish ball, etc. It was coordinated by Ms. Garima, Dr. Pankaj Kumar, and Dr. Kishor Kunal.



Demonstration of value-added fish products preparation

11.7 Field days-cum-input distribution programmes

During the period, various field days, farmer-scientist meetings were organized for SC fish farmers of Uttarakhand.

- Field days-cum-input distribution programme on “Carp culture practices in mid-hills” was conducted on 12th November 2025 at EFF, Champawat which was attended by 30 carp farmers of Champawat district of Uttarakhand. Inputs related to carp farming like thermometer, drag nets, KMnO_4 , plastic tubs, water testing kits, hand nets and carp feed were distributed to

26 SC farmers. It was coordinated by Dr. Pankaj Kumar and Dr. Kishor Kunal.

- Two field days-cum-input distribution programmes on “Good management practices in carp and trout farming” were conducted at Chamoli and Rudraprayag districts of Uttarakhand on 13th November and 14th November 2025, respectively. It was attended by total 50 fish farmers (25 carp and 25 trout farmers). On the occasion inputs like ice boxes, hand nets, dragnets, carp feed etc. were distributed. It was coordinated by Dr. Renu Jethi and Mr. Santosh Kumar.







12. Training and Capacity Building

12.1 Training on “Coldwater Resource Mapping using Geo-spatial tools”

A three-day training programme on “Coldwater resource mapping using geo-spatial tools” was conducted at ICAR-CICFR, Bhimtal during 19th-21st February 2025. It was attended by six final-year B.F.Sc students from the college of fisheries, Jabalpur, Madhya Pradesh gaining valuable insights into coldwater resource management and mapping techniques. The participants were trained in satellite data utilization, GIS software handling, creation of shapefiles, GPS field demonstrations, and applications of Google Earth software. They were

also sensitized about creating point, polygon, and line shapefiles, followed by digitization processes and map creation. The hands-on sessions equipped the students with practical skills essential for geo-spatial analysis. This training aimed to enhance their understanding of modern tools for sustainable coldwater resource management. The program received positive feedback, with participants expressing enthusiasm about applying these techniques in their future endeavors. Training was coordinated by Dr. Parvaiz Ahmad Ganie, Dr. Suresh Chandra, and Dr. Ananya Khatei.



12.2 Training on “Breeding, Seed, Hatchery, Feed and Disease Management of Rainbow Trout”

A three-day hands-on training programme was conducted on “Breeding, seed, hatchery, feed and disease management of rainbow trout” at ICAR-CICFR, Experimental Fish Farm, Champawat, from 27th February to 1st March 2025. Two entrepreneurs from Tamil Nadu participated in the training programme. It was coordinated by Dr. Pankaj Kumar, Dr. Kishor Kunal, and Ms. Garima.



12.3 Training on “Applied Techniques in Coldwater Fisheries Research”

A five-day training on “Applied techniques in coldwater fisheries research” was conducted during 3rd-9th April 2025 at ICAR-CICFR, Bhimtal. It was attended by 34 M.Sc students of Department of Zoology, Babasaheb Bhimrao

Ambedkar University, Lucknow. During the training programme, students were made aware of different research areas in coldwater fisheries through theory and practical classes. Lectures on different topics, including classical taxonomy of fishes, important diseases of coldwater fish and its control measures, basic molecular biology and

bioinformatics for research in fisheries, histopathology techniques and their application in life sciences, etc. were included. The training was coordinated by Dr. Neetu Shahi and Dr. Renu Jethi.



12.4 Training on “Breeding and Seed Production of Carp and Value Addition of Fish and Fishery Products”

A five-day hands-on training programme was conducted on “Breeding and seed production of carp and value addition of fish and fishery products” at ICAR-CICFR, Experimental Fish Farm, Champawat, during 22nd-26th May 2025 for farmers of Pithoragarh, Nainital and Champawat Districts of Uttarakhand. A total of 12 farmers participated in the training programme. It was coordinated by Dr. Pankaj Kumar, Dr. Kishor Kunal, and Ms. Garima.



12.5 Training on “Seed Production and Hatchery Management of Golden Mahseer”

A three-day training programme on “Seed production and hatchery management of golden mahseer” was organised at ICAR-CICFR, Bhimtal during 16th-18th September 2025. The captive

maturation and breeding technology for golden mahseer, developed by ICAR-CICFR is playing a significant role in its rehabilitation and conservation through ranching in natural habitats.



Training was attended by 29 fisheries officials (18 males and 11 females) from Madhya Pradesh, Jammu and Kashmir, Himachal Pradesh and Uttarakhand. The training served as a comprehensive platform to deliberate on various dimensions of golden mahseer conservation, encompassing its ecological significance, conservation challenges, and the potential of mahseer-based angling and ecotourism. Special emphasis was placed on the critical role of captive breeding and hatchery management in conserving this endangered species. The programme had in-depth theoretical sessions with practical demonstrations, covering the entire spectrum of seed production and hatchery operations, ranging from captive maturation and breeding, hatchery management, water quality monitoring, fabrication of bio-filters, broodstock and larval nutrition, and nursery rearing, to practices such as seed packaging and live transportation, live feed culture, including *Artemia* and infusoria, and how to establish a mahseer hatchery. By integrating knowledge with hands-on exposure, the training equipped participants with the essential skills, techniques, and best practices for successful captive breeding and hatchery management of golden mahseer. Training was coordinated by Dr. M.S. Akhtar, Dr. Ciji Alexander, and Dr. Renu Jethi.



12.6 Training on “Recirculating Aquaculture System for Intensive Farming of Fish”

The ICAR-Central Institute of Coldwater Fisheries Research (CICFR) organised a five-day training programme on “Recirculating Aquaculture Systems (RAS) for intensive fish farming” from 17th-21st November 2025 at Bhimtal. A total of 21 participants attended the programme, including fisheries officials from Madhya Pradesh, Himachal Pradesh, and Kashmir, as well as entrepreneurs and



students from various states. RAS is a highly efficient and sustainable technology that maximises fish production while using minimal resources. ICAR–CICFR has been engaged in RAS development for over five years and has successfully established functional RAS facilities in high-altitude regions such as Ladakh and other hill states. The training programme was designed to promote the scientific implementation of RAS and highlight its growing importance at the national level.

During the training programme, participants were introduced to various aspects of Recirculating Aquaculture Systems (RAS), including different system designs and models, water quality assessment, standard operating procedures, and risk management. Sessions also



covered design calculations, biosecurity measures, disease management, feed management, utilisation of RAS effluent for agriculture and composting, suitable fish species for RAS, advances in filtration technologies, and the techno-commercial feasibility of RAS. Practical demonstrations were conducted to complement the lectures. Expert talks were delivered by specialists from various national and international organisations, providing valuable insights to the trainees. At the conclusion of the programme, certificates were awarded to the participants, and feedback was collected. The programme was coordinated by Dr. Rajesh M, Dr. R. S. Patiyl, and Dr. Renu Jethi.



12.7 Training on "Coldwater Fisheries"

A five days field training on “Coldwater Fisheries” was organised for M.F.Sc students of ICAR-CIFE, Mumbai during 17th-21st November 2025 at Experimental Fish Farm, Champawat. It was attended by 12 students (9 female and 3 male). The training programme covered several activities such as overview of coldwater fisheries in India, breeding and seed production of rainbow trout, farm management of rainbow trout, estimation of physio-chemical characteristics of water from Kolidhek lake, Champawat, collection and identification of phytoplankton from Kolidhek lake, nutrition and health management in

coldwater fish farming etc. It was coordinated by Dr. Pankaj Kumar, Dr. Kishor Kunal, and Ms. Garima.



Other Trainings / Capacity building programmes / Webinars conducted

- Dr. Neetu Shahi organized one meeting with Deputy Managing Director of Indian Immunologicals Limited (IIL), Dr. Priyabrata Pattnaik who visited ICAR-CICFR, Bhimtal on 23rd May 2025. The visit aimed to explore potential collaboration between ICAR-CICFR and IIL for the development of a *Lactococcus garvieae* vaccine for rainbow trout. Confidential Disclosure Agreement (CDA), was signed between the ICAR-CICFR, Bhimtal and Indian Immunologicals Ltd (IIL), Hyderabad for the commercialization and distribution of *Lactococcus* vaccine in the month of May, 2025.
- Dr. Neetu shahi conducted IACUC meeting as member secretary on 4th March 2025 at ICAR-CICFR, Bhimtal to review applications received from various scientist to use fish for experimental purpose.
- Dr. S. Chandra coordinated six days training during 3rd-8th February 2025 organised by SBI RSETI, Bageshwar for 25 unemployed youth of Bageshwar.
- Dr. S. Chandra coordinated Viksit Krishi Sankalp Abhiyan (VKSA) at Institute as a Nodal Officer during 29th May to 12th June 2025.
- Dr. S. Chandra organized online viewing of 21st instalment release of PM Kisan Samman Nidhi program at Institute on 19th

November 2025 as Nodal Officer.

- Dr. S. Chandra coordinated Viksit Bharat-G-RAM-G and Kisan Diwas program on 23rd December 2025 at Institute.
- Dr. S. Ali conducted 38th RAC meeting of ICAR-CICFR during 5th-6th May 2025.
- Dr. S. Ali conducted IRC meeting of ICAR-CICFR on 21st July 2025.
- Dr. R. S. Patiyl and Dr. Renu Jethi organized one day training programme “Fish farming in hill region” on 11th December 2025 at Mahseer Hatchery Manan, Almora in collaboration with State Fisheries Department, Almora.

Lecture/Talks delivered

- Dr. Ciji Alexander delivered two lectures as a resource person on (i) Larval feeding management and nursery rearing of golden mahseer and (ii) Basics of fish feed formulations as well as conducted a practical demonstration of gamete quality analysis of golden mahseer in the training programme on “Seed production and hatchery management of golden mahseer” during 16th-18th September 2025 at ICAR-CICFR, Bhimtal.
- Ms. Garima delivered lectures on (i) Overview of carp culture in mid-hills in India, (ii) Formulation of carp feeds at farm, in the training programme on “Breeding and seed production of Carps in Mid Hills” during 19th to 21st May 2025 at ICAR-CICFR, EFF, Champawat.

- Ms. Garima delivered lectures on (i) Overview of carp culture in mid-hills in India (ii) Formulation of carp feeds at farm (iii) Making of breaded and battered products: tikki, cutlet, fingers, cheese balls, bread balls from Rainbow trout and (iv) Making of soup, kofta, momo, tikka and grilled fish from Rainbow trout in the training programme on "Breeding and seed production of carp and value addition of fish and fishery products" during 22nd-26th May 2025 at ICAR-CICFR, EFF, Champawat.
- Ms. Garima delivered lectures on (i) Making of breaded and battered products: tikki, cutlet, fingers, cheese balls, bread balls from Rainbow trout, (ii) Making of soup, kofta, momo, tikka, and grilled fish from Rainbow trout in the training programme on "Livelihood generation through value-added fish and fishery products" during 22nd to 24th May 2025 at ICAR-CICFR, EFF, Champawat.
- Ms. Garima delivered a lecture on "Culture and breeding of Rainbow trout" during a 5-day training programme on "Culture, breeding, hatchery management and disease control of rainbow trout" at ICAR-CICFR, Experimental Fish Farm, Champawat, from 4th to 8th January 2025 for farmers & state fisheries officials of Gangtok, Sikkim.
- Ms. Garima delivered a lecture on "Culture and breeding of Rainbow trout" during a 5-day training programme on "Culture, breeding, hatchery management and disease control of Rainbow Trout" at ICAR-CICFR, Experimental Fish Farm, Champawat, from 12th to 16th January 2025 for farmers & state fisheries officials of Gyalshing, Sikkim.
- Ms. Garima delivered a lecture on "Culture and breeding of Rainbow trout" during a 5-day training programme on "Culture, breeding, hatchery management and disease control of Rainbow Trout" at ICAR-CICFR, Experimental Fish Farm, Champawat, from 18th to 22nd January 2025 for farmers & state fisheries officials of Mangan, Sikkim.
- Ms. Garima delivered a lecture on "Culture and breeding of Rainbow trout" during a three-day hands-on training programme on "Breeding, seed, hatchery, feed and disease management of rainbow trout" from 27th February to 1st March 2025 at ICAR-CICFR, Experimental Fish Farm, Champawat.
- Dr. Kishor Kunal delivered lectures on (i) Identification and general biology of important coldwater fish species and (ii) Breeding and seed production of carps in the training programme on "Breeding and seed production of carps in mid hills" from 19th to 21st May 2025 at ICAR-CICFR, EFF, Champawat.
- Dr. Kishor Kunal delivered lectures on (i) Identification and general biology of important Coldwater fish species, (ii) Breeding and seed production of carps (iii) Cleaning, degutting, cutting in steaks and filleting of Rainbow trout in the training programme on "Breeding and seed production of carp and value addition of fish and fishery products" during 22nd to 26th May 2025.
- Dr. Kishor Kunal delivered a lecture on "Cleaning, degutting, cutting into steaks, and filleting of Rainbow trout" in the training programme on "Livelihood generation through value-added fish and fishery products" during 22nd to 24th May 2025 at ICAR-CICFR, EFF, Champawat.
- Dr. Kishor Kunal delivered lectures on (i) Overview of carp culture in mid-hills in India and (ii) Identification and general biology of important coldwater fish species in a one-day awareness cum training on "Carps culture practices in mid-hills" under SCSP on 12th November 2025 at ICAR-CICFR, EFF, Champawat.
- Dr. Kishor Kunal delivered lectures on (i) Breeding and seed production of Rainbow trout (ii) Farm management of Rainbow trout (iii) Collection and identification of phytoplankton from Kolidhek lake, in the training programme for M.F.Sc. Students of ICAR-CIFE,

Mumbai, on “Coldwater Fisheries” during 17th to 21st November 2025.

- Dr. Kishor Kunal delivered a lecture on “Overview of carp culture in mid-hills in India” in a one-day awareness cum training on “Carps culture practices in mid-hills” under SCSP on 28th November, 2025, at Vikash Bhawan Sabhagar, Pithoragarh.
- Dr. Kishor Kunal delivered a lecture on “Breeding and seed production of Rainbow trout” in a one-day awareness cum training on “Rainbow Trout farming in high altitude” under SCSP on 29th November, 2025, at Vikash Bhawan Sabhagar, Pithoragarh.
- Dr. Kishor Kunal delivered a lecture on “Hatchery management of Rainbow trout” during a 5-day training programme on “Culture, breeding, hatchery management and disease control of Rainbow Trout” at ICAR-CICFR, Experimental Fish Farm, Champawat, from 4th to 8th January 2025 for farmers & state fisheries officials of Gangtok, Sikkim.
- Dr. Kishor Kunal delivered a lecture on “Hatchery management of Rainbow trout” during a 5-day training programme on “Culture, breeding, hatchery management and disease control of Rainbow Trout” at ICAR-CICFR, Experimental Fish Farm, Champawat, from 12th to 16th January 2025 for farmers & state fisheries officials of Gyalshing, Sikkim.
- Dr. Kishor Kunal delivered a lecture on “Hatchery management of Rainbow trout” during a 5-day training programme on “Culture, breeding, hatchery management and disease control of Rainbow Trout” at ICAR-CICFR, Experimental Fish Farm, Champawat, from 18th to 22nd January 2025 for farmers & state fisheries officials of Mangan, Sikkim.
- Dr. Kishor Kunal delivered lectures on (i) Hatchery management of Rainbow trout and (ii) Disease management in Rainbow trout farming during a three-day hands-on training programme on “Breeding, seed, hatchery, feed and disease management of

rainbow trout” from 27th February to 1st March 2025 at ICAR-CICFR, Experimental Fish Farm, Champawat.

- Dr. Kishor Kunal delivered lectures on (i) Breeding and seed production of Rainbow trout (ii) Farm management of Rainbow trout (iii) Collection and identification of phytoplankton from Kolidhek lake in the training programme on “Coldwater Fisheries” during 17th to 21st November 2025
- Dr. Kishor Kunal delivered lectures on “Overview of carp culture in mid-hills in India” and “Breeding and seed production of Rainbow trout” during training and input distribution programme on 28th and 29th November 2025 at Pithoragarh.
- Dr. M. S. Akhtar delivered five lectures as a resource person on (i) Mahseer resources and why they need to be conserved (ii) Captive breeding technology of golden mahseer and hatchery management (iii) Recreational fisheries and eco-tourism in India (iv) Practical demonstration of golden mahseer breeding and seed production techniques and overall hatchery management (v) How to establish a mahseer hatchery? in the training programme on “Seed production and hatchery management of golden mahseer” during 16th -18th September 2025 at ICAR-CICFR, Bhimtal.
- Dr. Neetu Shahi delivered talk on the topic “Identification of bacteria and drug sensitivity test” in a seven day training programme on “Applied Techniques in Coldwater Fisheries Research” during 3rd to 9th April 2025 at ICAR-CICFR, Bhimtal.
- Dr. Neetu Shahi delivered talk on “Diseases of Coldwater Fish in India” in three one-day training-cum-input distribution programme on “Fish seed stocking and feed management in carp culture” under SCSP on 09th September 2025 under SCSP at ICAR-CICFR, Bhimtal.
- Dr. Neetu Shahi delivered online lecture on “Submission of DNA sequences to NCBI

database” in a training programme on molecular taxonomy of fish” on 31st January 2025 organized at College of Fisheries, Assam Agricultural University, Raha in collaboration with ICAR-CICFR, Bhimtal under NEH activity.

- Dr. P.A. Ganie delivered lectures on (i) Basics of Remote sensing and GIS (ii) Coldwater fisheries resources of India (iii) Coldwater resource mapping using geospatial tools (iv) Resource mapping using geospatial tools (v) Basics of GPS and its applications (v) Site suitability for aquaculture using remote sensing and GIS (vi) Open source data repositories of remote sensing data for resource mapping (vii) Types of GIS softwares: applications in the training programme on "Coldwater resource mapping using geospatial tools" during 19th to 21st February 2025 at ICAR-DCFR, Bhimtal.
- Dr. P.A. Ganie delivered lectures on (i) Ornamental fisheries: Status and Prospectus (ii) Aquarium keeping: a source of livelihood (iii) Culture and breeding of common ornamental fish species in a training programme on "Ornamental fish rearing in aquariums" during 19th to 21st April 2025 at village Harinagar, Bhimtal.
- Dr. Pankaj Kumar delivered lectures on (i) Site selection and construction of carp ponds (ii) Feeding and health management in carps and (iii) Important water quality parameters and their estimation in carp ponds in the training programme on “Breeding and seed production of Carps in Mid Hills” from 19th to 21st May 2025 at ICAR-CICFR, EFF, Champawat.
- Dr. Pankaj Kumar delivered a lecture on “Processing and value addition of fish and fishery products—an overview” in the training programme on “Livelihood generation through value-added fish and fishery products” during 22nd to 24th May 2025 at ICAR-CICFR, EFF, Champawat.
- Dr. Pankaj Kumar delivered lectures on (i) Breeding and seed production of carps and (ii) Feeding and health management in

carps in a one-day awareness cum training on “Carps culture practices in Mid-Hills” under SCSP on 12th November 2025 at ICAR-CICFR, EFF, Champawat.

- Dr. Pankaj Kumar delivered lectures on (i) Overview of coldwater fisheries in India (ii) Estimation of physico-chemical characteristics of water from Kolidhek Lake, and (iii) Nutrition and health management in coldwater fish farming, in the training programme for M.F.Sc. Students of CIFE, Mumbai on “Coldwater Fisheries” during 17th-21st November 2025.
- Dr. Pankaj Kumar delivered a lecture on “Breeding and seed production of carps” in a One Day awareness cum training on “Carps culture practices in Mid-Hills” under SCSP on 28th November 2025 at Vikash Bhawan Sabhagar, Pithoragarh.
- Dr. Pankaj Kumar delivered a lecture on “Farm management of Rainbow trout” in a one-day awareness cum training on “Rainbow Trout farming in high altitude” under SCSP on 29th November 2025 at Vikash Bhawan Sabhagar, Pithoragarh.
- Dr. Pankaj Kumar delivered a lecture on “Breeding and seed production of Rainbow trout” in a one-day awareness cum training on “Rainbow Trout farming in high altitude” under SCSP on 29th November 2025 at Vikash Bhawan Sabhagar, Pithoragarh.
- Dr. Pankaj Kumar delivered a lecture on “Feed management in Rainbow trout culture” during a 5-day training programme on “Culture, breeding, hatchery management and disease control of Rainbow Trout” at ICAR-CICFR, Experimental Fish Farm, Champawat, from 18th to 22nd January 2025 for farmers & state fisheries officials of Mangan, Sikkim.
- Dr. Pankaj Kumar delivered a lecture on “Feed management in Rainbow trout farming” during a three-day hands-on training programme on “Breeding, seed, hatchery, feed and disease management of rainbow trout” from 27th February to 1st

March 2025 at ICAR-CICFR, Experimental Fish Farm, Champawat.

- Dr. Rajesh M delivered lectures on (i) Recirculating Aquaculture System: Concepts, design and components (ii) Importance of water quality estimation: Theory and practical (iii) Bio-planning, product quality management and techno-commercial feasibility of RAS and (iv) Design calculation for RAS water flow, aeration selection, plumbing, solid removal and biofilter selection in the training programme on “Recirculating Aquaculture System for Intensive farming of fish” during 17th to 21st November 2025 at ICAR-CICFR, Bhimtal.
- Dr. Rajesh M. delivered an online guest lecture on “Recirculating Aquaculture System for Sustainable Fish Production” for the students undergoing Internship Programme for B.F.Sc. students of Kawardha, Chhattisgarh,” organized by ICAR-CIFE, Kakinada Centre on 25th November 2025.
- Dr. R. S. Patiyal delivered a lecture on Carp farming for mid hill region in one day training programme “Fish farming in hill region” on 11th December 2025 at Mahseer Hatchery Manan, Almora in collaboration with State Fisheries Department, Almora.
- Dr. Rajesh M. delivered an online lecture on “Intensified Fish Culture in RAS” on 2nd December 2025 during the 30-day Short Course on “Entrepreneurship Development in Fish Feed Manufacturing and Feeding Management,” organized by ICAR-CIFE, Kolkata Centre, from 10th November to 9th December 2025 at ICAR-CIFE, Kolkata.
- Dr. Renu Jethi delivered a lecture on Integrated farming in the training programme on “Applied Techniques in Coldwater Fisheries Research” during 3rd to 9th April 2025 at ICAR-CICFR, Bhimtal.
- Dr. Renu Jethi delivered a lecture on Role of CICFR in coldwater fisheries in the training programme on “Seed production and hatchery management of golden mahseer” during 16th to 18th September 2025 at ICAR-CICFR, Bhimtal.
- Dr. Renu Jethi delivered a lecture on Research and Extension Support of CICFR for Farmers in fisheries and aquaculture development in the training programme on “Recirculating Aquaculture System for Intensive farming of fish” during 17th to 21st November 2025 at ICAR-CICFR, Bhimtal.
- Dr. S. Ali delivered lecture on “Environmental impact on mahseer: The case of gender biasedness” in training programme on seed production and hatchery management of golden mahseer during 16th to 18th September 2025.
- Dr. S. Ali delivered a lecture on Career option for school children at Jawahar Navodaya Vidyalaya, Almora on 25th March, 2025.
- Dr. S. Chandra delivered a talk on Carp Fish Farming in Hills during the Fish Farmers Day organized on 10th July 2025 at CICFR, Bhimtal
- Dr. S. Chandra delivered online lecture on “Carp Farming and Health Management” in a training programme organized by KVK, ICAR-IVRI, Bareilly on 27th January 2025.
- Dr. S. Chandra conducted an online session on “Trout Farming and Disease Management” for fish farmers of Rudraprayag district as part of a training organized by the State Fisheries Department, Uttarakhand on 28th January 2025.
- Dr. S. Chandra delivered online lectures on Rainbow trout health management during seed and culture period” for fish farmers of Rudraprayag district as part of a training organized by the State Fisheries Department, Uttarakhand on 30th January 2025.
- Dr. S. Chandra delivered online lectures on (i) Disease management in Rainbow Trout Farms (ii) Disease management in rainbow trout farming (iii) Common fish Diseases and their Control (iv) Culture breeding, hatchery management and disease control of Rainbow trout (v) Coldwater fish health

management (vi) Important diseases of rainbow trout and their management (vii) Disease control, in hatcheries and trout farms in series of trainings conducted in EFF, Champawat for fish farmers and department official of Sikkim under NEH.

- Dr. S. Chandra delivered a presentation highlighting the mandate, achievements, and ongoing initiatives of the Institute through two online talks on “Coldwater Fish Farming” and “Rainbow trout health management during seed and culture period” on 9th January 2025 for fish farmers of Chamoli district where more than 50 fish farmers were present.
- Mr. S.K. Mallik delivered a lecture on (i) Common bacterial, parasitic, and fungal diseases in diseased rainbow trout (ii) Identification of the clinical signs and primary level diagnosis and importance of maintaining good water quality and biosecurity measures at the farm level (iii) Prudent usage of antibiotics, veterinary medicinal products and aquadugs in Rainbow trout farming (iv) Water quality parameters estimation in one-day training programme on “Diagnosis of diseases in Rainbow Trout” organized at Shergaon, Bomdila, Arunachal Pradesh under NER on 28th July 2025.
- Mr S.K. Mallik delivered a lecture on Antimicrobial Resistance, its challenges and risks associated with indiscriminate use of antibiotics in aquaculture in the interactive session with ICAR-CIFE students on the occasion of celebration of 'World Antimicrobial Resistance Awareness Week (WAAW)' during 18th to 24th November, 2025 at the ICAR-CICFR Field Centre, Champawat.
- Mr. S.K. Mallik delivered a lecture on “Fish diseases management in re-circulatory aquaculture” in the training programme on “Recirculating Aquaculture System for Intensive farming of fish” during 17th to 21st November 2025 at ICAR-CICFR, Bhimtal.
- Mr. S. K. Mallik delivered a lecture on “Current global and national challenges

posed by AMR in human and animal health, the genesis and mandate of the Indian Network for Fisheries and Animal Antimicrobial Resistance (INFAAR)” under All India Network Project on Antimicrobial Resistance in Fisheries and Livestock (AINP-FL) on 21st November 2025 at ICAR-CICFR, Bhimtal.

Student Guided

- Ms. Sandhya Bohra, PhD student of Kumaon University is pursuing PhD research work entitled 'A study on non-invasive biomarkers of stress in golden mahseer, *Tor putitora*' under the co-supervision of Dr. M. S. Akhtar.
- Mr. Sidhant, PhD student of Kumaon University is pursuing PhD research work entitled 'Effect of non-protein energy sources on growth and metabolic activity in rainbow trout (*Oncorhynchus mykiss*)' under the co-supervision of Dr. Ciji Alexander.
- Ms. Amarjeet Kaur, PhD student of Department of Zoology & Environmental Science, Punjabi University, Patiala, Punjab is pursuing thesis work on 'A study on transcriptome profiling and evaluation of differentially expressed genes related to thermal stress in golden mahseer (*Tor putitora*)' under the Co-supervision of Dr. S. Ali.
- Mr. Nikhil A, a M.F.Sc student of Acharya Narendra Dev University of Agriculture and Technology, Kumarganj, Ayodhya, completed M.F.Sc dissertation at ICAR-CICFR under the supervision of Dr. Ciji Alexander on the topic 'Ontogeny of digestive enzymes in golden mahseer larvae from different origin'.
- Mr. Ganesh Cheeranjhi completed M.F.Sc on topic 'Assessment of Microplastic contamination in Golden Mahseer (*Tor Putitora*) from Uttarakhand India' under supervision of Dr. Kishor Kunal at EFF, Champawat.
- Ms. Deepika, M.Sc student of Department of Biotechnology, Sir J. C. Bose Technical Campus, Bhimtal, Kumaun University

carried out six-month dissertation work under the guidance of Dr. Neetu Shahi on topic 'Biosafety and efficacy of *Aeromonas salmonicida* vaccine for rainbow trout' at ICAR-CICFR, Bhimtal from January 2025-July 2025.

- Mr. Anbarasan M, M.F.Sc student from Faculty of Fisheries, SKUAS&T, Srinagar carried out dissertation work under the co-guidance of Dr. Neetu Shahi on topic 'Phenotypic and genotypic surveillance of AMR in *Enterococcus* spp. Isolated from Rainbow trout *O. mykiss*' at ICAR-CICFR, Bhimtal from February - August 2025.
- Ms. Esha, M.F.Sc. student, SKUAST, Jammu and Kashmir completed dissertation work 'Rational design of novel anti-microbial peptide against fish pathogens as sustainable alternative to antibiotics' under the supervision of Dr. S. Chandra.
- Ms. Neha Sanwal, Ph.D student of college of Fisheries, GBPUA&T, Pantnagar is pursuing Ph.D research 'Dietary effects of *Cinnamomum tamala* and *Cinnamomum camphora* ethanolic leaf extract on growth, hematology, antimicrobial activity and histology of Jayanti rohu (*Labeo rohita*) challenged with *Aeromonas salmonicida*' under the supervision of Dr. Suresh Chandra.
- Mr. Jebarson Solomon J. student of ICAR-

CIFE, Mumbai is pursuing Ph.D research at ICAR-CICFR under the supervision of Dr. B.S. Kamalam and Dr. Rajesh M on the topic 'Elucidating the Ecophysiological Contrasts in Coldwater and Warmwater Fish'.

- Ms. Bhawna Gehlot, student of Delhi University, New Delhi completed Ph.D research at ICAR-CICFR, Bhimtal under the supervision of Dr. S. Chandra, Dr. B.S. Kamalam and Dr. Rajesh M on the topic 'Investigation on the comparative physiology and behaviour of coldwater Himalayan cyprinid fish'.
- Ms. Rini Joshi, student of Kumaon University, Nainital is pursuing PhD research on 'Ontogeny of digestive system in *Schizothorax richardsonii*' under the supervision of Dr. Rajesh M.
- Ms. Yamini Lohumi, student of SSJ University, Almora is pursuing PhD research on 'Exploration of Antimicrobial peptides in fish protein using computational approaches' under the supervision of Dr. Amit Pande.
- Ms. Ria Das, student of SSJ University, Almora is pursuing PhD research on 'Molecular identification and functional evaluation of probiotic strain bacteria isolated from the gut of rainbow trout from Western Himalayan Region' under the supervision of Dr. Amit Pande.

Different training and capacity building programs organized by ICAR-CICFR

S.No	Name of Training	Duration	Scheme/ Funding Agency	Number of Participants		
				Male	Female	Total
1	Five days training programme on “Culture, Breeding, Hatchery Management and Disease Control of Rainbow Trout” for Rainbow trout farmers of Sikkim at ICAR-CICFR, Field Centre, Champawat.	4 th -8 th January 2025	NER	15	4	19
2	Five days training programme on “Culture, Breeding, Hatchery Management and Disease Control of Rainbow Trout” for Rainbow trout farmers of Sikkim at ICAR-CICFR, Field Centre, Champawat.	12 th -16 th January 2025	NER	14	6	20
3	Five days training programme on “Culture, Breeding, Hatchery Management and Disease Control of Rainbow Trout” for Rainbow trout farmers of Sikkim at ICAR-CICFR, Field Centre, Champawat.	18 th -22 nd January 2025	NER	15	4	19
4	Training programme on Molecular taxonomy of fish	28 th January –3 rd February 2025	NER	10	19	29
5	Training programme on “Rainbow trout broodstock management and seed production” organized at Patlikuhal, Kullu, Himachal Pradesh	5 th February 2025	SCSP	23	2	25
6	Five days training programme on “Culture, Breeding, Hatchery Management and Disease Control of Rainbow Trout” for Rainbow trout farmers of Sikkim at ICAR-CICFR, Field Centre, Champawat.	9 th -13 th February 2025	NER	16	3	19
7	Three days training programme on “Coldwater Resource Mapping using Geospatial Tools” at ICAR-CICFR, Bhimtal.	19 th -21 st Feb 2025	Institutional	3	3	6
8	Three days training programme on “Breeding and Seed Production, Hatchery Management, Disease Management and Feed Management in Rainbow Trout” at ICAR-DCFR, EFF, Chamapwat.	27 th February 2025 to 1 st March 2025	Institutional	1	1	2
9	Three days training on “Advanced fish seed production techniques for sustainable aquaculture practices” for Scheduled Caste (SC) fish farmers of Jammu and Kashmir (Union territory) organized by ICAR-CICFR, Bhimtal	16 th to 18 th March 2025	SCSP	23	2	25
10	Three days training programme on “Modern Approaches to Aquaculture Nutrition and Feeding: Enhancing Growth and Sustainability” for SC fish farmers of Jammu and Kashmir (Union territory) organized by ICAR-CICFR, Bhimtal.	17 th -19 th March 2025	SCSP	23	2	25

11	Three days training programme on “Fish-Based Integrated Farming System (Fish-Horticulture-Livestock)” at KVK Unakoti, Chantail, Kailashahar, Tripura organized by ICAR-CICFR, Bhimtal.	19 th – 21 st March 2025	SCSP	22	3	25
12	Three days training programme on “Modern Aquaculture Technologies: Innovations for sustainable growth for Scheduled Caste (SC) fish Farmers” of Jammu and Kashmir (UT) organized by ICAR-CICFR, Bhimtal.	22 nd – 24 th March 2025	SCSP	23	2	25
13	Training programme on Applied Techniques in Coldwater Fisheries Research for M.Sc Students Organized at ICAR-CICFR, Bhimtal.	03 rd -09 th April 2025	Institutional	9	25	34
14	Three days training programme on “Ornamental Fish Rearing in Aquariums” in village- Harinagar, Bhimtal organized by ICAR-CICFR, Bhimtal.	19 th -21 st April, 2025	AINPFBOC	25	45	70
15	Three days training programme on “Breeding and seed production of Carp in Mid-hills” organized at Field Centre, ICAR-CICFR, Champawat.	19 th -21 st May, 2025	SCSP	25	0	25
16	Three days training programme on “Livelihood generation through value added fish and fishery products for SC Farmers” organized at Field Centre, ICAR-CICFR, Champawat.	22 nd – 24 th May, 2025	SCSP	25	0	25
17	Five days training programme on “Breeding and Seed Production of Carps and Value Addition of Fish and Fishery Products” organized at Field Centre, Champawat.	22 nd -26 th May, 2025	Institutional	10	2	12
18	One day training-cum-input distribution under NER organized by ICAR-CICFR, Bhimtal.	28 th July 2025	NER	21	34	55
19	Three-day training programme on “Seed Production and Hatchery Management of Golden Mahseer” organized at ICAR-CICFR, Bhimtal.	16 th -18 th September 2025	Institutional	19	10	29
20	Training-cum-input distribution programmes on “Fish seed stocking and feed management in carp culture” organized at CICFR, Bhimtal	9 th September 2025	SCSP	20	0	20
21	Training-cum-input distribution programmes on “Fish seed stocking and feed management in carp culture” organized at CICFR, Bhimtal.	11 th September 2025	SCSP	18	2	20

22	Training-cum-input distribution programmes on “Fish seed stocking and feed management in carp culture” organized at CICFR, Bhimtal.	17 th September 2025	SCSP	14	0	14
23	Training-cum-input distribution programmes on “Fish seed stocking and feed management in carp culture” organized at CICFR, Bhimtal.	24 th September 2025	SCSP	16	3	19
24	Training and awareness program on “Disease management in composite carp farming” organized at ICAR-CICFR, Bhimtal.	11 th October 2025	SCSP	46	28	74
25	Training and awareness programme on “Natural Farming and Sustainable Agricultural Practices” organized on the occasion of Pradhan Mantri Dhan-Dhanya Krishi Yojna (PM-DDKY) at ICAR-CICFR, Bhimtal.	11 th October 2025	Institutional	134	145	279
26	One day training program on “Backyard trout farming in high hill” in vibrant village of Dharchula, Pithoragarh, Uttarakhand.	10 th October 2025	NMHS	7	8	15
27	Five-days training programme “Capacity Building on Integrated Fish Farming for Livelihood Generation” at Bishnupur (Manipur) organized by ICAR-CICFR, Bhimtal.	27 th - 31 st October 2025	NER	24	26	50
28	Training and awareness programme organized during Janjatiye Gaurav VarshPakhwada organized by ICAR-CICFR, Bhimtal.	01 st – 15 th November 2025.	TSP	376	120	496
29	One day training-cum input distribution programme on “Carp Culture Practices in mid-hills” ICAR-CICFR, Field Centre, Champawat.	12 th November 2025	SCSP	30	0	30
30	One day training cum input distribution Programme on “Good management practices in carp and trout farming” at Chamoli organized by ICAR-CICFR, Bhimtal.	13 th November 2025	SCSP	23	7	30
31	One day training-cum-input distribution programme on “Good management practices in carp and trout farming” at Rudraprayag organized by ICAR-CICFR, Bhimtal.	14 th November 2025	SCSP	18	2	20
32	Five days training programme on “Recirculating Aquaculture Systems (RAS) for Intensive Fish Farming” organised at ICAR-CICFR, Bhimtal.	17 th -21 st Nov 2025	Institutional	19	2	21

33	Five-day Field training on “Coldwater Fisheries” was organized for M.F.Sc (F.R.M.) students of ICAR-CIFE, Mumbai at ICAR-CICFR, Field Centre, Champawat.	17 th -21 st November 2025.	Institutional	3	9	12
34	Awareness Programme on Antimicrobial Resistance (AMR) at ICAR-CICFR, Experimental Field Centre, Champawat	18 th -24 th Nov. 2025	AMR	38	117	155
35	Awareness programme on the occasion of Inauguration of the South India Natural Fish Farming Summit – 2025 and Live telecast of PM-KISAN Samman Nidhi at ICAR-CICFR, Bhimtal.	19 th Nov. 2025	Institutional	145	61	206
36	One day training-cum-awareness programme on “Carp culture Practices in Mid-Hill” organised at ICAR-CICFR, Bhimtal.	19 th November 2025	SCSP	26	16	42
37	One day training programme on “Carp culture Practices in Mid- Hill” organized by ICAR-CICFR at Pithoragarh.	28 th November 2025	SCSP	18	2	20
38	One day training programme on “Rainbow trout farming in high-altitude” organized by ICAR-CICFR, at Pithoragarh.	29 th Nov 2025	SCSP	17	3	20
39	One day training on “Fish farming in hill region” was organized at Manan, Almora (Block- Takula) in collaboration with State Fisheries Department, Almora by ICAR-CICFR, Bhimtal.	11 th Dec 2025	Institutional	13	20	33
40	One day training program on “Fish Disease Surveillance” at Manan organized by ICAR-CICFR, Bhimtal.	11 th Dec. 2025	NSPAAD	13	20	33
41	Two days training programme on “Best Management Practices and Seed Production of Rainbow Trout” at village Sirka, Dharchula, Pithoragarh district organized by ICAR-CICFR, Bhimtal.	17 th -18 th December 2025	TSP	16	8	24
42	Kisan Diwas and awareness programme on Viksit Bharat- Guarantee for Rozgar and Aajeevika Mission (Gramin) Bill, 2025 (G RAM G Bill) organized at ICAR-CICFR, Bhimtal.	23 rd December 2025	Institutional	74	77	151



13. Events and Meetings

13.1 Republic Day Celebration

ICAR-CICFR celebrated the 76th Republic Day at its premises on 26th January 2025, wherein all the staff members, including research students, participated. Dr Pramod Kumar Pandey, Director, ICAR-CICFR unfurled the national flag and

addressed the gathering. He conveyed warm wishes to all members on the occasion, highlighted the key achievements of the institute and complimented the staff members. Likewise, Republic Day was celebrated at Experimental Fish Farm, Champawat, with great fervour.



Celebration of Republic Day at ICAR-CICFR, Bhimtal and EFF, Champawat

13.2 ICAR-Directorate of Coldwater Fisheries Research, Bhimtal Elevated to ICAR-Central Institute of Coldwater Fisheries Research

In a landmark development for the field of Coldwater Fisheries Research in India, the ICAR-Directorate of Coldwater Fisheries Research (ICAR-DCFR), Bhimtal, was officially elevated to the status of **ICAR-Central Institute of Coldwater Fisheries Research (CICFR)**. The momentous occasion was celebrated with great enthusiasm at the institute's campus in Bhimtal on 21st February 2025.

The event was graced by esteemed dignitaries, including Hon'ble Secretary DARE & DG, Indian

Council of Agricultural Research (ICAR) Dr. Himanshu Pathak, who served as the Chief Guest. Dr. Pramod Kumar Pandey, Director, ICAR-CICFR, welcomed the gathering and expressed his heartfelt gratitude to the Secretary DARE & DG, ICAR, and the entire ICAR fraternity for their unwavering support in upgrading the Directorate to an Institute. In his address, Dr. Pandey highlighted the remarkable achievements of the institution over the years, highlighting its contributions to scientific research, capacity building, and technological innovations in coldwater fisheries and aquaculture.

The Secretary DARE & DG, ICAR, congratulated



ICAR-DCFR elevated to ICAR-Central Institute of Coldwater Fisheries Research

ICAR-Central Institute of Coldwater Fisheries Research, Bhimtal

the scientific, technical, and administrative staff for their dedication and commitment to excellence. In his keynote address, he emphasized the importance of coldwater fisheries in ensuring food security, livelihoods, and ecological sustainability. He lauded the institute's efforts in developing cutting-edge technologies and organising training programs that have benefited fish farmers and stakeholders across the Himalayan and other coldwater regions of India. He highlighted that this elevation is a testament to the hard work and vision of the scientists and staff of the institute.

Dr. J.K. Jena, DDG (Fisheries Science), Dr. Devika Pillai, ADG (Inland Fisheries) and Dr. Yashpal Singh Malik, Joint Director, ICAR-IVRI Mukteshwar, also congratulated the Director and staff, acknowledging their relentless efforts in making the institute a centre of excellence. All staff members, including scientists, technical, and administrative officials, were present on the occasion.

13.3 International Women's Day 2025

International Women's Day was celebrated at ICAR-CICFR on 7th March 2025 under the theme 'Accelerate Action'. The Chief Guest, Dr. Renu Martolia, CDPO, Bhimtal, Nainital, highlighted women's crucial role across all core aspects of society, including household management and financial decision-making and reiterated the need to promote gender equality with accelerated action. Dr. Amit Pande, Principal Scientist and Head, Upland Fish Production Division highlighted the institute's efforts to empower women by offering leadership roles across various technical and scientific responsibilities and appreciated their efforts in accomplishing their roles. On the occasion, various events viz., musical chair and extempore competitions were held for the staff of CICFR.



International Women's Day celebration at ICAR-CICFR

13.4 Snow trout ranching in Birahi Ganga and Alaknanda rivers in Chamoli

Ranching of snow trout was conducted on 23rd and 24th March 2025 at Pipalkoti, Chamoli district, under the joint aegis of ICAR–Central Institute of Coldwater Fisheries Research Bhimtal, VPHEP-THDC and the Department of Fisheries, Uttarakhand. The programme aimed to enhance snow trout populations and raise awareness about aquatic biodiversity conservation in the Alaknanda River and its tributary, the Birahi Ganga, near the VPHEP dam construction site. The Himalayan rivers often referred to as the “Water Bank of the World” are the origin points of over 10 major global river systems. Once characterized by high volumes of free-flowing water and rich biodiversity, these rivers now face ecological stress due to habitat fragmentation and seasonal flow reductions, severely impacting native fish populations. The ranching was focused mainly on promoting community-led conservation efforts and sensitizing the local population to the importance of protecting native fish stocks and riverine ecosystems. During the programme, a total of 200 healthy brooders of *Schizothorax progastus* and 3,000 fingerlings of *S. richardsonii*, reared under optimal conditions, were released at identified locations in the River Birahi Ganga and the Alaknanda River near their confluence. The event was attended by officials of THDC-VPHEP, including Shri Jitendra Singh Bisht, General Manager (Social Environment); Er. K.P. Singh, General Manager (TVM); Er. S.P. Doval, Deputy General Manager (Power); Er. Rabindra Makhloga, Deputy General Manager (Hydromechanical); Er. Anil Bhatt, Assistant General Manager (TVM); Shri Ritesh Chand,



Assistant Director of Fisheries, Chamoli; and Er. Dheeraj Adhikari, Manager (Social Environment); and Shri Yogesh Khati, Fisheries Inspector along with local fish farmers and villagers. The event was attended by 55 participants. The programme

marked a significant step toward sustainable management of fishery resources and was coordinated by Dr. Suresh Chandra, Principal Scientist and Head of the Hill Environment & Resource Management Division.



Snow trout ranching at Chamoli

13.5 Poshan Pakhwada

The 7th Poshan Pakhwada was observed from 8th-22nd April 2025 in support of the “Poshan Abhiyaan Jan Andolan”. As part of the campaign, a series of awareness and outreach activities were organized at Champawat and Bhimtal. Two awareness programmes were conducted at Mudiyani village, Champawat, highlighting the 'Importance of a balanced diet for child growth' and the 'Importance of fish as food.' A drawing competition and speech

competition on the theme 'Good Food and Bad Food' was organised at Aanad Bal Vidyalaya, Jhoop, Champawat. Additionally, an awareness programme for tea garden workers at Tarkeshwar, Champawat, and villagers of Harinagar, Bhimtal were organised with focusing on the theme “Poshan for Good Health”. These programmes were coordinated by Dr. Suresh Chandra, Dr. Pankaj Kumar, Dr. Kishor Kunal, and Ms. Garima.



13.6 Research Advisory Committee (RAC) meeting

The 38th RAC meeting was held on 05th - 06th May 2025 under the Chairmanship of Dr. A.G. Ponniah, Former Director, ICAR-CIBA & ICAR-NBFGR. The meeting was attended by other RAC members Dr. Devika Pillai, ADG (I.Fy), ICAR; Dr. Kuldeep Kumar, Former Principal Scientist, ICAR-CIFA; Dr. K.D. Joshi, Former Principal Scientist, ICAR-NBFGR; Dr. Ashoktaru Barat, Former Principal Scientist, ICAR-CIFA; Dr. P. Mukhopadhyaya, Professor & Head, Department of Economics, Goa University; Dr. Amit Pande, Director (Act.), ICAR-CICFR; and Dr. S. Ali, Member Secretary, ICAR-CICFR. The Director presented a brief account of the institute profile, activities, achievements and milestones and future plan of action. All the scientists of the institute attended the meeting, and progress was discussed and deliberated in the two-day meeting. The Chairman, RAC, congratulated the Director and scientists of ICAR-CICFR for the commendable achievements of the institute. He emphasized that field data collected during surveys should be translated into research to bring out meaningful outcomes. Furthermore, research work undertaken must be aligned with the mandate and vision document of the institute. He also congratulated the director and all scientists for their efforts in elevating the organization as a central institute.



13.7 International Yoga Day

All the staff and research scholars at the Institute and its Experimental Field Centre, Champawat, came together to observe the 11th International Yoga Day on 21st June 2025 with the theme “Yoga for One Earth, One Health.” The yoga session was held for the staff which included Yoga, Pranayam,

Aasan, and meditation following the common yoga protocol issued by the Ministry of AYUSH, Govt. of India.



Fig.: Glimpses of International Yoga Day at Institute

13.8 Review meeting by the Secretary, Department of Fisheries, GOI

Dr. Abhilaksh Likhi, IAS, Secretary, Department of Fisheries, Govt. of India, visited the ICAR-Central Institute of Coldwater Fisheries Research, Bhimtal on 21st June 2025. He went to see different facilities of the institute, such as the ornamental fish breeding unit, Recirculatory Aquaculture System (RAS) facility for rainbow trout, coldwater aquaponics unit, and feed mill. He also visited different research facilities of the institute. During the visit, he interacted with the farmers and discussed their various issues. He also reviewed the research and developmental work carried out by ICAR-CICFR and the various developmental works done by the Department of Fisheries, Uttarakhand.

The review meeting was attended by Sh. B.V.R.C. Purushotham, IAS, Secretary &



Director, Dept. of Fisheries, Govt. of Uttarakhand; Dr. Devika Pillai, ADG (I.Fy), ICAR, New Delhi; Dr. Amit Pande, Director (Act.), ICAR-CICFR; Scientists from ICAR-CICFR; Mrs. Alpana Haldia, Dy. Director (Kumaon Mandal), Dept. of Fisheries, Govt. of Uttarakhand; other personnel from State Fisheries Dept. and progressive fish farmers of Uttarakhand. The meeting was also attended through virtual mode by Sh. Sagar Mehra,

Jt. Secretary (Inland Fisheries & Administration) Min. of Fisheries, GoI; Ms. Neetu Kumari Prasad, Jt. Secretary (Marine Fisheries), Min. of Fisheries, GoI; Sh. K.Mohammed Koya, Fisheries Development Commissioner, Min. of Fisheries, GoI; Dr. Bijay Kumar Behera, Chief Executive, NFDB, Hyderabad; Directors and their representatives from different hill states.



13.9 Viksit Krishi Sankalp Abhiyan

The institute actively conducted 'Viksit Krishi Sankalp Abhiyan' across Uttarakhand from 29th May to 12th June 2025, covering 226 villages and reaching out to 6,146 farmers. All the scientists and technical staff of the institute, in four teams, participated in the Abhiyan. As part of the campaign, farmers were made aware of various ongoing government schemes, farmer's concerns and challenges were documented, and stronger institutional linkages were developed to ensure better support and outreach. Several persistent challenges faced by fish farmers in the region were identified during the campaign. These included

frequent encroachment by wild animals, severe water scarcity during critical growth periods, inadequate supply of essential inputs due to the region's difficult terrain, recurring natural disasters, and poor growth performance of stocked carp species in mid-hill areas. Despite these adversities, fish farmers in Uttarakhand are increasingly adopting innovative practices such as fish cultivation in Amrit Sarovars, value addition of rainbow trout, and polyculture with ornamental fish. These approaches are contributing significantly to improved productivity, enhanced livelihood opportunities, and the sustainable development of aquaculture in the hill regions.





Glimpses of Viksit Krishi Sankalp Abhiyan

13.10 National Fish Farmers Day

ICAR-CICFR organized National Fish Farmers Day on 10th July 2025. During the event a day long, technical session was organized on

different themes of fish farming in hilly region. Farmers were informed about the available technologies of coldwater fish farming and its benefits. Input distribution was also done for farmers belonging to SC/ST communities.



National Fish Farmers Day celebrated at ICAR-CICFR, Bhimtal

13.11 Institute Research Committee (IRC) meeting

The 21st IRC meeting was held on 21st July 2025 at ICAR-CICFR, Bhimtal, under the Chairmanship of Dr. Amit Pande, Director, ICAR-CICFR. Scientists presented the progress of the

ongoing research programmes and also discussed the future plan of work. Concept notes on new project proposals were thoroughly reviewed. The NER, TSP, SCSP programmes and farm activities at Experimental Fish Farm, Champawat were also discussed. All the scientists attended the meeting.



IRC conducted at ICAR-CICFR, Bhimtal



13.12 Independence Day Celebration

The 79th Independence Day was celebrated on 15th August 2025 with flag hoisting ceremony attended by staff at Bhimtal and Champawat campus. On the occasion, Dr. Amit Pande hoisted

national flag at Bhimtal with patriotic fervour and enthusiasm. In his address, he acknowledged the institute's contribution to the country in field of aquaculture. Dr. Pankaj Kumar hoisted national flag at Experimental Fish farm, Champawat.



Independence Day celebration at ICAR-CICFR, Bhimtal and EFF, Champawat

13.13 Institute 38th Foundation Day

Central Institute of Coldwater Fisheries Research, Bhimtal celebrated its 38th Foundation Day on 24th September 2025 with great enthusiasm. On the occasion, Honorable Member of Parliament, Nainital and Udham Singh Nagar, Shri Ajay Bhatt was the chief guest who congratulated all the staff of ICAR-CICFR on foundation day and wished for brighter future of the Institute. Dr. K.K. Vas, Former Director, ICAR-CICFR; Dr. C.B Joshi, Principal Scientist; Dr. Laxmi Kant, Director, ICAR-VPKAS, Almora; Dr. Yashpal Malik, Joint Director, ICAR-IVRI, Mukteshwar and Dr. Prem Kumar, Principal Scientist, ICAR attended the program as Guest of Honour. Dr. Amit Pande, Director of the Institute,

welcomed the distinguished guests and presented detail information on project activities and Institute's research work being conducted in mountain states. In his address, Honorable Member of Parliament, Shri Ajay Bhatt stated that the presence of CICFR in Bhimtal region of Uttarakhand is of particular importance to the people Uttarakhand. Local fishermen of the region will receive vital information related to fisheries. He further stated that this institute is performing its functions very well. He assured that efforts will soon be made to expand this institute by negotiating with the state government and providing land. Program was attended by fish farmers of Nainital and Udham Singh Nagar district.




38th Foundation Day of Institute

13.14 Institute Management Committee (IMC)

Institute organised 24th Institute Management Committee meeting on 20th August 2025 at Bhimtal under the chairmanship of Dr. Amit Pande, Director, ICAR-CICFR, Bhimtal. Different

agenda items related to action taken on the recommendation of 23rd IMC, budget expenditure, equipments purchased, empanelment of private hospitals under CGHS rates etc., were presented and discussed.



IMC conducted at CICFR, Bhimtal

13.15 PM Dhan-Dhaanya Yojana and Self-Reliance in Pulses Mission

ICAR–Central Institute of Coldwater Fisheries (ICAR–CICFR), Bhimtal, along with its Experimental Field Centre at Champawat, successfully organized a programme to mark the launch of the Pradhan Mantri Dhan-Dhanya Krishi Yojna (PM-DDKY) and Pulse Mission. The event on the national launch ceremony by the Hon'ble Prime Minister of India, Shri Narendra Modi, was witnessed by the participants through virtual mode. The PM-DDKY aims to enhance the resilience and productivity of India's agricultural sector by promoting sustainable farming practices, efficient use of natural resources, and farmer-centric development models. The live telecast of the national launch of PM-DDKY by the Hon'ble

Prime Minister was shown to all participants at both Bhimtal headquarter and Champawat centres. The programme at Bhimtal was graced by the Hon'ble Member of Parliament (Lok Sabha) from Nainital–Udham Singh Nagar constituency, Shri Ajay Bhatt, who was the Chief Guest of the occasion. He interacted with farmers, appreciated the initiatives of ICAR–CICFR, and emphasized the importance of adopting natural and sustainable agricultural practices for doubling farmers' income. A total of 279 (134 male, 37 female and 108 others) farmers attended the programme. Participants expressed great interest in the virtual launch and appreciated the government's new initiative for improving rural livelihoods and agricultural sustainability.

Following the inaugural session, a technical

session on “Natural Farming and Sustainable Agricultural Practices” was organized. Scientists from ICAR–CICFR delivered talks highlighting: The role of natural farming in improving soil health and reducing dependency on synthetic inputs, Integration of aquaculture and agriculture for enhanced farm income and use of locally available

bio-resources in maintaining ecological balance in hill farming systems. Participants engaged actively in discussions and sought practical guidance on implementing natural farming practices in their respective areas. The programme created widespread awareness about the objectives and benefits of the PM-DDKY.



PM Dhan-Dhaanya Yojana

13.16 Hindi Pakhwada

Hindi Pakhwada (Hindi Fortnight) was organised by Hindi section of the Institute during 1-15 September 2025. During the period, various competitions viz., hindi essay, hindi word knowledge, hindi translation, hindi skill, hindi debate, hindi typing competitions were organised for employees of hindi speaking and non-hindi speaking states. Awards and certificates of these competitions were given to winners on the occasion of foundation day of the Institute on 24th September 2025.

13.17 Swachhta Hi Sewa

ICAR-CICFR, Bhimtal along with its Experimental Fish Farm, Champawat chalked out a detailed programme to carry out National

Sanitation Campaign. Swachhta Hi Sewa “Swachhotsav” started at ICAR-CICFR, Bhimtal on 16th September 2025. All the members of staff participated in the pledge administered online by the Secretary DARE & DG, ICAR on the day. The pledge was also taken by all staff members of ICAR-CICFR Experimental Fish Farm & Field Centre, Champawat. The date wise activities to be carried out during the whole swachhotsav were brought to the notice of all the members of staff for successful execution. Banners on the theme have also been placed at the entrance of the institute building facing the main road to Bhimtal bypass to give a wide publicity to this important event. The awareness messages were posted on the institute website, instagram, facebook, twitter etc.

A plant in the institute campus at Bhimtal as well Experimental Fish Farm & Field Centre, Champawat was also planted on the theme “Ek Ped Maa Ke Naam”. During the campaign, the dirty/black spots were identified and cleanliness activities were also taken up. Programmes on poetry, swachhata quiz and swachhata ki pathshaala were organized for the school children of at Janta Junior High School, Mudiyani and Anand Bal Vidya Manidir, Joop. A preventive health check up was also organised in which the Ayurvedic Doctor performed health check up of the safai mitras, their families as well as the villagers.

A campaign was organized at the Tea Nursery, Mudiyani to create awareness on maintaining hygiene amongst the labourers working in the nursery. The labourers tool pledge to maintain cleanliness at their work places for a healthy working environment. Cleanliness campaign were also organized in the office premises, laboratories, farm complex of the Experimental Fish Farm & Field Centre, Champawat and CICFR, Bhimtal.

Cleanliness activities were organized at Dangibanj Temple, Mudiyani. The pujari of the temple along with the local public participated in the cleanliness campaign carried out in the temple surroundings. Institute organized a programme to acknowledge the unique and inspiring initiatives undertaken by Nagar Palika Parishad, Bhimtal, Nainital, Uttarakhand to integrate citizens with Swachhata and local art. The Parishad had created awareness at schools with regular activities through information education communication (IEC), renovated the public toilets, received an open defecation free (ODF) ++ certificates, installed

dustbins for wet and dry garbage at various points under Bhimtal Nagar Palika and made provision for door-to-door garbage collection. During the programme, discussions were also carried out for future plan to keep the town neat and clean. In recognition of their efforts, ICAR-CICFR gave certificate of appreciation to the officials of the Parishad.

As a part of campaign, Wastes to Art initiatives was organised by ICAR-CICFR, Bhimtal at the tourist place and park. The programme aimed to raise awareness amongst villagers about how the waste materials can be transformed into useful and aesthetically appealing art and decorative items. The concept of Reduce-Reuse-Recycle was highlighted and demonstrations were given on converting waste plastic bottles into flower pots, old newspapers into handy bags, which are ecofriendly that too use of waste oilcans for vegetable cultivation.

An important programme about creating awareness on access to various health services of the government was organized under the Swachhta Hi Sewa campaign. The sanitation workers along with the people from the nearby locality attended the programme. The various important schemes like Ayushman Bharat, Mission Indra dhanush, PM-JAY and other schemes for the benefit of the safai mitras and the local community were briefed ensure better health and a healthy lifestyle. Safety kits were distributed to sanitation workers for protection. A walkathon involving all staff members of the institute was also organized with great zeal in the nearby streets towards Vikas Bhawan, Bhimtal.





Glimpses of Swachhta Hi Sewa activities at Institute

13.18 Rashtriya Ekta Diwas (National Unity Day)

To commemorate the Birth Anniversary of Sardar Vallabhbhai Patel, Rashtriya Ekta Diwas (National Unity Day) was observed at ICAR-CICFR, Bhimtal on 31st October 2026. A pledge was administered at the Institute headquarter as well at Experimental Fish Farm & Field Centre,

Champawat. On this occasion, the contributions of Sardar Vallabhbhai Patel towards the unity, integrity and security of India were briefed. To promote the message of National Integration and collective strength, a unity run/walk was also organized by ICAR-CICFR EFF, Champawat in the nearby streets adjacent to the farm complex.



Run for Unity organised at EFF

13.19 Commemoration of 150 years of Vande Mataram

In compliance to the Council's instructions as per the directives of the Ministry of Culture, Government of India, a collective singing of Rashtrageet “Vande Mataram” was organized on 7th November 2025 at 10.00 AM in the Institute Auditorium to commemorate the completion of 150 years of Vande Mataram. On this occasion, Dr.

Amit Pande, Director of the Institute explained the activities to be observed year long from 7th November 2025 to 7th November 2026. Besides, the contributions of Bankim Chandra Chatterjee, who wrote the “Vande Mataram”, extracted from his novel Anandamath, were also highlighted. During freedom struggle movement, the song gave poetic expression to India's awakening spirit of unity, dedication, nationalism and self-respect.



Collective singing of Rashtrageet “Vande Mataram” at CICFR

13.20 PM Kisan Nidhi Program

The ICAR–Central Institute of Coldwater Fisheries Research, Bhimtal, organised a one-day Kisan Ghosti on 19th November 2025 in the Institute auditorium. As part of the event, participating farmers also viewed the live telecast of the release of the 21st instalment of the PM KISAN Samman Nidhi to farmers and the inauguration of the South India Natural Fish Farming Summit – 2025 from Coimbatore, Tamil Nadu.

The programme was graced by Dr. Harish Singh Bisht, Block Pramukh, Bhimtal, along with officials from the Uttarakhand State Fisheries Department, other state government representatives,

and local farmers. He encouraged the farmers to adopt environmentally friendly and natural farming practices suited to the hill ecosystem. While interacting with the participants, Dr. Amit Pande, Director emphasised the importance of natural fish farming practices for enhancing both ecological balance and economic resilience. The Nodal Officer of the programme, Dr. Suresh Chandra, highlighted the advantages of organic and natural fish farming as practical and sustainable approaches for long term aquaculture development in upland areas. A total of 206 participants, including fish farmers, attended the programme.



live telecast of the release of the 21st instalment of the PM KISAN Samman Nidhi

13.21 World AMR awareness week

ICAR-CICFR organized World AMR awareness week during 18th-24th November 2025 on the theme Act Now: protect our present, secure our future. During the week different awareness programme

on the themes of 'Avoiding indiscriminate use of antibiotics'; "Maintaining clean, biosecure culture system"; Keeping proper records and adhering to withdrawal period" were organized. This program benefitted 155 participants including students, fish farmers.



13.22 Constitution Day

The Constitution Day was celebrated in the Institute on 26th November 2025 with a pledge administered by all the staff members of the Institute in the main office campus. A brief of the preamble about the constitution was also recited by all the staff members. On this occasion, the Director of the Institute briefed the salient features of the constitution of India and its significance in

the democracy of the country. Besides, brief talks were also delivered by the scientists, students/scholars of the institute about the rights and duties enshrined in our samvidhan as well as declaration of the constitution day on 26th November. A small quiz competition was also organized amongst the students/scholars of the institute on the day.



Constitution Day celebrated in this Institute

13.23 Janjatiya Gaurav Varsh Pakhwada - 2025

As part of the Janjatiya Gaurav Varsh Pakhwada - 2025 celebrations, ICAR–Central Institute of Coldwater Fisheries Research implemented a series of awareness programmes across the tribal regions of Uttarakhand and Meghalaya during 1-15 November 2025. These initiatives focused on strengthening livelihood opportunities, promoting entrepreneurship, and fostering sustainable coldwater aquaculture practices among tribal people. The programmes brought together scientific knowledge, community participation, and cultural values to uplift some of India's most remote tribal communities in Uttarakhand. The awareness and infrastructure development programme were conducted along with Tribal Sub Plan (TSP) scheme of the Institute.

During the Pakhwada, CICFR undertook extensive awareness campaigns and hands-on demonstrations showcasing coldwater fish farming models developed under the TSP. These included rainbow trout raceways, carp culture ponds, recirculating aquaculture systems (RAS), aqua-gardens, and small-scale hatcheries. Farmers were introduced to scientific techniques in seed production, feeding, water quality management, stocking, and disease prevention. Particular emphasis was placed on

enabling tribal farmers to become self-reliant in fish seed production. Demonstrations on hatchery technology and seed transport equipped farmers with the skills to produce their own fish seeds. The impact of TSP interventions was especially visible in the remote Himalayan villages of Gunji, Dharchula, Pangu, Himkhola, Sirka, Ronto, and Kalika in Uttarakhand. Here, tribal farmers many of whom had limited exposure to scientific aquaculture successfully transitioned to commercially viable fish farming enterprises.

To ensure better market access and consistent income, CICFR facilitated Farmgate sale points for direct consumer access, bulk supply linkages with paramilitary forces stationed in border regions, training in value-added fish products, including fish balls, pickles, fillets, cutlets, and finger-chips. These initiatives significantly increased profit margins by reducing intermediaries and expanding product diversity. Institute emphasized the importance of conserving indigenous coldwater fish species such as golden mahseer and other indigenous hill fishes and ecological importance and as potential ornamental fishes. These programs also highlighted the cultural richness of Uttarakhand's tribal communities. Activities were conducted to promote traditional attire, architecture, carpentry

designs, and indigenous crafts. Public exhibitions, community demonstrations, and digital campaigns helped raise awareness and popularize traditional clothing among younger generations. Museum displays developed under the initiative now serve as a repository of tribal heritage and identity.

An educational initiative to commemorate the contributions of tribal freedom fighter Shri Parmal Singh Hyanki was organised. A commemorative booklet on his life was released, and his family members were honored by the Chief

Guest Shri Ashok Nabiya, Vice Chairman of the State Tribal Advisory Council (State Minister), Uttarakhand. In partnership with the Indo-Tibetan Border Police (ITBP), health and wellness camps in remote villages such as Gunji were organised. The Janjatiya Gaurav Varsh Pakhwada–2025 celebrations showcased how scientific aquaculture, when combined with community participation, cultural pride, and government support, can transform lives in remote tribal regions.



Glimpses of activities undertaken in Janjatiya Gaurav Varsh Pakhwada

13.24 Viksit Bharat G RAM G program

The ICAR–Central Institute of Coldwater Fisheries Research, Bhimtal, organised Kisan Diwas to mark the birth anniversary of Chaudhary Charan Singh, former Prime Minister of India, who devoted his life to the welfare of farmers. The programme was organised to create awareness among farmers about new government policies and schemes aimed at improving rural livelihoods. Farmers were shown a live telecast of the National Kisan Diwas programme. During the telecast, the Hon'ble Minister of Agriculture & Farmers Welfare explained the purposes and importance of the VB-G RAM-G Act, 2025. The Secretary, Shri Devesh Chaturvedi, Department of Agriculture and Farmers Welfare, Govt. of India, also addressed farmers and spoke about the newly passed VB-G RAM-G Act, which focuses on rural development, job creation, and livelihood security. The main focus of the programme was on the “Viksit Bharat–Guarantee for Rozgar and Aajeevika Mission (GARMIN): VB-G RAM-G Act, 2025”, which supports the national goal of Viksit Bharat

@2047. Farmers were informed that under this Act, every rural household willing to do unskilled manual work will be guaranteed 125 days of wage employment each year. The Act aims to empower rural communities, ensure inclusive growth, and bring together various development schemes so that benefits reach every household. It was also explained that all works under the Act will be part of the Viksit Bharat National Rural Infrastructure programme, with special focus on water security, rural infrastructure, livelihood-based assets, and measures to reduce the impact of extreme weather events. During the programme, Dr. Amit Pande, Director, ICAR-CICFR, Bhimtal encouraged farmers to spread awareness about government schemes among fellow farmers in their villages. Dr. Suresh Chandra, Principal Scientist and Head, coordinated the programme and gave a detailed information on the Pradhan Mantri Matsya Sampada Yojana (PMMSY). More than 155 farmers from five nearby villages of Bhimtal participated in the programme.



Live telecast of National Kisan Diwas programme

13.25 Swachhta Pakhwada

Swachhta Pakhwada started at ICAR-CICFR, Bhimtal on 16th December 2025 with a pledge on “Swachhta” administrated by all the members of staff of the Institute. Banners were displayed at the entrance of the Institute main building facing the road side for a wide publicity to this important event. The awareness messages were posted on the institute website, instagram, facebook, twitter etc.

A Seminar on the topic “Waste to Wealth - Transforming wastes into resources” was organized in the committee room of the Institute.

Dr. Suresh Chandra, Head (HE&RM) delivered a talk on the theme of the seminar. Outdated and unserviceable computers and its accessories were identified, segregated and kept aside for process of auctioning adopting all procedures as per the norms. Cleanliness campaign was taken up inside the office building in different sections/units and its premises. A cleanliness campaign was organized in the nearby street adjacent to the institute campus and residential colony of Vikas Bhavan, Bhimtal in which the residents of the colony were briefed on proper disposal of wastes including the plastic wastes in a proper manner. A plantation drive was



also undertaken in nearby street and locality to promote clean and green technologies.

Shramdaan was organized near the Saras market complex and Vikas Bhawan campus, Bhimtal to promote cleanliness for a healthy and hygienic life. Under the TSP activities “Karmyogi” VAP (Village Action Plan), a massive swachhta campaign was organized at distant locations in Village Samra and Sirkha Dharchula block, Uttarakhand.

Institute organized a programme in collaboration with Nagar Palika Parishad, Bhimtal in which Rahul Kumar Singh, Executive Officer and Shri Bhupendra Singh Yadav, Swachh Bharat Mission Consultant along with other staffs of the Nagar Palika and the local residents were present. Various activities like drawing and essay competitions were organised for students of Anand Baal Vidya Mandir, Joop, Champawat and Janta High School,

Mudiyani in Champawat. A massive cleanliness campaign was organized at the religious place "Seetakund" to raise awareness amongst the community to clean the public places for more visibility to the tourists. Various campaigns were organised in villages like Chaikuni, Moradi in Champawat district.

A programme was organised at EFF, Champawat for involvement of VIP/VVIPs in the swachhta activities, involvement of print and electronic media was ensured to give adequate publicity to the Swachhta Pakhwada. On this occasion, Shri Shyam Narayan Pandey, Vice President (Rajya Mantri), Advisory Committee on Forest & Environment; Smt. Prema Pandey, Chairperson, Nagar Palika, Champawat; Smt. Anchala Bohra, Block Pramukh, Champawat along with the representatives from the print & electronic media were present.



Glimpses of Swachhta Pakhwada activities



14. Awards, Honours and Recognitions

- The “Recirculating Aquaculture-Based Hatchery and Nursery Technology for Rainbow Trout” (ICAR Technology Certification No. ICAR-FS-ICAR-Technology-2025-044), developed at ICAR-CICFR by Dr. Rajesh M., Dr. Biju Sam Kamalam, Dr. R. S. Patiyal, Dr. Kishor Kunal, and Dr. Prakash Sharma, has been recognized as one of the Top Five Technologies by the Fisheries Science Division of ICAR, in acknowledgment of its contribution to sustainable aquaculture development.



- Dr. Neetu Shahi, Senior. Scientist (Biotechnology-Animal Science), ICAR-CICFR has received the award of ICAR National Fellow for her project “Development of a fast, easy and on-site CRISPR/CFPS based detector of major bacterial pathogens of rainbow trout”. The award was given by Agricultural Education Division (AED) of ICAR and it is for the duration of 5 years from the date of joining at the NF post.
- Dr. Ciji Alexander, Senior scientist, ICAR-CICFR received the 'Best Oral Presentation Award' for her paper on 'Effects of a formulated diet on growth and digestive enzyme activities in *Tor putitora* larvae' at the 12th International Conference on “Emerging Issues in Agricultural, Food Technology, Biological & Applied Sciences for Global Development-2025”, held at Maharana

Pratap University of Agriculture and Technology, Udaipur, Rajasthan, during 15th-17th November, 2025

- Dr. Ciji Alexander and Dr. Kh. Victoria Chanu, Senior scientists at ICAR-CICFR are being nominated to represent the institute as members of the Working Group on Inland Fisheries and Aquaculture under the National Framework on Traceability System for Fisheries and Aquaculture in India.
- Dr. Kh. Victoria Chanu, Senior scientist, ICAR-CICFR received the 'Best Oral Presentation Award' for her paper on 'PNA-based visual biosensor for rapid pathogen detection' in the International Conference on “Envisioning Livestock Production and Protection under the One Health Landscape (VIBCON 2025)” held at ICAR-IVRI, Mukteswar Campus during 6th-8th November 2025.
- Dr. Dimpal Thakuria, Senior scientist, ICAR-CICFR received the 'Best Oral Presentation' for the paper on 'Artificial designing of a novel antimicrobial peptide' in the International Conference on “Envisioning Livestock Production and Protection under the One Health Landscape (VIBCON 2025)” held at ICAR-IVRI, Mukteswar Campus during 6-8 November 2025.
- Dr. Neetu Shahi received certificate of honour for delivering online lecture titled “Submission of DNA sequences to NCBI database” on 31st January 2025 during the “Seven days hands on training programme on molecular taxonomy of fish” at Faculty of Fisheries Science, Assam Agricultural University, Raha, Assam.
- Dr. Neetu Shahi received certification of appreciation for being the nominated member of the Registration, Reception and Certificates Committee of 14 AFAF, at NASC complex, New Delhi.
- Mr. Bhupendra Singh received 'The student

travel award' during the 12th Symposium on Diseases in Asian Aquaculture (DAA 12) on “Transformative Innovations Shaping the Future of Aquatic Animal Health Management”, held from September 23-27, 2025, at the Hotel Leela Palace, Chennai, India.

- The abstract titled “Pharmacokinetic disposition and safety evaluation of emamectin benzoate in Rainbow Trout under therapeutic and elevated dosing regimens”

authored by Pathak, R., Kala, K., Patil, P.K., Shahi, N., Chatterjee, N.S., Nadella, R.K., Mallik, S.K., 2025, received the best poster award during 12th Symposium on Diseases in Asian Aquaculture (DAA 12) on “Transformative Innovations Shaping the Future of Aquatic Animal Health Management”, held from September 23-27, 2025, at the Hotel Leela Palace, Chennai, India. The poster award was received by Ms. Richa Pathak.

15. Linkages

ICAR-Central Institute of Coldwater Fisheries Research has developed functional linkages with different National level organizations, Agricultural Universities, State department of fisheries, financial agencies, Private companies, and Registered societies for promotion of R&D in collaborative programs.

15.1 ICAR Institutes

- ICAR-National Bureau of Fish Genetic Resources (ICAR-NBFGR), Lucknow, U.P
- ICAR-Central Institute of Fisheries Technology (ICAR-CIFT), Kochi, Kerala
- ICAR-Central Institute of Fisheries Education (ICAR-CIFE), Mumbai, Maharashtra
- ICAR-Central Institute of Freshwater Aquaculture (ICAR-CIFA), Bhubaneswar, Odisha
- ICAR-Central Institute of Brackishwater Aquaculture (ICAR-CIBA), Chennai, Tamil Nadu
- ICAR-Central Inland Fisheries Research Institute (ICAR-CIFRI), Barrackpore, West Bengal
- ICAR-Research Complex for NEH Region, Barapani, Meghalaya
- ICAR-Indian Institute of Soil and Water Conservation (ICAR-IISWC), Dehradun, Uttarakhand
- ICAR-Vivekanand Pravatiya Krishi Anusandhan Sansthan (ICAR-VPKAS), Almora, Uttarakhand
- ICAR-Indian Veterinary Research Institute (ICAR-IVRI), Izatnagar, U.P
- ICAR-Directorate of Foot and Mouth Disease (ICAR-PDFMD), Mukteswar, Uttarakhand
- ICAR-Indian Agricultural Statistics Research Institute (ICAR-IASRI), New Delhi
- ICAR-Indian Agricultural Research Institute (ICAR-IARI), New Delhi
- Science and Engineering Research Board (SERB), New Delhi
- Indian Space Research Organization (ISRO), Bengaluru
- North Eastern Space Application Centre, Shillong, Meghalaya
- Uttarakhand State Council for Science and Technology, Dehradun
- Survey of India, Dehradun, Uttarakhand
- Ministry of Environment, Forest & Climate Change, New Delhi
- Indian Council of Forest Research and Education (ICFRE), Dehradun
- Tehri Hydro Development Corporation Ltd.
- Sashastra Seema Bal (SSB), Ministry of Home Affairs, Govt. Of India, Champawat
- Indian Institute of Engineering (IIT), Roorkee
- National Bank for Agriculture and Rural Development (NABARD), Dehradun

15.3 State Agencies/Departments

- Department of Fisheries, Uttarakhand
- Department of Fisheries, Himachal Pradesh
- Department of Fisheries, Jammu & Kashmir
- Department of Fisheries, Sikkim
- Department of Fisheries, Arunachal Pradesh
- Department of Fisheries, Meghalaya
- Department of Fisheries, Mizoram
- Department of Fisheries, Nagaland
- Department of Fisheries, Tamil Nadu
- Uttarakhand Council for Biotechnology
- Directorate of Animal/Sheep Husbandry, UT of Ladakh.

15.4 Universities & Colleges

- GB Pant University of Agriculture Science & Technology, Pantnagar
- GB Pant Institute of Himalayan Environment and Development, Almora
- College of Fisheries, SKUAST, Srinagar, J&K
- College of Fisheries, Assam Agricultural University, Raha
- College of Fisheries, Central Agricultural

15.2 Central Agencies/Departments

- National Fisheries Development Board (NFDB), Hyderabad, Telangana
- Department of Biotechnology (DBT), New Delhi

University, Lembucherra

- Tamil Nadu Dr. J. Jayalalithaa Fisheries University, Naggapattinam
- Kerala University of Fisheries & Oceanography
- Kumaun University, Nainital, Uttarakhand
- HNB Garhwal University, Srinagar, Uttarakhand
- Guwahati University, Assam
- Assam Don Bosco University, Guwahati
- West Bengal University of Animal & Fisheries Sciences, Kolkatta
- Nagaland University, Kohima
- Rajiv Gandhi University, Arunachal Pradesh
- Bhimrao Ambedekar Central University, Lucknow, U.P
- Deen Dayal Upadhaya Gorakhpur University, Gorakhpur, U.P
- Central Agricultural University, Imphal, Manipur
- Acharaya Narendra Dev University of Agriculture and Technology, Kumarganj, Ayodhya, UP
- Manipur University, Imphal
- Central Agricultural University, Jhansi, U.P
- Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan
- Soban Singh Jeena University, Almora, Uttarakhand.
- ICFAI University, Agaratala, Tripura
- Dr. Rajendra Prasad Central Agriculture University, Pusa, Samastipur, Bihar

- Graphic Era University, Dehradun

15.5 Krishi Vigyan Kendras (KVK)

- KVK Lohaghat, Champawat, Uttarakhand
- KVK Almora, Uttarakhand
- KVK Jyolikot, Uttarakhand
- KVK West Kameng, Arunachal Pradesh
- KVK Tawang, Arunachal Pradesh
- KVK Lower Subansiri, Arunachal Pradesh
- KVK Upper Subansiri, Arunachal Pradesh
- KVK Lower Dibang Valley, Arunachal Pradesh
- KVK East Siang, Arunachal Pradesh
- KVK Bajaura, Himachal Pradesh
- KVK Unakoti, Tripura
- KVK East Sikkim, Sikkim
- KVK Hailakandi, Assam

15.6 Registered Societies/ NGOs/ Private Companies

- Devan Hills Plantations Company (P) Ltd., Munnar, Kerala
- SPY Agro Pvt. Ltd. Nadyal, Kurnool, Andhra Pradesh
- String Bio Pvt. Ltd. Bengaluru, Karnataka
- Growel Feeds Pvt. Ltd.
- Aker Biomarine India Pvt. Ltd., Mumbai
- Uttarakhand Jal Vidyut Nigam Ltd., Dehradun
- Shree Ram India Gums Ltd., Jodhpur, Rajasthan
- Das and Kumars, Varanasi, Uttar Pradesh

ICAR-CICFR in News & Media

चौगरखा बकरी, गो-पालन बढ़ाएगा किसानों की आजीविका

संवाद न्यूज प्रजेसी

मुंबई (बीबीसी)। भारतीय पशु विज्ञान संस्थान (ICAR) के राष्ट्रीय पशु विज्ञान परिषद (NVP) के अध्यक्ष डॉ. अशोक कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

डॉ. कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

डॉ. कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

मछलियों की जान पर नहीं आएगी आंच, कोशिकाओं से तैयार होगा मांस

अहमदाबाद और कोलकाता के वैज्ञानिकों ने मछली को जलाने से बचाने का तरीका खोजा है।

डॉ. अशोक कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

डॉ. कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

किसान मेले में वैज्ञानिक तरीके से खेती पर जोर

संवाद न्यूज प्रजेसी

नई दिल्ली (बीबीसी)। भारतीय पशु विज्ञान संस्थान (ICAR) के राष्ट्रीय पशु विज्ञान परिषद (NVP) के अध्यक्ष डॉ. अशोक कुमार ने कहा कि किसान मेले में वैज्ञानिक तरीके से खेती पर जोर देना चाहिए।

डॉ. कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

डॉ. कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

रैनबो ट्राउट मछली उत्पादन से लाभ कमाएं : डॉ. लेखी

संवाद न्यूज प्रजेसी

नई दिल्ली (बीबीसी)। भारतीय पशु विज्ञान संस्थान (ICAR) के राष्ट्रीय पशु विज्ञान परिषद (NVP) के अध्यक्ष डॉ. अशोक कुमार ने कहा कि रैनबो ट्राउट मछली उत्पादन से लाभ कमाएं।

डॉ. कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

डॉ. कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

किसान सम्मान निधि कार्यक्रम का दिखाया सीधा प्रसारण

संवाद न्यूज प्रजेसी

नई दिल्ली (बीबीसी)। भारतीय पशु विज्ञान संस्थान (ICAR) के राष्ट्रीय पशु विज्ञान परिषद (NVP) के अध्यक्ष डॉ. अशोक कुमार ने कहा कि किसान सम्मान निधि कार्यक्रम का सीधा प्रसारण किया जा रहा है।

डॉ. कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

डॉ. कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

धन-धान्य कृषि योजना से मालामाल होंगे किसान

संवाद न्यूज प्रजेसी

नई दिल्ली (बीबीसी)। भारतीय पशु विज्ञान संस्थान (ICAR) के राष्ट्रीय पशु विज्ञान परिषद (NVP) के अध्यक्ष डॉ. अशोक कुमार ने कहा कि धन-धान्य कृषि योजना से मालामाल होंगे किसान।

डॉ. कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

डॉ. कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

आधुनिक तकनीक पर अनुसंधान करें वैज्ञानिक : लेखी

संवाद न्यूज प्रजेसी

नई दिल्ली (बीबीसी)। भारतीय पशु विज्ञान संस्थान (ICAR) के राष्ट्रीय पशु विज्ञान परिषद (NVP) के अध्यक्ष डॉ. अशोक कुमार ने कहा कि वैज्ञानिक आधुनिक तकनीक पर अनुसंधान करें।

डॉ. कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

डॉ. कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

मातृशिक्षी अनुसंधान के लिए शीघ्र उपलब्ध कराई जायेगी भूमि

संवाद न्यूज प्रजेसी

नई दिल्ली (बीबीसी)। भारतीय पशु विज्ञान संस्थान (ICAR) के राष्ट्रीय पशु विज्ञान परिषद (NVP) के अध्यक्ष डॉ. अशोक कुमार ने कहा कि मातृशिक्षी अनुसंधान के लिए शीघ्र उपलब्ध कराई जायेगी भूमि।

डॉ. कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

डॉ. कुमार ने कहा कि चौगरखा बकरी, जो गो-पालन के लिए उपयोग की जाती है, किसानों की आजीविका में मदद करेगी।

भवाली/भीमताल/रामनगर जागरण

केंद्रीय मत्स्य पालन विभाग के सचिव डा. लिखी ने शीतल जल मत्स्य केंद्र का किया निरीक्षण
आधुनिक तकनीक पर आधारित अनुसंधान को दें प्राथमिकता

[illegible]

डा. लिट्टो ने बताया कि ठंडे पानी की गलती प्रभावितों की चिकित्सा में अधिक है। उपचारों में इस दिशा

[illegible]

सौ ऐश्वर्य के अवसर प्राप्त कर
गये। कार्यक्रम में बड़ी संख्या में
प्राथमिक विद्यालय उच्चविद्या
लयों से विद्यार्थी से ऐश्वर्य को
उनकी सम्पत्तियाँ सुनीं। बाल
साहित्यिक प्रतियोगिता में एवं दुर्ग
विद्यालय संघिय बोर्डोअरों परस्पर्ध
में, लीडोई अग्रविषय, लीडोई मेकान
री, निदेशक मन्त्र्य हा अग्रि
यों, एकोस मन्त्र्य हा ऐश्वर्य
उच्चविद्यालय हा अग्रव्य उत्तर,
लिया मन्त्र्य अग्रिपरी लिया अग्र
लिया संघिय के विद्यार्थी ऐश्वर्य हा



आइसिंगराम भीमराव का निरीक्षण
कमले हा. अभिलषा मिश्री = आभार

सांसद अजय भट्ट संग किसानों ने देखा प्रधानमंत्री का लाइव प्रसारण



अपना संस्कार, ईश्वर ने के विचार का सीमा नहीं है
 किसी ने प्रकृति की सीमा नहीं
 का अन्तर्गत प्रकृति की सीमा नहीं है।

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मछली पालन से आय बढ़ाने को किया प्रेरित

भीमताल। केन्द्रीय शीतजल माल्पत्यकी अनुसन्धान संस्थान के ऑडिटोरियम में प्रधानमंत्री किसान सम्मान निधि योजना की 20वीं किस्त नौ करोड़ 70 लाख किसानों को जारी होने पर पीएम प्रसारण कार्यक्रम आयोजित किया गया। प्रसारण के माध्यम से ग्राम हरिनगर के मत्स्य पालकों की प्रधानमंत्री द्वारा वारणसी से 20,500 करोड़ धनराशि सीधे किसानों के खाते में हस्तांतरित आदि दिखाया गया। संस्थान निदेशक डा अमित चण्डे ने किसानों को बधाई देते हुए मत्स्य पालन से अपनी आय के स्रोतों में वृद्धि किये जाने के लिए प्रेरित भी किया। संस्थान ने सरकार की माल्पत्यपूर्ण अनुसूचित जाति उपयोगन के अन्तर्गत मत्स्य कृषकों को मछली का चारा भी उपलब्ध करवा गया। यहां वरिष्ठ वैज्ञानिक डा सुरेश चन्द्रा, डा अरएस पतिवाल, डा एसअली, डा रेनु जेठी, डा के. विकटोरिया चन्नु, डा एमएस अख्तर, डा हिमाल ठकुरिया, डा सीजी एवं डा. परवेज अहमद सहित संस्थान के सभी कर्मचारियों ने भाग लिया। बताया कार्यक्रम का सजीव प्रसारण संस्थान के चम्पावत केन्द्र पर भी स्थानीय कृषकों के लिये किया गया।

विष्णुगाड़-पीपलकोटी जल विद्युत परियोजना द्वारा अलकनन्दा नदी में स्नो टाउट संरक्षण हेतु रैपिंग एवं जागरूकता कार्यक्रम आयोजित

समोही। स्वदेशी मसली प्रजातियों के संरक्षण और विपुलाग्र-निराकरणों जल विद्युत परियोजना (डैम)ओं के माध्यम से प्रदूषण को जल संचयन के

टिपिकल) की एगरी, लोहा, अरु महाबकाक (सुन ताउत), की अर एल महालीन, एल महाबकाक (एगरी), और की अलित भू, एल महाबकाक (टिपिकल) अलित भू, एल महाबकाक (टिपिकल) मली ताउत के महाब पर प्रकाश काली हू, इन कालर बैकल की बरी टिपिकल के लिए खा की अलितभकाक पर जोर दिख। महाब किलत काली की महाब

इस बात से भयानक रोषविकृत
करते हुए, पंथीयोजना प्रमुख
(वीरिन्ध्यापि) के अग्रज वर्ग ने

अब, 'टीएचडीसी इंडिया लिमिटेड' परंपरागत विचार के प्रति प्रतिबद्ध है और यह बहुत हमारे जीवन के विभिन्न के संलग्न की जिम्मेदारी को दर्शाती है। यह एडवर्ड का संलग्न



डीसीएफआर ने चलाया स्वच्छता जागरूकता अभियान

भीमताल। भारतीय कृषि अनुसंधान परिषद एवं केंद्रीय शीतजल मात्स्यिकी अनुसंधान संस्थान भीमताल की ओर से चलाये गये स्वच्छता पखवाड़े के तहत विविध कार्यक्रम आयोजित किये गये। संस्थान के वैज्ञानिकों व कर्मचारियों ने अलग-अलग टोलियों में लोगों को स्वच्छता के प्रति जागरूक किया गया। वैज्ञानिकों ने नगर के बिकास भवन परिसर समेत ग्रामीण क्षेत्रों में जाकर ग्रामीणों को स्वच्छता का महत्व समझाया गया। साथ ही सरकार की विभिन्न सरकारी योजनाओं को जानकारी दी गयी। संस्थान के निदेशक डा. अमित पांडे ने बताया 17 सितंबर से दो अक्टूबर तक स्वच्छता पखवाड़ा चलाया गया है। जिसके तहत संस्थान द्वारा स्वच्छता अभियान समेत अन्य कार्यक्रम चलाये गये हैं। बताया संस्थान के चम्पवत सेंटर द्वारा भी पखवाड़े के तहत क्षेत्र में वृहद स्वच्छता जागरूकता अभियान चलाया गया।

8. **सैनिक उद्योगधन कानून, 25 सितंबर, 2023**

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शीतजल मातृ अनुसंधान को मिला केंद्रीय दर्जा

इसलिए मिलने पर संस्थान में नव्य कार्यक्रम आयोजित

[illegible]

केन्द्रीय शीतबल

महिलेयों को अनुसंधान सम्मान, भीमराव में
हलिकर को प्रधानमंत्री किसान सम्मान निधि
योजना की 20वीं किस्त जारी किए जाने का
कार्यक्रम आयोजित किया गया। कार्यक्रम में
संस्थान के निदेशक डॉ. अमित पांडे ने
किसानों को एकीकृत कुशल उपजकार माल्य
पानन में अपनी आर्थिक बढ़ाने के लिए
प्रेरित किया। संवाद

मत्स्य पालन आजीविका का अच्छा साधन : सांसद

[illegible]

विभागों के लिए कृषि और मानव संसाधन

भीषाना के लिए कृष्ण और मत्स्य पालन अहम भीषाना (नीतिशास्त्र)। केंद्रों से होकर महीनली अनुसंधान संस्थान भीषाना में पूर्व अग्रणी भीषाना भीषाना के अग्रणी को विज्ञान संस्थान विज्ञान के नाम में बनाया गया। केंद्रों कृष्ण मंत्री विज्ञान मित्र भीषाना में सर्वोच्च माध्यम से विज्ञानों को संवेष्टित किया। उन्होंने विज्ञानों से कृष्ण, माध्यम पालन और सुभाषान के अग्रणी अग्रणीका को बनाए गए जोर दिया। वर्ष 20-47 तक अग्रणी को विज्ञान संस्थान में अग्रणी देने का अग्रणी किया। संस्थान के निर्देशक डॉ. अग्रणी पालन ने कहा कि भीषाना निर्देशक अग्रणी पालन को और से विज्ञानों को विज्ञान संस्थानों का नाम दिया का रहा है। माध्यम पालन के माध्यम से विज्ञानों को अग्रणीका को बनाए का प्रस्ताव किया जा रहा। अग्रणी में विज्ञान क्षेत्रों के विज्ञान भीषाना है। अग्रणी

16. Publications

16.1 Research papers

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16.3 Books and Books Chapters

- Kantal, D., Arun, K., & Ganie, P. A. (2025). Economic Implications of Information Technology in Aquaculture and Fisheries. In: P. A. Ganie, R. Posti, & P. K. Pandey (Eds.), *Information Technology in Fisheries and Aquaculture* (pp. 227-250). Springer, Singapore. ISBN: 978-981-97-8553-7. https://www.google.com/search?q=https://doi.org/10.1007/978-981-97-8553-7_13

- Khatei, A., Ganie, P. A., & Pandey, P. K. (2025). Introduction of Information Technology in Fisheries and Aquaculture. In: P. A. Ganie, R. Posti, & P. K. Pandey (Eds.), *Information Technology in Fisheries and Aquaculture* (pp. 1-15). Springer, Singapore. ISBN: 978-981-97-8553-7.
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 - Khatei, A., Ganie, P. A., Posti, R., & Swamy, J. M. (2025). Aquatic Environmental Monitoring with Sensor Network. In: P. A. Ganie, R. Posti, & P. K. Pandey (Eds.), *Information Technology in Fisheries and Aquaculture* (pp. 151-166). Springer, Singapore. ISBN: 978-981-97-85537.
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 - Khatei, A., Ganie, P. A., Sidiq, M. J., Posti, R., & Pandey, P. K. (2025). Genomic Insights into Fisheries and Aquaculture: A Bioinformatics Approach. In: P. A. Ganie, R. Posti, & P. K. Pandey (Eds.), *Information Technology in Fisheries and Aquaculture* (pp. 183-201). Springer, Singapore. ISBN: 978-981-97-8553-7.
https://www.google.com/search?q=https://doi.org/10.1007/978-981-97-8553-7_11
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 - Mallik, S. K., Pathak, R., Kala, K., & Shahi, N. (2025). Advances in Pharmacokinetics, Efficacy, Biosafety, and Withdrawal of Approved Antibiotics in Aquaculture Practices. In: S. K. Mallik, N. Shahi, & P. K. Pandey (Eds.), *Management of Fish Diseases* (pp. 353-370). Springer.
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 - Pathak, R., Mallik, S. K., Kala, K., & Shahi, N. (2025). Novel Antimicrobial Strategies to Combat Multidrug-Resistant Bacteria in the Aquatic Environment. In: S. K. Mallik, N. Shahi, & P. K. Pandey (Eds.), *Management of Fish Diseases* (pp. 505-525). Springer.
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 - Sidiq, M. J., Ganie, P. A., Posti, R., Magloo, A. H., & Bhat, R. A. H. (2025). Current Challenges in Fisheries and Aquaculture Sector: A Technological Perspective. In: P. A. Ganie, R. Posti, & P. K. Pandey (Eds.), *Information Technology in Fisheries and Aquaculture* (pp. 35-57). Springer, Singapore. ISBN : 9 7 8 - 9 8 1 - 9 7 - 8 5 5 3 - 7 .
https://www.google.com/search?q=https://doi.org/10.1007/978-981-97-8553-7_3
 - Singh, B., Shahi, N., & Mallik, S. K. (2025). Aquatic Animal Welfare and Behavioural Health. In: S. K. Mallik, N. Shahi, & P. K. Pandey (Eds.), *Management of Fish Diseases* (pp. 465-488). Springer.
- 16.4 Policy guidelines**
- Akhtar, M. S., Ciji, A., & Pandey, P. K. (2025). Policy guidelines for mahseer ranching. *ICAR-CICFR Publication, Policy Paper No. 3*. pp. 1-23.
- 16.5 Bulletins, Leaflets and Manuals**
- Akhtar, M. S., Ciji, A., & Pandey, P. K. (2025). Mahseer hatchery: Standard operating procedures (SOPs). *ICAR-CICFR Publication, Bulletin No. 36*. pp. 1-16.
 - Ali, S., Pandey, N. N., & Jethi, R. (2025). Parvatiye Chetron me matsya samvardhan. *ICAR-CICFR Publication, Pamphlet No. CICFR No. 01*.
 - Ali, S., Pandey, N. N., Jethi, R., & Kumar, S.

(2025). Matsay samvardhan hetu paani ki gunwatta. *ICAR-CICFR Publication, Pamphlet No. CICFR No. 02.*

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- Chandra, S., Chanu, K. V., & Mallik, S. K. (2025). Capacity Building on Integrated Fish Farming for Livelihood Generation. *ICAR-CICFR Bulletin No. 37.* pp. 1-71. (Note: A duplicate format of this entry from the end of the source list was consolidated here).
- Chandra, S., Jethi, R., Bhatt, R. A. H., Mallik, S. K., & Ganie, P. A. (2025). Rainbow trout prakshetron ki pramookh bimariyaan aur unke rokthaam ke upay. *ICAR-CICFR Bulletin No. 34.*
- Chanu, K. V., & Thakuria, D. (2025). Synthetic peptides: Current applications and Future Prospects. In: *Training manual on Basic techniques in biotechnology and bioinformatics* (pp. 13-20). College of Veterinary Sciences, AAU, Khanapara.
- Ganie, P. A., Chandra, S., Khatei, A., Bhat, R. A. H., & Posti, R. (Eds.). (2025). Coldwater Resource Mapping Using Geospatial Tools. *Training manual, ICAR-DCFR 01.* pp. 1-59.
- Khatei, A., Ganie, P. A., Mallik, S. K., Bhat, R. A. H., & Sidiq, M. J. (Eds.). (2025). Ornamental fish rearing in aquariums. *Training manual, ICAR-CICFR 03.* pp. 1-27.
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16.6 Abstracts

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- Ali, S., Akhtar, M. S., & Kaur, A. (2025). Influence of temperature on expression profile of sex-differentiation related genes at early developmental stages of an endangered cyprinid *Tor putitora* (Hamilton, 1822). *14th AFAF* (Abstract No. TS-4-020, p. 334).
- Ali, S., Kaur, A., & Pandey, P. K. (2025). Thermal stress modulates the expression of oxidative stress and immune-related genes during ontogenic developmental stage in golden mahseer (*Tor putitora*), an endangered Himalayan cyprinid. *17th ASC* (Book of Abstract Vol-II, ASC2025/Abstract0289, p. 637). Pantnagar.
- Chandra, S., Shahi, N., Singh, B., & Mallik, S. K. (2025). Isolation and Characterization of Multiple Pathogenic Bacterial Strains from Infected Grass Carp (*Ctenopharyngodon idella*) and Common Carp (*Cyprinus carpio*) Reared in Mid-Himalayan Cages of India. *14th Asian Fisheries and Aquaculture Forum (14AFAF)-2025* (pp. 1-902). NASC Complex, New Delhi, India.
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- Chanu, K. V., Thakuria, D., Gain, D., Pant, V., & Pandey, P. K. (2025). Targeted PCR detection and inhibitory effects of organic acids on *Saprolegnia* species. *XVII Agricultural Science Congress-2025* (p. 685). GBPUAT, Pantnagar.
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- New Delhi.
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 - Ciji, A., & Akhtar, M. S. (2025). Effects of a formulated diet on growth and digestive enzyme activities in *Tor putitora* larvae. *12th International Conference on Emerging Issues in Agricultural, Food Technology, Biological & Applied Sciences for Global Development-2025*. Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan.
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 - Ciji, A., Akhtar, M. S., Kamalam, B. S., Rajesh, M., & Sharma, P. (2025). Influence of broodstock origin on egg and larval quality of golden mahseer (*Tor putitora*). *5th Biotechnology Conclave cum International Conference on Harnessing Biotechnology for Sustainable BioE3 Future*. Uttarakhand Council of Biotechnology, Patwadangar, Nainital, Uttarakhand.
 - Ciji, A., Akhtar, M. S., Rajesh, M., & Kamalam, B. S. (2025). Effects of dietary soy lecithin on biochemical responses and thermal tolerance of golden mahseer, *Tor putitora*. *4th Biotechnology Conclave and International Conference on Strategies for Sustainable Agriculture, Environment & Health for Viksit Bharat*. Biotech Bhavan, Haldi, Pantnagar, Uttarakhand.
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 - Kala, K., Pathak, R., Shahi, N., Patil, P. K., Chatterjee, N. S., Nadella, R. K., Patiyal, R. S., Pande, V., & Mallik, S. K. (2025). Efficacy and residue profile of emamectin benzoate in managing argulus infestations in juvenile Rainbow Trout, *Oncorhynchus mykiss* under coldwater conditions. *12th Symposium on Diseases in Asian Aquaculture (DAA 12)*. Hotel Leela Palace, Chennai, India.
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 - Shahi, N., Singh, B., Pande, A., Mallik, S. K., & Chandra, S. (2025). First report of *Lactococcus petauri* in farmed rainbow trout *Oncorhynchus mykiss* of INDIA: A comprehensive phenotypic and genomic characterization. *World Aquaculture 2025 India*. Hyderabad, India.
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 - Singh, B., Shahi, N., Mallik, S. K., Kala, K., & Pandey, P. K. (2025). *Argulus japonicus* (Thiele 1900) Infestation in Farmed Rainbow

- Trout, *Oncorhynchus mykiss* in Mid-altitude Himalayan Region of Northern India. *14th Asian Fisheries and Aquaculture Forum (14AFAF)-2025* (pp. 1-902). NASC Complex, New Delhi, India.
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 - Lactococcus petauri* CICFR DBL PA1 | JBMKJ4000000000 | 20.04.2027 | Shahi, N., Singh, B., Mallik, S. K., Pande, A., & Chandra, S. (2025)|
 - Lactococcus petauri* R E L 3 | JBLYVC0000000000 | 20.04.2027 | Shahi, N., Singh, B., Mallik, S. K., Pande, A., & Chandra, S. (2025)|
 - Lactococcus petauri* Rt14 | JBSLR0000000000 | 04.11.2026 | Shahi, N., Mallik, S. K., Singh, B., Pande, A., & Chandra, S. (2025)|
 - Lactococcus petauri* R F 1 | JBSYFY0000000000 | 11.01.2027 | Shahi, N., Mallik, S. K., & Singh, B. (2025)|
 - Lactococcus petauri* W F 1 | JBSYFX0000000000 | 11.01.2027 | Shahi, N., Singh, B., & Mallik. (2025)|
 - Lactococcus garvieae* DBL S9 | JBMIQS0000000000 | 20.04.2027 | Singh, B., Shahi, N., Mallik, S. K., Pande, A., Chandra, S., & Bisht, S. P. S. (2025)|
 - Lactococcus garvieae* P 0 8 | JBTAEZ0000000000 | 30.11.2026 | Singh, B., Shahi, N., Kala, K., Mallik, S. K., Patiyal, R. S., & Bisht, S. S. (2025)|
 - Aeromonas veronii* strain LJ1 | JBSDKA0000000000 | 10.12.2025 | Shahi, N., Singh, B., Mallik, S. K., & Kamalam, B. S. (2025)|
 - Aeromonas veronii* strain GC13 | JBRXBD0000000000 | 03.11.2026 | Shahi, N., Chandra, S., & Mallik, S. K. (2025)|
 - Aeromonas hydrophila* strain RRt06 | JBLSRM0000000000 | 10.12.2026 | Shahi, N., Mallik, S. K., & Singh, B. (2025)|
 - Flavobacterium covae* FCH | CP187228 | 07.05.2026 | Shahi, N., Mallik, S. K., & Singh, B. (2025)|
 - Flavobacterium covae* FCBC | CP187240 | 07.05.2026 | Shahi, N., Mallik, S. K., & Singh, B. (2025)|
 - Pseudomonas trutticola* sp. nov. | JBUBQD0000000000 | 04.06.2027 | Shahi, N., Kala, K., Mallik, S. K., Pande, A., Singh, B., & Chandra, S. (2025)|
 - Lactococcus formosensis* isolate KEIN1 | JBSKFN0000000000 | 01.10.2026 | Shahi, N., Sudhagar, A., Dharmaratnam, A., Singh, B., & Mallik, S. K. (2025)|

16.7 NCBI submissions Whole Genome Sequence Submissions

Organism / Strain	Accession No.	Release Date	Authors
<i>Lactococcus petauri</i> CICFR DBL 238	JBMKJZ0000000000	20.04.2027	Shahi, N., Singh, B., Mallik, S. K., Pande, A., & Chandra, S. (2025)

| *Pseudomonas mosselii* PhMp1 |
 JBSYFZ000000000 | 30.11.2025 | Shahi, N.,
 Mallik, S. K., Rathore, R., Bisht, M. S., &
 Singh, B. (2025)|

16S rRNA Partial Gene Sequence Submissions

Organism	Isolate/Strain	GenBank ID	Authors
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<i>Aeromonas veronii</i>	RSPG1	PQ897120	Shahi, N., Mallik, S. K., Singh, B. K., & Rathore, R. K.
<i>Aeromonas veronii</i>	RSPF2	PQ897121	Shahi, N., Mallik, S. K., Singh, B. K., & Rathore, R. K.
<i>Pseudomonas mosselii</i>	RSPF3	PQ897122	Shahi, N., Mallik, S. K., Singh, B. K., & Rathore, R. K.
<i>Pseudomonas mosselii</i>	RSMPGW	PQ897114	Shahi, N., Mallik, S. K., Singh, B. K., & Rathore, R. K.
<i>Aeromonas veronii</i>	GC 13	PQ901955	Shahi, N., Mallik, S. K., Singh, B., Kala, K., & Chandra, S.
<i>Aeromonas veronii</i>	LJ 1	PQ901958	Shahi, N., Mallik, S. K., Singh, B. K., & Kala, K.
<i>Aeromonas salmonicida</i>	AS India	PQ901950	Shahi, N., & Mallik, S. K.
<i>Aeromonas hydrophila</i>	RMSE - 2	PQ898438	Shahi, N., Mallik, S. K., Singh, B., & Kala, K.
<i>Enterococcus gallinarum</i>	SC 2	PQ898120	Shahi, N., Mallik, S. K., Singh, B. K., & Kala, K.
<i>Lactococcus petauri</i>	SC6(A)	PQ898118	Shahi, N., Mallik, S. K., Singh, B., & Kala, K.
<i>Lactococcus garvieae</i> subspecies <i>garvieae</i>	SC6b	PQ898090	Shahi, N., Mallik, S. K., Singh, B., & Kala, K.
<i>Lactococcus garvieae</i>	SC4b	PQ898112	Shahi, N., Mallik, S. K., Singh, B., & Kala, K.
<i>Lactococcus garvieae</i>	SC4(a)	PQ898017	Shahi, N., Mallik, S. K., Singh, B., & Kala, K.
<i>Lactococcus garvieae</i>	SC5	PQ897994	Shahi, N., Mallik, S. K., Singh, B., & Kala, K.
<i>Lactococcus garvieae</i>	BC4(b)	PQ898000	Shahi, N., Mallik, S. K., Singh, B., & Kala, K.

<i>Lactococcus garvieae</i>	BC2a	PQ898016	Shahi, N., Mallik, S. K., Singh, B., & Kala, K.
<i>Lactococcus garvieae</i>	PA1	PQ902074	Shahi, N., Mallik, S. K., Singh, B. K., & Kala, K.
<i>Lactococcus garvieae</i>	NS238	PQ962509	Shahi, N., Mallik, S. K., Singh, B., & Kala, K.
<i>Lactococcus garvieae</i>	W/F	PQ902112	Shahi, N., Mallik, S. K., Singh, B., & Kala, K.
<i>Lactococcus garvieae</i>	REL 3	PQ931984	Shahi, N., Mallik, S. K., Singh, B. K., & Kala, K.
<i>Lactococcus garvieae</i>	LI 10	PQ932022	Shahi, N., Mallik, S. K., Singh, B., & Kala, K.
<i>Aeromonas hydrophila</i>	BC3	PQ898019	Shahi, N., Mallik, S. K., Singh, B., Kala, K., & Pande, A.
<i>Aeromonas veronii</i>	RSPG2	PV203212	Shahi, N., Mallik, S. K., Singh, B., & Rathore, R.
<i>Aeromonas veronii</i>	EMIPLi2	PV203215	Shahi, N., Mallik, S. K., Singh, B., & Rathore, R.
<i>Aeromonas veronii</i>	EMIPLi1	PV203217	Shahi, N., Mallik, S. K., Singh, B., & Rathore, R.
<i>Bacillus</i> sp.	Aa DCFR	PV053104	Shahi, N., Singh, B., Mallik, S. K., & Kala, K.
<i>Lactococcus garvieae</i>	W/F	PV065517	Shahi, N., Singh, B., & Mallik, S. K.
<i>Lactococcus garvieae</i>	REL3	PV065521	Shahi, N., Singh, B., & Mallik, S. K.
<i>Lactococcus garvieae</i>	PCRID 238	PV065519	Shahi, N., Singh, B., & Mallik, S. K.

Cytochrome Oxidase Partial Gene Sequence Submissions

Organism	Isolate/Strain	GenBank ID	Authors
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<i>Puntius chelynoides</i>	NC21	PV055179	Shahi, N., Sarma, D., Singh, B., & Mallik, S. K.



17. Participation in Conference/Symposia/Workshop/Meetings/Trainings

17.1 Participation in Conference/Symposia/Workshop

Meetings/seminars/conferences/workshops attended by the Director/Act. Director (Dr. Pramod Kumar Pandey during 01.01.2025 to 31.03.2025 and Dr. Amit Pande during 01.04.2025 to 31.12.2025).

S. No	Description	Date
1.	Chaired a special session on Fish, Fisheries and Fisherman & attended as Guest of Honour at the International Seminar on "Current Environmental Issues for Sustainable Circular Economic Strategies and Fisheries Development for a Greener Tomorrow" at Gurukul Kangri Vishwavidyalaya, Haridwar.	28.01.2025 to 29.01.2025
2.	Participated in the 14 th Asian Fisheries and Aquaculture Forum (14AFAF) at ICAR Convention Centre, New Delhi.	11.02.2025 to 15.02.2025
3.	Attended the Inauguration of Mahseer Hatchery by Hon'ble Governor of Manipur at Manipur University, Imphal	07.03.2025 to 12.03.2025
4.	Attended a Board Meeting at ASRB, New Delhi.	12.03.2025
5.	Attended the annual meeting of Vice Chancellors of AUs and Directors of ICAR Institutes at New Delhi.	19.05.2025 to 21.05.2025
6.	Attended the Inland State Meet under the chairmanship of Hon'ble Union Minister for Fisheries, Animal Husbandry and Dairying at Indore.	13.06.2025
7.	Attended a Management Development Programme on Leadership Development at ICAR-NAARM, Hyderabad.	16.06.2025 to 27.06.2025
8.	Attended the 102 nd Foundation Day of ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan (VPKAS), Almora as Guest of Honour.	04.07.2025
9.	Participated in the 97 th ICAR Foundation Day at NASC Complex, New Delhi.	16.07.2025
10.	Attended a meeting with Directors of all ICAR Fisheries Institutes convened by DDG (Fisheries Science), ICAR, New Delhi.	17.07.2025
11.	Attended the National Workshop on "Species Prioritization in Aquaculture and Genetic Improvement" at ICAR-CIFA, Bhubaneswar.	30.08.2025 to 03.09.2025
12.	Attended Consultation Meeting on "State-Related Priorities- Researchable Issues & Roadmap" held at ICAR-VPKAS Experimental Farm, Hawalbagh, Almora.	04.09.2025
13.	Monitored the progress of the Recirculatory Aquaculture System (RAS) at ICAR-CICFR Field Centre, Champawat.	09.10.2025
14.	Attended World Aquaculture (WA-2025) at Hyderabad and held a meeting with Dr. Manuel Barange, Assistant Director General (FAO), and other senior FAO officials as per the instructions of DDG (FS), ICAR, New Delhi.	10.11.2025 to 13.11.2025
15.	Attended the First Zonal Meeting regarding Administrative & Financial Matters and Submission of Agenda Items of ICAR Institutes at ICAR-Indian Institute of Soil & Water Conservation (IISWC), Dehradun.	29.11.2025 to 30.11.2025
16.	Monitored the progress of the Recirculatory Aquaculture System (RAS) at ICAR-CICFR Field Centre, Champawat.	04.12.2025
17.	Monitored the progress of the Recirculatory Aquaculture System (RAS) at ICAR-CICFR Field Centre, Champawat.	26.12.2025

S. No	Description	Date
Online meetings attended by Director from January-December 2025 January 2025		
January, 2025		
1.	North Eastern Region States Meet 2025 to strengthen small-scale & sustainable fisheries under the chairmanship of Shri Rajiv Ranjan Singh alias Lalan Singh, Hon'ble Minister of Fisheries, Animal Husbandry and Dairying and Panchayati Raj organized by Department of Fisheries, New Delhi.	06.01.2025
2.	Attended a meeting for finalization of RE and BE under the chairmanship of DDG (Fisheries Science) convened by ICAR-CMFRI, Kochi.08.01.2025	08-01-2025
3.	Disease surveillance programme and disease free zone under the chairmanship of Secretary (Fy) convened by Department of Fisheries, Government of India, New Delhi.	10.01.2025
February, 2025		
4.	Meeting to mobilize groups of fish farmers and fishers for training/exposure visits at 8 ICAR institutions and related Krishi Vigyan Kendras (KVKs), chaired by the Joint Secretary (Marine Fisheries), Department of Fisheries, Government of India, New Delhi.	07.02.2025
5.	Annual Review Meeting with the CG Centres convened by Dr. Bikash Mandal, ADG (International Relation), ICAR, DARE, New Delhi.	17.02.2025
6.	XXVIII Meeting of ICAR Regional Committee No. V comprising the States of Delhi, Punjab and Haryana organized by ICAR-IASRI, New Delhi.	18.02.2025
7.	Address by Secretary, DARE & Director General, ICAR personnel of all the ICAR Institutes.	28.02.2025
March 2025		
8.	Review of PMMSY projects under the chairmanship of DDG (FS), ICAR, New Delhi.	05.03.2025
9.	The first meeting for constitution of an expert Committee to update/formulate the guideline of freshwater fish & shellfish hatcheries certification & accreditation in India under the chairmanship of the Joint Secretary (Inland Fisheries), Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India, New Delhi.	05.03.2025
10.	Attended the meeting convened to review the progressive expenditure of ICAR units upto 28 February 2025 with all the SMDs, Institute's Directors, Administrative and Finance heads under the chairmanship of AS&FA, DARE, ICAR, New Delhi.	11.03.2025
11.	Meeting for the financial review of SMD and other important matters under the chairmanship of DDG (FS)	21.03.2025
April 2025		
12.	Meeting with Directors of all ICAR Fisheries institutes under the chairmanship of DDG (Fy), ICAR, New Delhi.	17.04.2025
13.	Meeting with Indian Immunologicals Limited, Telangana for collaboration on fish vaccine development with ICAR-CICFR, Bhimtal.	24.04.2025

14. Meeting to discuss the status of Fisheries Clusters notified under the PMMSY under the chairmanship of The Secretary, Department of Fisheries, Animal Husbandry & Dairying, New Delhi.	30.04.2025
May 2025	
15. Monthly Meeting of SMD under the chairmanship of DDG (Fy.), ICAR, New Delhi.	01.05.2025
16. Meeting on Viksit Krishi Sankalp Abhiyan being organized by ICAR-ATARI Ludhiana.	14.05.2025
17. Meeting on Viksit Krishi Sankalp Abhiyan Team Formation & Codal Formalities being organized by ICAR-ATARI Ludhiana.	17.05.2025
18. Online Interaction with all VKSA teams convened by ICT-ICAR, New Delhi.	24.05.2025
June 2025	
19. Meeting on Viksit Krishi Sankalp Abhiyan being organized by ICAR-ATARI Ludhiana under the chairmanship of DDG (Extension).	07.06.2025
20. Interaction Meeting on Viksit Krishi Sankalp Abhiyan (VKSA) under the chairmanship of Hon'ble Union Minister of Agriculture and Farmers Welfare, Government of India, New Delhi.	24.06.2025
July 2025	
21. Meeting to review the implementation of Aquaculture Insurance, GAIS & Vessel Insurance under ongoing PM-MKSY and PMMSY respectively under the chairmanship of joint Secretary (IF), Ministry of Fisheries, Animal Husbandry and Dairying, Department of Fisheries, New Delhi.	04.07.2025
22. Meeting to discuss the development of fisheries in Amrit Sarovar of all the States/UTs under the chairmanship of Union Secretary (Fisheries), Ministry of Fisheries, Animal Husbandry and Dairying, Department of Fisheries, New Delhi.	16.07.2025
23. Meeting on the institute-wise online presentation of Implementable Action Points with Timeframe for Vision 2050 under the chairmanship of DDG (Fy.), ICAR, New Delhi.	28.07.2025
24. Meeting under the Chairmanship of Hon'ble Minister of Agriculture & Farmers Welfare (HAM) regarding release of 20 th Installment of PM-KISAN Scheme.	30.07.2025
25. Meeting on the institute-wise online presentation of Implementable Action Points with Timeframe for Vision 2050 under the chairmanship of DDG (Fy.), ICAR, New Delhi.	30.07.2025
August 2025	
26. Review and discussion meeting on Satellite Application in Fisheries and Aquaculture under the chairmanship of Secretary (Fisheries), Ministry of Fisheries, Animal Husbandry and Dairying, Department of Fisheries, New Delhi.	04.08.2025
27. Aquaculture insurance issues under PM-MKSSY convened under the chairmanship of Joint Secretary, Department of Fisheries, Government of India.	12.08.2025
28. National Workshop on Transforming Food, Land & Water convened by IISWC Dehradun.	13.08.2025

29. Meeting for constitution of the Coordination Committee for Viksit Krishi Sankalp Abhiyan (Rabi Season) for Uttarakhand organized by ICAR-VPKAS, Almora. 19.08.2025

September 2025

30. 10th lecture of the Matsya Manthan series, titled "Seaweed Aquaculture: Cultivation Technologies, Promises and Challenges in India" delivered by Dr. Shrikumar Suryanarayan, CMD & Co-founder, Sea6 Energy Pvt. Ltd., Bangalore, under the chairmanship of the Secretary, Department of Fisheries, Government of India, Ministry of Fisheries, Animal Husbandry & Dairying, New Delhi. 02.09.2025
31. Meeting with all States/UTs, ICAR institutes and Federations to identify the challenges/reforms for enhancing the production, productivity and seafood exports under the co-chairpersonship of Joint Secretary (Inland Fisheries) and Joint Secretary (Marine Fisheries) Department of Fisheries, Government of India, Ministry of Fisheries, Animal Husbandry & Dairying, New Delhi. 04.09.2025
32. Meeting with all States/UTs, ICAR institutes and Federations to identify the challenges/reforms for enhancing the production, productivity and seafood exports under the chairpersonship of Secretary (Fisheries), Department of Fisheries, Government of India, Ministry of Fisheries, Animal Husbandry & Dairying, New Delhi. 06.09.2025
33. Second Meeting of Working Group on Inland Fisheries and Aquaculture under the chairmanship of the Fisheries Development Commissioner, Department of Fisheries, Government of India, Ministry of Fisheries, Animal Husbandry & Dairying, New Delhi. 08.09.2025
34. Attended 31st Pt. Govind Ballabh Pant Memorial Lecture and Annual Day Function of NIHE, Kosi-Katarmal, Almora. 10.09.2025
35. Meeting regarding implementation of VKSA during RABI season 2025 organized by ICAR-ATARI Ludhiana. 11.09.2025
36. Meeting on National Traceability Framework under PM-MKSSY convened under the chairmanship of Fisheries Development Commissioner, Department of Fisheries, Government of India, New Delhi. 12.09.2025
37. Meeting of VKSA (Rabi) of Uttarakhand organized by ICAR-VPKAS Almora. 12.09.2025
38. Meeting on capacity building programme towards Blue Port Initiatives under Technical Cooperation Programme (TCP) between FAO and Ministry of Fisheries, Animal Husbandry and Dairying (Department of Fisheries). 18.09.2025
39. Meeting of VKSA (Rabi) of Uttarakhand organized by Directorate of Agriculture, Dehradun. 19.09.2025
40. Meeting on Fish Tech for Post-Harvest Management and Value Addition (Inland and Marine Fisheries) under the chairmanship of Secretary, Dept. of Fisheries, Govt. of India, New Delhi at ICAR-Central Institute of Fisheries Technology (ICAR-CIFT), Kochi. 19.09.2025
41. Meeting convened to discuss the conduct of VKSA during RABI season 2025, under the chairmanship of Secretary DARE & DG, ICAR. 24.09.2025

October 2025

42. Preparatory Webinar on Risk Assessment and Risk Management at SBSTTA-27: 01.10.2025

Discussions from an Asia Perspective organized by Korea Institute for Promoting Asia Biosafety Cooperation (KIPABiC) in collaboration with United Nations Environment Programme (UNEP) and the four participating countries: Bangladesh, India, Mongolia, and the Philippines. Biotech Consortium India Limited (BCIL) is associated with KIPABiC as the expert technical agency.	
43. Review meeting of "Pradhan Mantri Dhan Dhaanya Krishi Yojana (PMDDKY)" convened by ICAR-ATARI Ludhiana.	10.10.2025
44. Meeting to discuss the status of Fisheries Clusters of North Eastern region notified under the Pradhan Mantri Matsya Sampada Yojana (PMMSY) under the chairmanship of Secretary, Dept. of Fisheries, Govt. of India, New Delhi.	10.10.2025
45. Launching of Prime Minister Dhan Dhaanya Krishi Yojana (PMDDKY) by Hon'ble Prime Minister at NASC, PUSA, New Delhi.	11.10.2025
46. Meeting to discuss the status of Fisheries Clusters of Inland States/UTs notified under the Pradhan Mantri Matsya Sampada Yojana (PMMSY) under the chairmanship of Secretary, Dept. of Fisheries, Govt. of India, New Delhi.	14.10.2025
47. Meeting to review implementation status of Aquaculture Insurance Component under Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana (PM-MKSSY) under the Chairmanship of Joint Secretary (IF), Department of Fisheries, Govt. of India, New Delhi.	16.10.2025
48. Meeting on Communication Plan under the Chairmanship of Secretary (F), Department of Fisheries, Govt. of India, New Delhi.	22.10.2025
49. Review meeting under the chairmanship of DDG (Fy.), ICAR, New Delhi.	23.10.2025
50. Review meeting on Raigad Cooperative Cluster under the chairmanship of Secretary, Department of Fisheries, Ministry of Fisheries, Govt. of India, New Delhi.	28.10.2025
51. Meeting on QRT assessment of ICAR-CICFR, Bhimtal under the chairmanship of DDG (Fy.), ICAR, New Delhi.	28.10.2025
52. 44 th Meeting of National Committee on Introduction of Exotic Aquatic Species into Indian Waters under the chairmanship of Joint Secretary (IF), Department of Fisheries, Ministry of Fisheries, Govt. of India, New Delhi.	28.10.2025
53. Meeting through video conferencing on preparation of Farmers Conference Programme on the occasion of Rajya Esthapna Rajat jayanti Samaroh at Pantnagar, U.S.Nagar.	28.10.2025
54. Participated in the Inaugural Ceremony of the 21 st Annual Workshop of AICRP on PEASEM as the Guest of Honour at ICAR-VPKAS Almora.	30.10.2025
November 2025	
55. Management of Fisheries and aquaculture in Reservoirs under the Chairmanship of Secretary, Department of Fisheries, GoI, New Delhi.	04.11.2025
56. Interaction meeting with Directors, VCs and Head KVKs under the chairmanship of Secretary DARE & DG ICAR.	14.11.2025
57. Online training on implementation of eOffice Functional File Numbering System (eOfficeFFNS) in ICAR and Record Management System (RMS) convened by Deputy Secretary (ICT), ICAR, New Delhi.	14.11.2025

December 2025	05.12.2025
58. Meeting on the topic "Artificial reproduction and nursery rearing of common carp" delivered by Dr. Kovacs Gyula, Gene Bank Incharge & Associate Professor, NAIC-HAKI, Szarvas, Hungary.	
59. Meeting on National Framework on Traceability in Fisheries & Aquaculture under PM-MKSSY convened by the Department of Fisheries, Ministry of Fisheries, Animal Husbandry & Dairying, New Delhi.	08.12.2025
60. Attended 1 st Management committee meeting of Kendriya Vidyalaya, Bhimtal as CJEWCC Member.	08.12.2025
61. Meeting to discuss progress of i-GOT courses by ICAR employees and preparation of Domain Specific Courses related to Agriculture and Allied Science for hosting on i-GOT Karmayogi Platform under Mission Karmayogi, under the chairmanship of Secretary DARE & DG, ICAR, New Delhi.	08.12.2025
62. Online training session on TA/Hybrid TSA module in PFMS convened by PFMS Training Division, Min. of Finance, Deptt of Expenditure, O/o CGA, Govt. of India, New Delhi.	17.12.2025
63. Meeting convened by DDG (F.S), ICAR, New Delhi.	17.12.2025
64. Aquaculture Insurance issues under PM-MKSSY under the chairmanship of Joint Secretary, DoF, GoI, New Delhi.	18.12.2025
65. Webinar on 'Automation and Digital Fishing Ports' for Capacity Building convened by the Department of Fisheries, Ministry of Fisheries, Animal Husbandry & Dairying, New Delhi.	18.12.2025
66. Meeting on National Framework on Traceability in Fisheries & Aquaculture under PM-MKSSY convened by the Department of Fisheries, Ministry of Fisheries, Animal Husbandry & Dairying, New Delhi.	19.12.2025
67. Meeting with the Secretary DARE & DG ICAR in connection with Viksit Bharat-Guarantee for Rozgar and Aajeevika Mission (Gramin) Bill, 2025 (VB-G RAM G Bill) on the occasion of Kisan Samman Diwas (Swachhata Pakhwada).	22.12.2025
68. Programme on Viksit Bharat-Guarantee for Rozgar and Aajeevika Mission (Gramin) Bill, 2025 (VB-G RAM G Bill) on the occasion of Kisan Samman Diwas (Swachhata Pakhwada).	23.12.2025

17.2 Participation in meetings/seminars/conferences/workshops

- Dr. Ciji Alexander attended 12th International Conference on "Emerging Issues in Agricultural, Food Technology, Biological & Applied Sciences for Global Development-2025" and presented an abstract entitled 'Effects of a formulated diet on growth and digestive enzyme activities in *Tor putitora* larvae' during 15-17 November 2025 at Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan.
- Dr. Ciji Alexander attended 14th Asian Fisheries and Aquaculture Forum (14th AFAF) and presented an abstract entitled 'Broodstock nutrition improves reproductive performance and larval quality traits of golden mahseer, *Tor putitora* (Abstract No. TS-5-008)' during 12-15 February 2025 at NASC Complex, New Delhi.
- Dr. Ciji Alexander attended 4th Biotechnology Conclave and International Conference on "Strategies for Sustainable Agriculture, Environment & Health for Viksit Bharat" and presented an abstract

entitled 'Effects of dietary soy lecithin on biochemical responses and thermal tolerance of golden mahseer, *Tor putitora*' during 03-05 February 2025 at Biotech Bhavan, Haldi, Pantnagar, Uttarakhand.

- Dr. Ciji Alexander attended XVII Agricultural Science Congress and presented an abstract entitled 'A cocktail of micronutrients and additives influence sperm quality traits in chocolate mahseer, *Neolissochilus hexagonolepis*' during 20-22 February 2025 at G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand.
- Dr. Ciji Alexander attended 5th Biotechnology Conclave cum International Conference on "Harnessing Biotechnology for Sustainable BioE3 Future" and presented an abstract entitled 'Influence of broodstock origin on egg and larval quality of golden mahseer (*Tor putitora*)' during 19-21 November 2025 at Uttarakhand Council of Biotechnology, Patwadangar, Nainital, Uttarakhand.
- Dr. Ciji Alexander participated in Viksit Krishi Sankalp Abhiyan from 29 May to 12 June 2025.
- Dr. Ciji Alexander attended meeting (online) on National Framework on Traceability in Fisheries & Aquaculture under PM-MKSSY convened by the Department of Fisheries, Ministry of Fisheries, Animal Husbandry & Dairying, New Delhi on 19 December 2025.
- Dr. D. Thakuria and Dr. Kh. Victoria Chanu participated in the celebration of World Fisheries Day on 21 November 2025 at Sushma Swaraj Bhawan, Chanakyapuri, New Delhi.
- Dr. D. Thakuria attended Capacity Building Programme under TCP between FAO and Ministry of Fisheries, Animal Husbandry and Dairying [Department of Fisheries] towards Blue Port Initiatives on 18 September 2025.
- Dr. D. Thakuria attended virtual meeting on "To discuss the status of Fisheries Clusters of North Eastern Region notified under PMMSY" on 10 October 2025.
- Dr. D. Thakuria participated in the pre-Kharif season "Viksit Krishi Sankalp Abhiyan" organized from 29 May to 12 June 2025.
- Dr. Kh. Victoria Chanu and Dr. Ciji Alexander attended Meeting of committee on National Traceability Framework under the chairmanship of Fisheries Development Commissioner on 12 September 2025 through online mode.
- Dr. Kh. Victoria Chanu and Dr. Ciji Alexander attended two-day in-person meeting of committee on National Traceability Framework held on 18-19 September 2025 at Chanderlok Building, Janpath, New Delhi.
- Dr. Kh. Victoria Chanu participated and presented paper on "Anti-oomycete potential of *Pseudomonas fluorescens*: A molecular docking and in vitro analysis against *Saprolegnia*" in 14th Asian Fisheries and Aquaculture Forum held at NASC Complex, New Delhi during 12-15 February 2025.
- Dr. Kh. Victoria Chanu participated and presented paper on "PNA-based visual biosensor for rapid pathogen detection" in International Conference on "Envisioning Livestock Production and Protection under the One Health Landscape (VIBCON 2025)" held at ICAR-IVRI, Mukteswar Campus during 06-08 November 2025.
- Dr. Kh. Victoria Chanu participated and presented paper on "Targeted PCR detection and inhibitory effects of organic acids on *Saprolegnia* species" in XVII Agricultural Science Congress-2025 held at GBPUAT, Pantnagar during 20-22 February 2025.
- Dr. Kh. Victoria Chanu participated in the pre-Kharif season "Viksit Krishi Sankalp Abhiyan" organized from 29 May to 12 June 2025.
- Dr. Kishor Kunal attended a virtual meeting on the Import of New Strains of Common Carp from Hungary on 10 October 2025.

- Dr. Kishor Kunal attended a webinar/workshop on eHRMS2.0 & e-Office on 17 July 2025.
- Dr. Kishor Kunal attended an online meeting on Coldwater Fisheries Insurance with Secretary (Fisheries), Ministry of Fisheries, GoI on 12 August 2025.
- Dr. Kishor Kunal attended an online meeting on establishment of Processing and Value Addition facility at ICAR-CICFR, Bhimtal with ICAR-CIFT on 04 August 2025.
- Dr. Kishor Kunal attended an online meeting on the preparation of Vision-2050 with DDG (Fisheries) from 28-31 July 2025.
- Dr. Kishor Kunal attended the Fish Farmer's Day programme at ICAR-CICFR, EFF, Champawat on 10 July 2025.
- Dr. Kishor Kunal attended the Kisan Samman Nidhi (Hon'ble PM programme) on 02 August 2025.
- Dr. Kishor Kunal attended the PM Kisan Dhan Dhanya (Hon'ble PM programme) on 11 October 2025.
- Dr. Kishor Kunal participated in a Farmer's Meet, Demonstration, and Input Distribution Programme conducted for farmers of Pithoragarh district on 29 March 2025.
- Dr. Kishor Kunal participated in Input Distribution Programme conducted at ICAR-CICFR, Experimental Fish Farm, Champawat under SCSP for farmers of Pithoragarh district on 13 January 2025. A total of 19 farmers participated in the programme.
- Dr. Kishor Kunal participated in Input Distribution Programme conducted for farmers of Champawat and Pithoragarh district on 24 May 2025.
- Dr. Kishor Kunal participated in Input Distribution Programme conducted on 12 November 2025 for 26 carp farmers of Champawat district.
- Dr. Kishor Kunal participated in Input Distribution Programme conducted at Pithoragarh on 28 November 2025 for 20 carp farmers of Pithoragarh district.
- Dr. Kishor Kunal participated in Input Distribution Programme conducted at Pithoragarh on 29 November 2025 for 20 trout farmers of Pithoragarh district.
- Dr. Kishor Kunal participated in Viksit Krishi Sankalp Abhiyan from 29 May to 12 June 2025.
- Dr. M. S. Akhtar attended 14th Asian Fisheries and Aquaculture Forum (14 AFAF) during 12-15 February 2025 at NASC Complex, New Delhi and delivered an oral presentation on 'Exploring age-dependent fertility traits in male golden mahseer (*Tor putitora*) brooders for improved hatchery efficiency (Abstract No. TS-2-014).
- Dr. M. S. Akhtar attended two-day National Workshop on "Species prioritization in aquaculture and genetic improvement" during 01-02 September 2025, jointly organized by ICAR-Central Institute of Freshwater Aquaculture, Bhubaneswar and Asian Fisheries Society Indian Branch (AFSIB), Mangalore, at ICAR-CIFA, Kausalyaganga, Bhubaneswar.
- Dr. M. S. Akhtar participated in Viksit Krishi Sankalp Abhiyan from 29 May to 12 June 2025.
- Dr. Neetu Shahi as a member of International Veterinary Vaccinology Network attended meeting of IVVN on 10 December 2025 via online mode.
- Dr. Neetu Shahi attended online meeting with India Immunological Limited, Telangana, Hyderabad, India for collaboration on *Lactococcus garvieae* vaccine development for ICAR-CICFR, Bhimtal, India. Meeting was attended by Dr. Amit Pande (Director, ICAR-CICFR, Bhimtal), Inventor Dr. Neetu Shahi and Dr. R. S. Patiyl & Dr. Biju Sam Kamalam (Member ITMU).
- Dr. Neetu Shahi attended online presentation for new project under the CRP on vaccine and diagnostics (CRPVD) on 29 October 2025 via online mode.

- Dr. Neetu Shahi attended Symposium on "Aquatic Animal Diseases: Emerging Challenges and Preparedness" on 13 February 2025 at NASC complex, New Delhi during 14th AFAF.
- Dr. Neetu Shahi attended the 44th meeting of National Committee on Introduction of Exotic Aquatic Species into Indian Waters on 28 October 2025 at 02:30 pm. The meeting was attended in online mode.
- Dr. Neetu Shahi attended the meeting and gave presentation of her project for ICAR National Fellow at KAB II of ICAR, New Delhi, India on 04 August 2025.
- Dr. Neetu Shahi attended the progress review meeting of DBT on 15 May 2025 via online mode.
- Dr. Neetu Shahi gave oral presentation on topic "First report of *Lactococcus petauri* infection in farmed rainbow trout *Oncorhynchus mykiss* of India: A comprehensive phenotypic and genomic characterization" at World Aquaculture 2025 India at Hyderabad, Telangana, from 10-13 November 2025.
- Dr. Neetu Shahi participated and presented a research paper titled "An Immersion Vaccine Against Zoonotic Fish Pathogen *Lactococcus garvieae* for Coldwater Fish Rainbow Trout (*Oncorhynchus mykiss*) of India" in the 14th AFAF organized by the AFS, Kuala Lumpur, Malaysia; ICAR, New Delhi; Dept of Fisheries, Govt of India held at ICAR Convention Centre, NASC complex, New Delhi during 12-15 February 2025.
- Dr. Neetu Shahi, as member attended the meeting of Registration, Reception and Certificates Committee of 14AFAF with DDG (Fisheries Science) on 01 February 2025 at 02:30 pm via Zoom.
- Dr. P. A. Ganie attended the XVII Agricultural Science Congress organized during 20-22 February 2025 at G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India.
- Dr. P. A. Ganie presented a paper (Virtually) on "Terrain-dependent accuracy evaluation of digital elevation models in a high-altitude Western Himalayan river basin for environmental modelling applications" in the World Congress on Climate Change and its effects (CCIE-2025) at Central College, Kathmandu, Nepal, on 06-08 September 2025.
- Dr. Pankaj Kumar participated in Viksit Krishi Sankalp Abhiyan from 29 May to 12 June 2025.
- Dr. Rajesh M attended the Transforming UK Food Systems Programme (TUFKS) annual conference during 06-07 January 2025 at York University, UK.
- Dr. Rajesh M attended the World Aquaculture Conference in Hyderabad from 11-13 November 2025 and presented research titled "Fish in Murky Waters: Exposure to Acute Siltation Triggers Stress, Oxidative Imbalance, and Gill Tissue Damage in Rainbow Trout Juveniles."
- Dr. Renu Jethi attended and presented a poster on the topic "Trout farming as a livelihood option in Himalayan Region: Opportunities and constraints" in XVII Agricultural Science Congress, 20-22 February 2025 at G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India.
- Dr. S. Ali attended a meeting on Coldwater Insurance with NFDB, Hyderabad on 04 July 2025.
- Dr. S. Ali attended a meeting on the organization of PMKDDY programme with ATARI, Ludhiana on 10 October 2025.
- Dr. S. Ali attended a meeting with DDG (Fisheries Science) from 29-30 September 2025.
- Dr. S. Ali attended a virtual meeting on the Import of New Strains of Common Carp from Hungary on 10 October 2025.
- Dr. S. Ali attended a webinar/workshop on eHRMS2.0 & e-Office on 17 July 2025.
- Dr. S. Ali attended an online lecture on Seaweed Aquaculture organized by the Ministry of Fisheries

under the Matsya Manthan Series on 02 September 2025.

- Dr. S. Ali attended an online meeting of DG, ICAR on the Release of the 21st Instalment of PM Kisan Samman Nidhi on 14 November 2025.
- Dr. S. Ali attended an online meeting on Amrit Sarovar organized by the Ministry of Fisheries, GoI on 16 July 2025.
- Dr. S. Ali attended an online meeting on Coldwater Fisheries Insurance with Secretary (Fisheries), Ministry of Fisheries, GoI on 12 August 2025.
- Dr. S. Ali attended an online meeting on Coldwater Fisheries Insurance chaired by Joint Secretary (Fisheries), Department of Fisheries, Ministry of Fisheries.
- Dr. S. Ali attended an online meeting on EFC Preparation with SMD (Fisheries Science) on 11 August 2025.
- Dr. S. Ali attended an online meeting on EFC with DDG (Fisheries Science) on 01 October 2025.
- Dr. S. Ali attended an online meeting on Farmer's Training programme organized by the Department of Fisheries, Ministry of Fisheries on 07 February 2025.
- Dr. S. Ali attended an online meeting on Hatchery Accreditation and Seed Certification with DDG (Fisheries Science) on 17 April 2025.
- Dr. S. Ali attended an online meeting on Inland Export with the Ministry of Fisheries, GoI on 22 August 2025.
- Dr. S. Ali attended an online meeting on PMMSY-Phase-II with Dr. Sagar Mehra, Joint Secretary (Fisheries Inland) on 14 August 2025.
- Dr. S. Ali attended an online meeting on Space Application with Secretary (Fisheries), Ministry of Fisheries, GoI on 04 August 2025.
- Dr. S. Ali attended an online meeting on Technical Cadre Issues with DDG (Fisheries Sciences) on 17 December 2025.
- Dr. S. Ali attended an online meeting on Technology Certification with SMD (Fisheries Sciences) on 22 May 2025.
- Dr. S. Ali attended an online meeting on the Establishment of Processing and Value Addition with CIFT on 04 August 2025.
- Dr. S. Ali attended an online meeting on the preparation of Vision-2050 with DDG (Fisheries) from 28-31 July 2025.
- Dr. S. Ali attended an online meeting on the QRT of the Institutes with DDG (Fisheries Science) on 28 October 2025.
- Dr. S. Ali attended an online meeting on the VB-G Ram G programme and Kisan Diwas chaired by DG, ICAR.
- Dr. S. Ali attended an online meeting on the Working Group for Traceability with the Ministry of Fisheries, GoI on 01 September 2025.
- Dr. S. Ali attended an online meeting on VKSA – Rabi with ICAR-VPKAS, Almora on 19 August 2025.
- Dr. S. Ali attended an online meeting on VKSA Review with Hon'ble Minister of AF&W, GoI on 24 June 2025.
- Dr. S. Ali attended an online meeting on VKSA with DG, ICAR on 24 September 2025.
- Dr. S. Ali attended an online meeting with the Ministry of Agriculture on 31 July 2025.
- Dr. S. Ali attended DG, ICAR's online meeting on Various ICAR Issues on 28 October 2025.



- Dr. S. Ali attended DG's online meeting on the Hon'ble PM programme at NASC on 09 October 2025.
- Dr. S. Ali attended meetings on Fisheries Cluster Development with the Ministry of Fisheries on 10 and 14 October 2025.
- Dr. S. Ali attended meetings with DDG (Fisheries Science) on EFC Presentation on 16 and 23 October 2025.
- Dr. S. Ali attended online meetings on Production, Productivity, and Export in Inland Fisheries with the Ministry of Fisheries on 04 and 06 September 2025.
- Dr. S. Ali attended the 14th AFAF, New Delhi at NASC Complex from 12-15 February 2025.
- Dr. S. Ali attended the 17th Agriculture Science Congress at GBPUA&T, Pantnagar, Uttarakhand from 20-22 February 2025.
- Dr. S. Ali attended the Hon'ble PM's programme on VB-G Ram G & Kisan Diwas on 23 December 2025.
- Dr. S. Ali attended the Kisan Samman Nidhi – Hon'ble PM programme on 02 August 2025.
- Dr. S. Ali attended the official programme for the release of the book 'Meri Yojna' by Hon'ble Governor Uttarakhand at Rajbhawan, Dehradun on 24 February 2025.
- Dr. S. Ali attended the online 44th Meeting of the National Committee on Introduction of Exotics in India on 28 October 2025.
- Dr. S. Ali attended the PM Kisan Dhan Dhanya – Hon'ble PM programme on 11 October 2025.
- Dr. S. Ali participated in Viksit Krishi Sankalp Abhiyan from 29 May to 12 June 2025.
- Dr. S. Chandra attended an online meeting of MoFAH&D on 10 October 2025 on Clusters in Northeastern to discuss the status of Fisheries Clusters of North Eastern Region notified under PMMSY.
- Dr. S. Chandra attended online meeting of MoFAHD on Fisheries Cluster on 14 October 2025.
- Dr. S. Chandra attended Pradhan Mantri Dhan Dhanya Krishi Yojna (PMDDKY) on 11 October 2025.
- Dr. S. Chandra attended the e-office online training on 17 July 2025.
- Dr. S. Chandra attended the meeting convened by DDG to finalize the hatchery accreditation on 17 April 2025.
- Dr. S. Chandra attended the VC Meeting on Development of Fisheries in Amrit Sarovar Ponds on 16 July 2025 convened by Secretary, MoFAD.
- Dr. S. Chandra attended the virtual Consultation Meeting on PMMSY Phase-II on 14 August 2025.
- Dr. S. Chandra attended the virtual meeting on proposed ICAR All India Network Project on "Alternate therapeutics for responsible aquaculture" on 05 August 2025.
- Dr. S. Chandra attended two meetings of MoFA&D on 10 February 2025 and 20 February 2025 to finalize the proposed skill development programme for the upland states.
- Dr. S. Chandra under the Chairmanship of D.G., attended the online iGOT Karmyogi Meeting on 08 December 2025.
- Ms. Garima attended a webinar/workshop on eHRMS2.0 & e-Office on 17 July 2025.
- Ms. Garima attended an online meeting on establishment of Processing and Value Addition facility at ICAR-CICFR, Bhimtal with ICAR-CIFT on 04 August 2025.
- Ms. Garima attended an online meeting on the preparation of Vision-2050 with DDG (Fisheries)

from 28-31 July 2025.

- Ms. Garima attended the Kisan Samman Nidhi (Hon'ble PM programme) on 02 August 2025.
- Ms. Garima attended the PM Kisan Dhan Dhanya (Hon'ble PM programme) on 11 October 2025.
- Ms. Garima participated in a Farmer's Meet, Demonstration, and Input Distribution Programme conducted for farmers of Pithoragarh district on 29 March 2025.
- Ms. Garima participated in Input Distribution Programme conducted at ICAR-CICFR, Experimental Fish Farm, Champawat under SCSP for farmers of Pithoragarh district on 13 January 2025. A total of 19 farmers participated in the programme.
- Ms. Garima participated in Input Distribution Programme conducted for farmers of Champawat and Pithoragarh district on 24 May 2025.
- Ms. Garima participated in Viksit Krishi Sankalp Abhiyan from 29 May to 12 June 2025.

17.3 Participation in training

- Dr. Kishor Kunal attended a training programme on "Recent Advances in Natural farming" jointly organized by ICAR-NCIPM and MANAGE from 06-10 January 2025.
- Dr. Neetu Shahi attended "Orientation workshop on Mission Karmayogi" being organized by DARE/ICAR on 27 February 2025 at A. P. Shinde Symposium Hall, NASC Complex, New Delhi.
- Dr. Rajesh M completed Postdoctoral Fellowship in Recirculating Aquaculture System on the research topic "Impact of elevated environmental carbon dioxide and nitrate levels on king prawns in recirculating aquaculture system" at University of Exeter, United Kingdom from April 2024 to July 2025, funded by UK-Research & Innovations-Biotechnology and Biological Sciences Research Council.
- Dr. S. Ali attended online training program on "Impactful AI tools in Agriculture" organized by ICAR-NAARM from 15-19 September 2025.

17.4 Participation in exhibition

- Dr. M. S. Akhtar participated in the exhibition at the 14th Asian Fisheries and Aquaculture Forum held from 12-15 February 2025 at the NASC Complex, New Delhi.
- Dr. Renu Jethi and Dr. Ciji Alexander participated in exhibition of institute technologies in 4th Biotechnology Conclave and International Conference on Strategies for Sustainable Agriculture, Environment and Health for Viksit Bharat during 03-05 February 2025 at Biotech Bhawan, Haldi, Pantnagar.
- Dr. Renu Jethi and Mr. Santosh Kumat participated in exhibition of institute technologies in 17th Agricultural Science Congress Agro-Expo during 20-22 February 2025 at GBPUA&T, Pantnagar.
- Dr. Renu Jethi and Mr. Vivek Pandey participated in exhibition of institute technologies in Farmer's fair at ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora on 03 October 2025.



18. Library and Documentation Services

18.1 Library Procurement and Holdings

The ICAR-CICFR library and documentation unit serves as a repository of literature, providing up-to-date information in fisheries and allied subjects.

The library currently holds ~7611 books, ~1700 volumes of foreign journals, ~550 volumes of Indian journals and more than 9000 other publications. The library provides services to the institute's scientists and other staff members apart from scholars, researchers, students and other stakeholders from local organizations interested in the scientific literature on coldwater fisheries and allied subjects. As part of the One Nation One Subscription (ONOS) initiative, the library offers users access to a broad range of e-resources through the ONOS platform.

18.2 Library automation

The library maintained the records of books, journals, bulletins etc. in the KOHA Library Software. The software currently holds more than 7500 records. The bar-coding of books and periodicals are actively being done. The digitalization work of the institute's in-house publications has been done and hosted in the Institute's website.

18.3 Exchanges services

The library maintained exchange relationships with various research organizations and institutes of national and international reputation. The annual reports, newsletters, special publications and technical bulletins published from time to time have been mailed to more than 100 organizations/ institutions, Directors of the Department of Fisheries, Deans College of Fisheries, and other stakeholders.

18.4 Documentation section

The documentation section of the library is entrusted with the responsibility of publishing in-house publications such as scientific bulletins, brochures, pamphlets, annual reports, newsletters, monographs etc., through the GeM portal. During the year, this section published one annual report for 2024, two training manuals, a Newsletter, and a Hindi magazine (Himjyoti).



ICAR-CICFR's in-house publications during the year 2025



19. Important Committees

19.1 Members of Research Advisory Committee (01.01.2023 to 31.12.2025)

Dr. A.G. Ponniah Former Director, ICAR-CIBA & ICAR-NBFGR	Chairman
Dr. B.P. Mohanty ADG (I.Fy.), ICAR, New Delhi	Member
Dr. Kuldeep Kumar Former Principal Scientist, ICAR-CIFA, Bhubaneswar	Member
Dr. K.D. Joshi Former Principal Scientist, ICAR-NBFGR, Lucknow	Member
Dr. Ashoktaru Barat Former Principal Scientist, ICAR-CIFA, Bhubaneswar	Member
Dr. P. Mukhopadhyay Professor & Head, Department of Economics, Goa University, Goa	Member
Dr. Amit Pande Act. Director, ICAR-CICFR, Bhimtal	Member
Dr. Shahnawaz Ali Principal Scientist, ICAR-CICFR, Bhimtal	Member Secretary

19.2 Members of Institute Management Committee (From 09.07.2025 onwards)

Dr. Amit Pande, Director (Act.) ICAR-CICFR, Bhimtal	Chairman
The Director Department of Fisheries, Government of Uttarakhand, Badasi Grand Dhanyari, Rajpur Road, Dehradun-248008, Uttarakhand	Member
Dr. Devika Pillai, Assistant Director General (I.Fy.), Indian Council of Agricultural Research, Krishi Anusandhan Bhawan – II, PUSA, New Delhi - 110012	Member
The Vice Chacellor, G.B. Pant University of Agriculture & Technology, Pantnagar – 263145, US Nagar, Uttarakhand	Member
The Director of Fisheries, UT of Ladakh, Leh - Ladakh	Member
Dr. Neeraj Sood, Pr. Scientist, ICAR-NBFGR, Canal Ring Road, P.O. Dilkusha, Telibagh, Lucknow – 226002, Uttar Pradesh	Member
Dr. A.K. Prusty, Pr. Scientist, ICAR -IIFSR, Modipuram, Meerut, Uttar Pradesh	Member
Dr. M. Muruganandam, Pr. Scientist, ICAR-IISWC, Dehradun, Uttarakhand	Member
Dr. (Mrs.) Prabhati K. Sahoo, Former Pr. Scientist, ICAR-CIFA, Bhubaneshwar, Odisha	Member
Smt. Khilawati Rawat, Sr. Administrative Officer, ICAR -CICFR, Bhimtal	Member Secretary
Sh. D.C. Sati, Sr. Finance & Accounts Officer, ICAR -CICFR, Bhimtal	Special Invitees
Sh. A.K. Sinha, Astt. Administrative Officer, ICAR -CICFR, Bhimtal	"
Sh. P.C. Tewari, Astt. Administrative Officer, ICAR -CICFR, Bhimtal	"
Sh. Jaideep Gulia, Assistant, ICAR-CICFR, Bhimtal	"

19.3 Members of Prioritization Monitoring & Evaluation Cell (From 22.04.2025 onwards)

Dr. Shahnawaz Ali, Principal Scientist	In-charge
Dr. Kh. Victoria Chanu, Senior Scientist	Member
Dr. M.S. Akhtar, Senior Scientist	Member
Sh. Amit Kumar Saxena, Sr. Technical Officer	Technical support
Smt. Susheela Tewari, Principal Private Secretary	Secretarial assistance

19.4 Members of Prioritization Monitoring & Evaluation Committee (From 22.04.2025 onwards)

Dr. Amit Pande, Director (Act.)	Chairman
Dr. Suresh Chandra, Head & Principal Scientist	Member
Dr. R.S. Patiyal, Principal Scientist	Member
Sh. S.K. Mallik, Scientist (SS)	Member
Dr. Shahnawaz Ali, Principal Scientist	Member Secretary

19.5 Members of Institute Technology Management Committee (From 10.04.2024 onwards)

Dr. Amit Pande, Director (Act.)	Chairman
Dr. Veena Pande, Head, Dept. of Biotechnology, Kumaon, University, Bhimtal Campus.	External Member
Dr. Shahnawaz Ali, Principal Scientist	Member
Dr. Neetu Shahi, National Fellow	Member
Dr. M.S. Akhtar, Senior Scientist	Member
Dr. Biju Sam Kamalam, Senior Scientist (till 22 nd May 2025)	Member
Dr. R.S. Patiyal, Principal Scientist	Member Secretary

19.6 Members of Institute Technology Management Unit (From 30.10.2025 onwards)

Dr. R.S. Patiyal, Principal Scientist	In-charge
Dr. Biju Sam Kamalam, Senior Scientist (till 22 nd May 2025)	Member
Dr. Rajesh M, Senior Scientist (from October 2025 onwards)	Member
Dr. Ananya Khatei, Scientist (from October 2025 onwards)	Member

19.7 Members of Agricultural Knowledge Management Unit (From 18.04.2024 onwards)

Sh. Amit Kr. Saxena, Sr. Technical Officer	In-charge
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19.8 ARMS

Dr. Shahnawaz Ali, Principal Scientist	In-charge
Sh. Amit Kr. Saxena, Sr. Technical Officer	Technical support

19.9 Library Advisory Committee (From 23.04.2025 onwards)

Dr. Amit Pande, Director (Act.)	Chairman
Dr. Shahnawaz Ali, Principal Scientist	Member
Dr. Renu Jethi, Senior Scientist	Member
Dr. Ciji Alexander, Senior Scientist	Member
Smt. Khilawati Rawat, Senior Administrative Officer	Member
Sh. Santosh Kumar, Astt. Chief Technical Officer	Member Secretary

19.10 Institute Joint Staff Council (From 04.07.2025 onwards)

Official side	
Dr. Amit Pande, Director (Act.)	Chairman
Sh. S.K. Mallik, Scientist (SS)	Member
Dr. R.S. Patiyal, Principal Scientist	Member
Smt. Khilawati Rawat, Sr. Administrative Officer	Member
Sh. D.C. Sati, Sr. Finance & Accounts Officer	Member
Smt. Susheela Tewari, Principal Private Secretary	Member Secretary
Staff side	
Sh. Pratap Singh Bisht, Assistant	Secretary, CJSC
Sh. H.S. Bhandari, UDC	Member
Sh. T. M. Sharma, Technical Officer (till 30 th November 2025)	Member Secretary
Sh. R.K. Arya, Technical Officer	Member
Sh. Manoj Kumar, MTS	Member
Sh. Ravinder Kumar, MTS	Member

19.11 Institute Biosafety Committee (From 09.10.2025 onwards)

Dr. Amit Pande, Director (Act.)	Chairman
Dr. Manish Mahawar, Principal Scientist, Division of Biochemistry, ICAR-IVRI, Izatnagar (from 9 th October, 2025 onwards)	External Expert
Dr. Kaushal Kishor Rajak, Principal Scientist, Division of Biological Products, ICAR-IVRI, Izatnagar (from 9 th October, 2025 onwards)	External Expert
Dr. M.A. Ramakrishnan, Acting Head & Pr. Scientist Division of Virology, ICAR-IVRI, Mukteshwar (till 8 th October, 2025)	DBT Nominee
Dr. A.B. Pandey, Professor, School of Biological sciences, Faculty of Rural Management Sustainability, Dev Sanskriti Vishwavidyalaya, Haridwar (till 8 th October, 2025)	External Expert
Dr. Sujoy Kumar Dhara, Pr. Scientist Division of Veterinary Biotechnology, ICAR-IVRI, Izatnagar (till 8 th October, 2025)	External Expert

Col. (Dr.) C. S. Rawat, MBBS, DPH, FRIPHH (till 8 th October, 2025)	Biosafety Officer
Dr. Tarun Kumar Tamta, Principal Medical Superintendent, BD Pandey District Hospital, Nainital (from 9 th October, 2025 onwards)	Biosafety Officer
Dr. Neetu Shahi, National Fellow (from 9 th October, 2025 onwards)	Member Secretary
Dr. Kh. Victoria Chanu, Senior scientist (till 8 th October, 2025)	Member Secretary
Dr. Shahnawaz Ali, Principal Scientist (till 8 th October, 2025)	Internal Expert
Dr. Biju Sam Kamalam, Sr. Scientist (till 22 nd May, 2025)	Internal Expert

19.12 Institutional Animal Care & Use Committee (From 22.04.2025 onwards)

Dr. Amit Pande, Director (Act.)	Chairman
Dr. Shahnawaz Ali, Principal Scientist	Member
Dr. Dimpal Thakuria, Senior Scientist	Member
Dr. Ananya Khatei, Scientist	Member
Dr. Ciji Alexander, Senior Scientist	Member Secretary

19.13 Store Purchase Advisory Committee (From 20.12.2021 onwards)

Dr. Neetu Shahi, National Fellow (till 6 th November, 2025)	Chairman
Sh. S. K. Mallik, Scientist (SS) (from 7 th November, 2025 onwards)	Chairman
Dr. Kh. Victoria Chanu, Senior Scientist	Member
Dr. Parvaiz Ahmad Ganie, Scientist	Member
Sh. D.C. Sati, Sr. Finance & Accounts Officer	Member
Smt. Khilawati Rawat, Sr. Administrative Officer	Member
Sh. A.K. Sinha, Astt. Administrative Officer	Member Secretary

19.14 Aadhar Enabled Biometric Attendance System Committee

Sh. Amit Kr. Saxena, Sr. Technical Officer	Nodal Officer
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19.15 Women Cell Committee (From 11.12.2023 onwards)

Dr. Renu Jethi, Senior Scientist	In-charge
Dr. Neetu Shahi, Senior Scientist	Member
Dr. Kh. Victoria Chanu, Senior Scientist	Member
Dr. Ciji Alexander, Senior Scientist	Member
Smt. Susheela Tewari, Principal Private Secretary	Member
Sh. Amit Kumar Saxena, Sr. Technical Officer	Member

19.16 Internal Committee / Women Complaint Committee (From 23.04.2025 onwards)

Dr. Neetu Shahi, Senior Scientist (till 25 th November, 2025)	Chairman
Dr. Kh. Victoria Chanu, Senior Scientist (from 26 th November, 2025 onwards)	Chairman

Dr. Renu Jethi, Senior Scientist	Member
Smt. Khilawati Rawat, Sr. Administrative Officer	Member
Smt. Chayanika Sah Bisht, Director, Kumaon Community College, Ranikhet	External Member
Dr. Suresh Chandra, Head & Principal Scientist	Member
Sh. Amit Kumar Saxena, Sr. Technical Officer	Member

19.17 Committee for CORPUS Fund (From 17.04.2025 onwards)

Dr. Amit Pande, Director (Act.)	Chairman
Dr. Suresh Chandra, Head & Principal Scientist	Member
Dr. R.S. Patiyal, Principal Scientist	Member
Dr. Shahnawaz Ali, Principal Scientist	Member
Smt. Khilawati Rawat, Sr. Administrative Officer	Member
Sh. D.C. Sati, Sr. Finance & Accounts Officer	Member

19.18 Technical Evaluation Committee (From 10.12.2025 onwards)

Sh. S.K. Mallik, Scientist (SS) (till 9 th December 2025)	Chairman
Dr. Shahnawaz Ali, Principal Scientist (from 10 th December 2025 onwards)	Chairman
Dr. Dimpal Thakuria, Senior Scientist	Member
Dr. Ciji Alexander, Senior Scientist	Member
Dr. Parvaiz Ahmad Ganie, Scientist (SS)	Member





20. Gender Research and Extension

Gender research and extension activities at ICAR-Central Institute of Coldwater Fisheries Research are aimed at promoting inclusive and equitable participation of women in the coldwater fisheries sector through research, capacity building, and outreach initiatives. Recognizing the vital role of women in fisheries and allied activities, the institute has undertaken focused efforts to integrate gender perspectives into research and extension programmes, thereby enhancing livelihood opportunities, decision-making capacity, and socio-economic empowerment of women stakeholders.

20.1 Gender fact sheet

		Male	Female
1. Staff Details (as on 31 st December, 2025)	RMP	-	-
	Project Coordinators/Head of Divisions/ Heads of Regional Stations	02	-
	Scientific	09	06
	Technical	06	-
	Administrative	07	03
2. Budget details (Rs. in Lakh; financial year 2024-25)			
a. Annual Budget		827.98	
b. Budget Utilized		827.97	
c. Gender Budget		37.83 towards women welfare	
d. Gender Budget Utilized		37.83	

20.2 Women's participation in various programmes

During the year, ICAR-CICFR organized several programmes such as input distribution and awareness campaigns, demonstrations, exposure visits, and extension activities at its headquarters in Bhimtal as well as at the Experimental Field Centre, Champawat. These programmes were aimed at disseminating scientific knowledge, promoting sustainable coldwater fisheries practices, and enhancing the livelihood opportunities of fish farming communities in the region. Special emphasis was given to encourage the participation of women fish farmers and a significant number of women actively participated in these programmes as listed below:

S. No	Name of Event/Activity (like Seminars, fairs, discussions, runs, competitions, etc. organized)	Total Participants	Women Participants
1.	Training-cum-input distribution program on “Rainbow trout broodstock and health management” on 28 January 2026 at Mandi, Himachal Pradesh	25	2
2.	Training-cum-input distribution program on “Rainbow trout broodstock and health management” on 29 January 2026 at Kullu, Himachal Pradesh	25	3
3.	One day training program on Entrepreneurship development through backyard farming of rainbow trout and ornamental fish and input distribution at Munsyari, District- Pithoragarh, Uttarakhand organized by ICAR-CICFR, Bhimtal on 21 Feb 2026	27	2
4.	Live telecast of releasing the 22 nd installment of PM-Kisan Samman Nidhi on 13 March 2026	98	15

5.	Training-cum-exposure visit of B.F.Sc students of college of Fisheries and Research Institute, Thoothukudi T.N on 24 February 2026 at ICAR-CICFR, Bhimtal	47	33
6.	Training-cum-exposure visit of B.F.Sc students of college of Fisheries, Nagpur on 19 March 2026 at ICAR-CICFR, Bhimtal	30	11
7.	One Day training on “backyard trout farming in vibrant villages” was conducted on 26 March 2026 at Vibrant village of Dharchula Block, Uttarakhand	40	11
8.	Seven Days training “Applied Techniques in Coldwater Fisheries Research”, 3-9 April 2025 for M.Sc students of Babasaheb Bhimrao Ambedkar University, Lucknow	34	25
9.	Five days training for farmers on “Breeding and seed production of carp and value addition of fish and fishery products” during 22-26 May 2025 at EFF, Champawat	13	2
10.	Viksit Krishi Sankalp Abhiyan during 29 May to 12 June 2025 by CICFR, Bhimtal.	5946	2069
11.	Viksit Krishi Sankalp Abhiyan during 29 May to 12 June 2025 by CICFR, EFF, Champawat.	2572	1338
12.	Educational visit of M.Sc students from Dolphin (PG) Institute of Biomedical and Natural Sciences, Dehradun on 01 May 2025	23	16
13.	Educational visit of students of Woodbridge School, Bhimtal on 4 June 2025	35	18
14.	Educational visit of B.F. Sc students of College of Fisheries, GADVASU, Ludhiana on 13 June 2025	21	9
15.	Educational visit of M.Sc students of University of Burdwan on 20 June 2025	16	9
16.	Fish Farmers Day on 10 July 2025	46	13
17.	Educational Visit of trainee officers from Bihar Institute of Public Administration and Rural development, Gaya in collaboration with Uttarakhand Academy of Administration on 09 July 2025 at CICFR, Bhimtal	83	27
18.	PM-Kisan Program on 02 August 2025	82	24
19.	One day training-cum-input distribution programme on “Fish seed stocking and feed management in carp culture” under SCSP on 11 September 2025 at Bhimtal	20	2
20.	One day training-cum-input distribution programme on “Fish seed stocking and feed management in carp culture” under SCSP on 17 September 2025 at Bhimtal	14	2
21.	Three days training on "Seed Production and Hatchery Management of Golden Mahseer" 16-18 September 2025	29	10

22.	Foundation Day Program	122	30
23.	One day training and awareness program on “Disease management in composite carp farming” at ICAR-CICFR, Bhimtal on 11 October 2025	74	28
24.	The Pradhan Mantri Dhan Dhanya Krishi Yojana (PMDDKY) live telecast on 11 October 2025	279	37
25.	One day training cum input distribution programme at Chamoli district of Uttarakhand on 13 November 2025	30	7
26.	One day training cum input distribution programme at Rudraprayag district of Uttarakhand on 14 November 2025	20	2
27.	One Day training-cum-Exposure visit for students of College of Fisheries, Dr B.S Konkan Krishi Vidhyapeeth, Dapoli at CICFR, Bhimtal on 17 November 2025	50	26
28.	Five-days training programme on Recirculating Aquaculture Systems (RAS) for Intensive Fish Farming for Madhya Pradesh, Himachal Pradesh, and Kashmir at ICAR-CICFR, Bhimtal during 17-21 November 2025	21	2
29.	Field training on "Coldwater Fisheries" organised for M.F.Sc students of ICAR-CIFE, Mumbai during 17-21 November 2025 at Experimental Fish Farm, Champawat.	12	9
30.	Awareness Programme on Antimicrobial Resistance (AMR) at EFF, Champawat on 19 November 2025	37	25
31.	Awareness programme on Antimicrobial Resistance (AMR) in Fisheries & Aquaculture at Bhimtal on 19 November 2025	15	5
32.	PM-KISAN Live Telecast on 19 November 2025 at CICFR, Bhimtal at EFF, Champawat	206	61
33.	Awareness Programme and Quiz Competition on Antimicrobial Resistance (AMR) at Government Girls' Inter College (GGIC), Bhimtal, Nainital, Uttarakhand on 20 November 2025	85	85
34.	Awareness Programme on Antimicrobial Resistance (AMR) at CICFR, Bhimtal on 21 November 2025	18	2
35.	One Day training-cum-Exposure Visit for students of Karnataka Veterinary, Animal and Fisheries Sciences University, Manglore at CICFR, Bhimtal on 25 November 2025	49	19
36.	Two day awareness cum training programme on “Carp Culture Practices in mid-hills & Rainbow trout farming in high altitude” under SCSP at Pithoragarh District during 28-29 November 2025	40	5

37.	One Day training-cum-Exposure Visit for students of Department of Zoology, Sidho Kanho Birsha University, Purulia, West Bengal at CICFR, Bhimtal on 03 December 2025	28	13
38.	One day training on “Fish farming in hill region” at Almora for fish farmers on 11 December 2025	33	6
39.	One Day training-cum-Exposure Visit for students of College of fisheries, GADVASU, Ludhiana at CICFR, Bhimtal on 11 December 2025	22	10
40.	One Day training-cum-Exposure Visit for students of Department of Zoology, MB PG College, Haldwani at CICFR, Bhimtal on 12 December 2025	35	32
41.	Kisan Diwas on 23 December 2025 at CICFR, Bhimtal	151	55

20.3 Training and capacity building programme on 'Value addition of fish and fishery products'

Several training programmes on the preparation of value-added fish products were organized at the Experimental Fish Farm, Champawat, with the objective of enhancing livelihood opportunities and promoting fish-based entrepreneurship among rural women. These hands-on training sessions focused on imparting practical skills related to hygienic processing, preparation techniques, value addition, packaging, and utilization of fish for developing nutritious and marketable products. During the year, nearly 50 women participated in the training programmes and received practical exposure in the preparation of a variety of value-added fish products. The products demonstrated included fish cutlet, fish kabab, fish pickle, fish patty, grilled fish, fish kofta, fish cheese ball, fish finger, fish ball, fish momo, fish soup, and fish nuggets. The training programmes helped women farmers to improve knowledge and technical skills in fish processing and encouraged them to explore small scale income-generating activities based on fish value addition.

21. Personnel

Staff list as on 31.12.2025

21.1 Research Management		
Dr. Amit Pande		Director (Acting) & Head (Upland Fish Production)
21.2 Scientific Staff		
1.	Dr. Suresh Chandra	Head (Hill Environment & Resource Management) & Principal Scientist (Fish Pathology)
2.	Dr. R.S. Patiyl	Principal Scientist (Fish Genetics & Breeding)
3.	Dr. Shah Nawaz Ali	Principal Scientist (Aquaculture)
4.	Dr. Neetu Shahi	ICAR National Fellow
5.	Sh. Sumanta Kumar Mallik	Scientist (Selection Scale) (Aquaculture)
6.	Dr. Md. Shahbaz Akhtar	Senior Scientist (Fish & Fishery Science)
7.	Dr. Renu Jethi	Senior Scientist (Agriculture Extension)
8.	Dr. Dimpal Thakuria	Senior Scientist (Biochemistry-Animal science)
9.	Dr. Kh. Victoria Chanu	Senior Scientist (Biochemistry-Animal science)
10.	Dr. Ciji Alexander	Senior Scientist (Aquaculture)
11.	Dr. Biju Sam Kamalam J. (till 22.05.2025)	Senior Scientist (Fish Nutrition)
12.	Dr. Rajesh M	Senior Scientist (Fish Nutrition)
13.	Sh. Pankaj Kumar (From 13.01.2025 onwards)	Senior Scientist (Fish Nutrition)
14.	Dr. Kishor Kunal	Scientist (SS) (Fisheries Resource Management)
15.	Dr. Parvaiz Ahmad Ganie	Scientist (SS) (Fisheries Resource Management)
16.	Dr. Raja Aadil Hussain Bhat (till 17.07.2025)	Scientist (SS) (Fish Health)
17.	Smt. Garima	Scientist (Fisheries Resource Management)
18.	Ms. Ananya K	Scientist (Fish Genetics & Breeding)
21.3 Technical Staff		
1.	Sh. Amit Kumar Joshi	Chief Technical Officer
2.	Sh. Santosh Kumar	Assistant Chief Technical Officer
3.	Sh. Amit Kumar Saxena	Sr. Technical Officer
4.	Sh. Hansa Dutt (Retired on 30.09.2025)	Technical Officer
5.	Sh. T.M. Sharma (Retired on 30.11.2025)	Technical Officer
6.	Sh. R.K. Arya (Retired on 31.12.2025)	Technical Officer
7.	Sh. Manoj Kumar Yadav (till 29.08.2025)	Driver (Sr. Technical Assistant)
8.	Sh. Vivek Pandey	Technician
9.	Sh. Sunder Lal	Technician
10.	Sh. Bhola Dutt Mouni	Technician
21.4 Administrative Staff		
1.	Smt. Khilawati Rawat	Senior Administrative Officer
2.	Sh. D.C. Sati	Senior Finance & Accounts Officer
3.	Sh. Ankesh Kumar Sinha	Asstt. Admn. Officer
4.	Sh. P.C. Tewari	Asstt. Admn. Officer
5.	Smt. Susheela Tewari	Principal Private Secretary
6.	Sh. Pratap Singh Bisht	Assistant
7.	Smt. Munni Bhakt	Assistant
8.	Sh. Jaideep Gulia	Assistant



9.	Sh. Hansa Singh Bhandari	UDC
10.	Sh. Dharam Singh	LDC
21.5 Skilled Supporting Staff		
1.	Sh. Ravinder Kumar	Skilled Supporting Staff
2.	Sh. Pooran Chandra	Skilled Supporting Staff
3.	Sh. Manoj Kumar	Skilled Supporting Staff
4.	Sh. Kuldeep Kumar	Skilled Supporting Staff
5.	Smt. Basanti Devi	Skilled Supporting Staff

22. Staff News

22.1 Joining

- Dr. Pankaj Kumar joined as Senior Scientist (Fish Nutrition) on 13th January 2025 at EFF, Champawat.
- Dr. Ciji Alexander, Sr. Scientist (Fish Nutrition) joined as Senior Scientist (Aquaculture) at ICAR-CICFR, Bhimtal on 6th May 2025.
- Dr. Suresh Chandra, Principal Scientist joined as Head, Division of Hill Environment and Management at ICAR-CICFR, Bhimtal on 3rd June 2025.
- Dr. Neetu Shahi, Sr. Scientist has joined as ICAR-National fellow on 1st December 2025 at ICAR-CICFR, Bhimtal for the project titled “Development of a fast, easy and on-site CRISPR/CFPS based detector of major bacterial pathogens of rainbow trout” for the tenure of 5 years.

22.2 Superannuation

- Sh. Hansa Dutt Sanwal, Technical Officer, superannuated on 30.09.2025.
- Sh. T.M. Sharma, Technical Officer, superannuated on 30.11.2025.
- Sh. R.K. Arya, Technical Officer, superannuated on 31.12.2025.

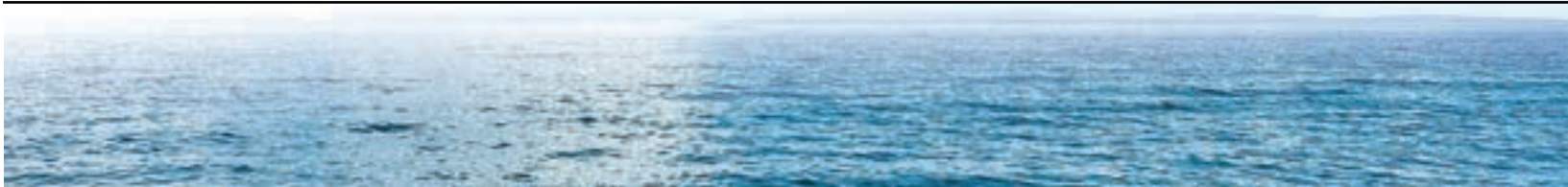
22.3 Transfer/Deputation/Resign

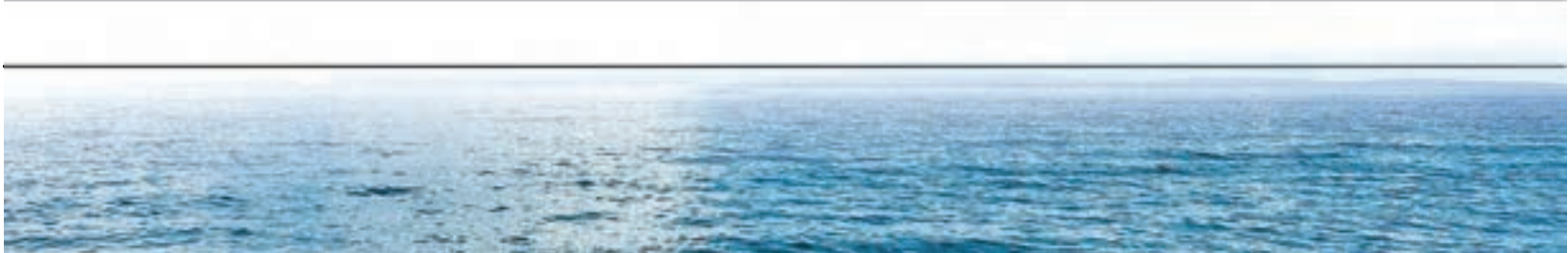
- Dr. Pramod Kumar Pandey, Director was relieved from ICAR-CICFR, Bhimtal on 1st April 2025 on deputation to join the post of Dean, College of Fisheries, Rani Lakshmi Bai Central Agricultural University, Jhansi, Uttar Pradesh.
- Dr. Biju Sam Kamalam J., Sr. Scientist (Fish Nutrition) relieved from ICAR-CICFR, Bhimtal on 22nd May 2025 to join the post of Senior scientist (Aquaculture) at ICAR-Central Marine Fisheries Research Institute, Vizhinjam, Kerala.
- Sh. Manoj Kumar Yadav, Senior Technical Assistant transferred to ICAR-National Bureau of Fish Genetic Resources, Lucknow, Uttar Pradesh on 29th August 2025.
- Dr. Raja Aadil Hussain Bhat, Scientist (SS) resigned on 17th July 2025.

20.4 Promotions

- Dr. Neetu Shahi was awarded ICAR National Fellow w.e.f. 01.12.2025.
- Sh. D.C. Sati was promoted to Senior Finance & Accounts Officer w.e.f. 01.01.2025.
- Sh. Amit Kumar Joshi was promoted to Chief Technical Officer w.e.f. 13.11.2025.



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This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



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